EXECUTIVE SUMMARY

1 INTRODUCTION

Indian Academy of Highway Engineers (IAHE), a premier organization under the aegis of Ministry of Road Transport & Highways (MORTH) has undertaken formulation of Detailed Project Reports (DPR under Phase I in the states of Maharashtra, Karnataka, Gujarat, Chhattisgarh and Rajasthan. In the state of Maharashtra, Nagpur –Sakoli- Gadchiroli – Chamorshi – Ashti – Nagepalli - Sironcha forms an important highway for movement of goods from Nagpur southwards as also is the main artery serving the relatively underdeveloped areas of Gadchiroli district of Maharashtra. This highway recently upgraded as NH 353 C, from Sakoli to Sironcha, is an amalgamation of erstwhile State Highway (SH) 11 and State Highway (SH) 9. The project length of 204.5 km which runs entirely in Gadchiroli district is currently of the specification of a Major State Highway (MSH). It is anticipated that in view of a major bridge under construction on Godavari River near Sironcha , likely to be completed by the year 2016, movement of goods and associated vehicular traffic from Vidharba, Raipur to Telangana and southern Chattisgarh will be greatly facilitated. As such the vehicular traffic along this highway now declared as national highway is likely to increase in many folds. Currently the existing highway is a SH specification and the proposal is to upgrade this to NH specifications. The existing road till recently was an MDR and converted into MSH and the alignment passes through low lying areas of river Wainganga as also large tracts of Reserved Forest. A number of major bridges exist on the highway, which were constructed in late eighties. There is substantial scope for Up-gradation in the status of bridges as also the alignment for an all-weather road.

2 PROJECT DESCRIPTION

The project alignment commences from Gadchiroli and terminates at Sironcha over a length of 204.5km. Presently, state highway kilometer markings are at the site and the project corridor appears to start at km 172+650 as per kilometer markings (MSH 11). MSH 11 Chainage has been compared with the NH 353 C Chainage and Chainage at the

starting point, i.e. proposed Chainage of NH 353 C for the present project is km 113+650 at Indira Square Junction in Gadchiroli.

The road traverses through Gadchiroli district of Maharashtra via Gadchiroli, Chamorshi, Ashti and Allepalli and reaches end point at Sironcha at Chainage km 318+200.

Existing ROW of the Project Road varies from 16 m to 22 m (in urban area) and in other area it varies from 30 to 60 m on an average. Improved road connectivity is vital for economic growth of a region in particular and nation in general. They help in transporting men and material effectively to the destinations in time. Thus it provides larger market for the product and produce giving remunerative returns to the producers.

PROPOSED IMPROVEMENTS

The existing project highway is presently a 2-Lane undivided carriage. The project proposes to:

- Developing the carriageway with paved shoulders and strengthening the existing Carriage way by overlays / rehabilitation / reconstruction.
- In addition to strengthening the existing carriageway, 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.
- The project highway passes through many settlements.
- To minimize the adverse impacts on the various settlements and to minimize land acquisition, short realignments to reduce adverse impacts. The proposed works shall be limited to a proposed ROW of 30/60m. It is also proposed to have concentric widening to the extent possible to remove discrimination and local conflicts.
- Service roads are also proposed to be provided at a number of locations. These locations were proposed based on the proximity to cultural properties, educational and health units, and size of Settlements.
- Proper drainage, grade-separation, road furniture, utilities and amenities wherever required shall also be provided.

3 ANALYSIS OF ALTERNATIVES

Three alternative options have been studied and the best alternative based on length of bypass, direction of the bypass (Left/Right), land acquisition, Rehabilitation/Resettlement, prevention of cultural properties, water and air quality, Proximity to built-up area leading to ribbon development etc. has been recommended for Chamorshi, Allapalli and Sironcha.

4 BASELINE ENVIRONMENTAL PROFILE

4.1 Physical Environment

Meteorology

The study of Meteorological and micro meteorological parameters is significant in a road project as these parameters regulate transport and diffusion of pollutants released into the atmosphere. Field monitoring done from the month of October 2015 reveals that a predominant wind direction is from the West &WSW. Minimum temperature recorded was 22 ^{o}C and maximum 41 ^{o}C, mean relative humidity recorded was 61.69%.

Base line environment study has been carried out as per the guidelines for various parameters such as water, soil, noise and air, which reveals all the samples are within the limits.

SUMMARY OF BASELINE ENVIRONMENT

Air Environment:

- At Potegaon Road of Gadchiroli (AAQ1) showed maximum concentration of **PM_{10},$PM_{2.5}$ and NO_x(61.03 μg/m^3, 20.12 μg/m^3& 22.3 μg/m^3** and 13.93μg/m^3 respectively) among the 10 monitored locations.
- The sampling location Ashti (AAQ4) showed maximum concentration of **SO_2 and CO (11.54 µg /m^3 & 0.241 mg /m^3)** among the 10 monitored locations.

From the above Result it is evident that all values monitored are found well below the National Ambient Air Quality standards.

Water Environment

Ground Water Quality

- It is evident from the results presented in table that the parameters are within the acceptable limits of natural water except
- Total hardness at GW3 : 388.08mg/l
- Total Alkalinity at GW3 : 499.1 mg/l
- Total Coliform at all the samling location is found to be <2 MPN/100ml.

Surface Water Quality

From the primary data it can be observed that the water quality falls in category 'B' of the Use based classification of surface waters as specified by CPCB.

Noise environment

The day & night time noise covering Silence, Residential and Commercial zones of the 10 sampling locations identified.

It is observed that Chaudampally falls under the WLS and considered as silence Zone. The Day time monitoring values are slightly beyond the CPCB standard at 56.2 dB(A)in L_{eq}.

The noise levels at all stations during night time were found to be within the CPCB Standards where as the Day time noise levels are beyond the prescribed standards which can be attributed to the day time activities in surrounding villages including traffic

Land Environment

- The soils collected in the study area are varying such as sandy loam & silt loam.
- There are no trace metals present except heavy metals such as Iron, Copper & Manganese

4.2 Biological environment

Forest Resources

The alignment passes through Chaprala wild life sanctuary and partly under Pranahita WLS.

The project road passes through forest areas in most of the stretches passing through 3 divisions Gadchiroli, Allapalli & Sironcha . The land adjacent to the road predominantly falls under forest area and partially agricultural. The total forest area requirement is 97.88 ha.

Trees within ROW

Tree survey has been carried out along the proposed alignment. A total of 30226 trees are estimated to be in the ROW.

Avenue plantation shall be done as per IRC SP 21:2009.

Fauna

Monkey, cattle and some domestic Animals dominate along the project road.

Since the project corridor passes through WLS the details of the faunal species in the region is described below:

Chaprala Wildlife Sanctuary is located near Chandrapur and is home to a variety of wild animals like the barking deer, blue bull, peacock and flying squirrel among other animals.

It also houses endangered species such as the leopard, jungle fowl, wild boar and sloth bear.

There are 131 species of avi-fauna recorded in this protected area of which as many as three bird species are of endangered status and two species of endangered reptiles -the Indian python and common Indian monitor are found.

Pranahita Wildlife Sanctuary is a home for the endangered Black Buck, Chinkara, Wolf.

Fauna commonly found in this sanctuary are Tiger, Panther, Sloth Bear, Cheetal, Black Buck, Nilgai, Chinkara, a variety of aquatic Birds & Reptiles.

But no critically endangered species have been found in the study area Critically Endangered Animal Species of India March 2011 edition.

Flora

As the road traverses through forest area the type of forest and its importance is stated below:

Southern Tropical Moist Deciduous Forests : These consist of two main sub types, namely, Moist Teak bearing Forests and Moist Mixed deciduous Forests. These are commercially important and valuable forests of the State and are mainly confined to the Project Tiger area in the Gadhchiroli district, consisting of species such as Tectona grandis (Teak); the associates are Terminalia tomentosa (Ain), Delbergia latifolia (Shisham), Adina cardifolia (Haldu), Madhuca indica (Moha), Pterocarpusmarsupium (Bija), Mitragyna parviflora (Kalam), Salmalia malabaricum (Semal) and Dendrocalamus strictus (Bamboo) etc.

Teak is present occasionally and the evergreen component of species is larger than in case of teak bearing forests.

The main species are Pterocarpus marsupium (Bija), Salmalia malabaricum (Semal), Terminalaia bellarica (Behada), Dalbergia latifolia (Shishum), Syzigium cumini (Jambul), Terminalia tomentosa (Ain), Lagerstremia parviflora (Bendara) etc.

This region is inhabited mainly by the Gond-Madia tribes who, even today, lead a primitive way of life and mainly depend on the forest for their day-to-day needs such as wood, timber, grass, etc.

FLORA for the part of the alignment falling under Pranahita WLS is Dry deciduous and riverine Forests with Teak, Bamboo, Terminalias, Anogeisus etc.

4.3 Social Environment

Settlement

There exist settlements varying in size and populations along the project corridor.

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.

Public Consultation

Public 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 during public consultation were road safety problems. The issues raised by the public have been duly incorporated in project design.

5 ANALYSIS OF POTENTIAL ENVIRONMENT IMPACT & MITIGATION MEASURES

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 endeavor 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.

5.1 Climate

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

5.2 Land

Road construction activities involve marginal alterations in the local physiography and drainage patterns. No significant soil erosion is envisaged as terrain of project road is plain and gentle rolling, however embankment protection through stone pitching and revitting/turfing is proposed. Avenue plantation is envisaged all along the project road.

5.3 Air Quality

There will be rise in particulate matter levels during the construction activities, which shall again be within prescribed limit after the construction activities are over. During construction materials will be transported in tarpaulin covered vehicles only. Water sprinkling shall be done on haul roads and near crusher plant. PUC certified vehicles only allowed for transportation of construction materials.

5.4 Noise Quality

The impact of noise levels from the proposed project on the neighboring communities are anticipated during construction. High noise generating operation during night i.e., 10:00 PM to 06:00 AM shall be restricted. Personal Protective Equipment shall be provided to all construction labours. Regular preventive maintenance of the construction equipment and vehicles will be ensured. It has been concluded that both day and night times equivalent noise levels are within the permissible limits right from start of project life.

5.5 Water 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 like oil, grease and fuel in the equipment yards and asphalt plants. This will be more prominent in case of locations where the project road crosses rivers, canals etc. Oil traps have been suggested for control of contamination of water bodies by such spills. Septic tanks followed by soak pits are proposed at temporary camps.

5.6 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.

5.7 Impact on Human Use Values

The PAPs shall be compensated as per the NHAI Act, 1951 as amended. Accidents are bound to increase coupled with ribbon development. There shall also be some impacts on cultural or religious properties along the corridor. Service roads are proposed where habitations are involved in order to segregate local traffic from through traffic. Bypasses are proposed at densely populated built-up areas to avoid accidents, which will also reduce ribbon development.

6 ENVIRONMENT MONITORING PROGRAMME

The concessionaire shall ensure Air, water, noise and soil quality monitoring at regular intervals during the construction and operation periods under the supervision of IAHE. Reports of the monitoring shall be submitted to the statutory authorities as compliance periodically.

7 ADDITIONAL STUDIES

Public consultations were carried out as an integral part of the project preparation to ensure the community supports the project since it serves them. A continuous involvement of the stakeholders and the affected community was obtained. The feedback in the consultation sessions has led to substantial inputs for the project preparation – including, influencing designs.

Major findings related to key issues such as general perception about the project; suggestions to mitigate hardships resulting from dislocation and loss of livelihood are presented below:

- It was observed that people are not only aware of the project but also welcomed the project in general.
- The PAPs in general and the legal title holders of land acquisition in particular were very much concerned about the mode of compensation.
- People want that their views should be taken into account in every matter where it counts or new road option such as, selection of rehabilitation sites and overpasses/underpasses etc.
- They requested for facilities and amenities like underpasses, bus stand and safer accessibility at points of habitant's area.
- People requested about creation of employment opportunities during road construction and later phases of the project.

Accordingly the requests of PAPs were considered, wherever possible, and were conceived.

In accordance with the EIA Notification Dated14th September,2006 Public Hearing has to be conducted for "for "Rehabilitation and upgrading of the existing road to 2/4 lane with Paved shoulders configuration with capacity augmentation provision of Gadichiroli - Sironcha section of NH-353C in the State of Maharashtra". - By Maharashtra State Pollution Control Board (MSPCB) for Gadchiroli District.

8 PROJECT BENEFITS

The main objective of the proposed project is to minimize negative impacts and to maximize the benefits to the local populace in particular and region & nation in general. Further, it will help in economic growth, social equity and environmental sustainability, which is the national objective. The benefits of project are:

- Local people will get fulltime and part time jobs;
- Land value will increase along the project road.
- All villages along the road side will be benefitted by the means of economical growth.
- Amenities will be developed along the project road which can be beneficial to the

local people

- Transportation facilities will be developed
- Easy access to the entire zone for marketing Agricultural and other products
- Project road development will be boosting the development of the region as well as the nation.
- Smooth moving of traffic will be reducing the fuel consumption as well as wear and tear of vehicles, which will indirectly save the Environment and Economy of the nation.

9 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 IAHE and the Concessionaire.

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 IAHE. All construction activities being taken up by the Concessionaire and shall be scrutinized by IAHE.

The implementation of RAP shall be as per the details given in the RAP report. In the pre-construction phase of the project the consultant as appointed by IAHE 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 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 Concessionaire, IAHE 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 Independent Consultant and the Environmental Officer of the IAHE. His prime responsibility shall be to appraise the Environmental Specialist about the ground conditions. He shall also procure the requisite clearances and the NOCs for the project and

shall also strictly supervise that the Concessionaire adheres to the EMP. The officer shall also participate in training programmes and assist IAHE in preparing documentation for good practices in environmental protection.

The reporting system will operate linearly – Concessionaire who is at the lowest rung of the implementation system reporting to the Consultant, who in turn shall report to IAHE. All reporting by the contractor shall be on a quarterly basis, while the reporting time of the Concessionaire shall be decided upon by the IAHE. The IAHE Site Office will be responsible for setting the targets for the various activities anticipated during construction phase and obtaining agreement from the Concessionaire after mobilization but before beginning of works on site. The Concessionaire will report from then on regarding the status on each of these. The IAHE Site Office will monitor the activities through its own staff or the consultant's Environmental Specialist after it has obtained the Concessionaire 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 IAHE Site Office. For EMP implementation a budgetary provision of **Rs. 31.95** crores is envisaged.

10 CONCLUSIONS:

In view of a major bridge under construction on Godavari River near Sironcha , which is likely to be completed by the year 2016, movement of goods and associated vehicular traffic from Vidharba, Raipur to Telangana and southern Chattisgarh will be greatly facilitated by Up-gradation and increase in traffic many folds.

Based on the preliminary EIA study and surveys conducted for the Project, it can be safely concluded that associated 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, with EMP in place the project shall bring considerable improvement to possible exposure levels.