

0. EXECUTIVE SUMMARY

0.1 PROJECT BACKGROUND

National Highways Authority of India (NHAI) has been entrusted to implement the development of stretches of NH under DPR/KAR/phase – IV B/2010 on BOT Mode / EPC mode. NHAI has decided for carrying out feasibility study and detailed project preparation for 2-lane with paved shoulders (with provision of capacity augmentation) / 4 lane standard as per the traffic volume. NHAI has appointed M/s. Feedback Infra Pvt. Ltd. for providing the required consultancy services for the project in the state of Karnataka.

0.2 NEED OF THE PROJECT

The demand for the project has emerged primarily from the demand in the increase of existing traffic numbers plying on the road. However there are other conditions which have led to the demand of the project. These are

- The project road is section of NH 209 connects the urban and semi urban regions outside Bangalore.
- NH 209 provides an alternate route to NH 7 and NH 47 from Bangalore to Coimbatore, with a saving of upto 50 km.
- Also, due to poor geometrics and inferior riding quality of the road considerable traffic is known to take diversion along SH 17 and join project road either in Kanakpura or in Malavalli, who head to the mentioned locations or further ahead, especially from southern and eastern regions of Bangalore and vice-versa. Similarly, traffic towards Mysore from these parts of Bangalore is presently adopting SH 17 as that being a superior facility. But SH-17 at present is congested due to heavy traffic. Hence improvement of NH209 would takeoff considerable traffic from SH-17 and forms an alternative route.

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 lanes standards is needed.

0.3 PROJECT ROAD

NH-209 starts in the state of Tamil Nadu near Dindigal and ends at Bangalore in Karnataka. The Project Road is 2 lanes with earthen shoulder from Km 306.600 (proposed Km 307.810) near Chamarajanagar to Km 438.475 (proposed Km 435.250) Harohalli section of NH 209 in the State of Karnataka. Total existing length of the project road is 131.875 Km & the proposed length is 127.440 Km Since the project road is an existing road, the decision to upgrade the road to 2 lane/4 lane with paved Shoulder.

0.4 PROJECT INFLUENCE AREA

The project is located in the districts of Chamarajanagar, Mandya & Ramanagara in Karnataka. The project districts are bounded by Kerala in the South & South-West, Tamilnadu in the South and South-East, Bangalore & Tumkur District in the North, Mysore and Hasan District in the West. The existing Right of Way (RoW) in general varies between 12-30m. The proposed RoW is 30m all throughout for 2 Lane undivided Carriageway with paved shoulder sections and 45m for bypasses & 4 Lane Divided Carriageway sections. 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 (NHAI), Government of India.

0.6 PROPOSED IMPROVEMENTS

The existing project highway is presently 2 lanes undivided carriage way. To cater to the future traffic, the project proposes to:

- Develop 2 Lanes Undivided/ 4 lanes divided carriageway with paved shoulders and strengthening the existing carriageway 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 at appreciate locations
- To minimise the adverse impacts on the various settlements and to minimise land acquisition 4 bypass, 9 major realignment and 16 minor realignment/curve improvement has been proposed
- The proposed works shall be limited to a proposed ROW of 30 m 2 Lanes undivided carriageway with paved shoulder sections and 45m for 4 lanes divided carriageway with paved shoulder sections. It is also proposed to have concentric widening to the extent possible to remove discrimination and local conflicts
- No Cattle/ pedestrian/ vehicular underpasses have been proposed.
- 1 Toll plaza at Km 363.000 (existing) has been proposed
- 1 Truck Lay byes at Km381.590has been proposed
- 52 Nos. of Bus-bays with bus shelter and 2Nos. of bus shelters are proposed at various locations
- Proper drainage, grade-separation, 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 the approved ToR & guidelines given by the Ministry of Environment & Forests, Govt. of India. The EIA has been included in project preparation to streamline environmental issues in project design.

The study methodology for the EIA employs a simplistic approach in which the important environmental issues have been identified during the Environmental Screening phase. Based on the identification baseline data was generated and then analysed to predict the impacts and quantify them.

The detailed highway designs of project road have been closely coordinated with the preparation of report. The EIA preparation led to the identification of potential environmental impacts. 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:

- Forest Clearance and Tree felling permission from Divisional Forest Officer / District Administration
- Prior Environmental Clearance from 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 25m

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 Karnataka 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 ground 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 project area lies in South Interior Karnataka Climatic Zone of the state Karnataka. The climate is characterized by a hot summer and is generally dry except during monsoon. The climate is distinguished by four seasons i.e. 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). The annual temperature in the project region ranges between 12° to 46°C. May is the hottest month with a mean max of 40°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. The humidity of the project area is lowest during the dry season and highest during the monsoon period.

Geology

Karnataka is constituted of rock formations ranging in age from 3300 m.y. to 5 m.y. Barring a narrow coastal strip of about 5000 sq.km of Tertiary and Quaternary sediments and another 31,250 sq.km of Deccan basalts, the remaining area is dominated by Archaean-Proterozoic rocks. Mysore Plateau, geologically constituted of Dharwar Craton comprises of greenstone-granite belts, gneisses and granulites. Greenstone belts essentially consist of meta-volcanosedimentary sequences, surrounded and dissected by Peninsular Gneiss. At the southern end of the craton these give way to granulite suite of rocks. The craton preserves a billion year orogenic history from 3400 m.a. to 2400 m.a. Epicratonic or intracratonic sedimentary basins called Purana Basins occupy the northern segment of the craton whose northern part in turn is concealed by Deccan basalts. Thus younging of lithosequence from south to north is evident.

Soil^[s1]

The soils of the project districts varies from Medium black soils to Red loamy soils, Red sandy loam soils, Red gravelly soils, Red sandy soils. The soils of the district Chamarajanagar are derived from Granitic gneisses and Charnockite rocks. Red soil is present in upland areas and also noticed at the contact of granites and schist. In Mandya District, The soils range from red sandy loams to red clay loam very thin in ridges and higher elevations and comparatively thick in valley portions. A major part of the district Ramanagara is occupied by red sandy soil (60%), and the remaining by red loamy soil. Red sandy soil mainly occurs in Channapatna, Kanakapura and Ramanagara taluks in undulating land slopes.

Ambient Air Quality

The air quality in the project area is less polluted. The concentrations of all pollutants are well within the prescribed limits of the National Ambient Air Quality Standards. The maximum concentration of PM10 is 72.665 µg/m³ at Jakkasandra while the minimum concentration is 65.79µg/m³ at Mangala. For PM2.5 the maximum reading was found 44.55µg/m³ at Uttamballi (Near Bus Stop), while the lowest recorded value of PM2.5 was 40.26µg/m³ Between Halaguru & Honnaganahalli

Noise Quality

The noise monitoring shows that noise levels are marginally higher than the noise standards in 4 locations during day & 6 locations at night. This may be due to mix activities as well as vehicular movement on the road. Noise, though is a major area of concern, at locations of sensitive receptors (educational establishments like schools and colleges, health units etc.) identified quite close to the road.

Water Hydrology and Drainage

According to CGWB based on the stage of ground water development in District Chamarajanagar 100% area in Yalandur taluk falls in safe category. in Chamarajanagar and Kollegal taluk 76% and 40% area fall in safe category respectively. In Mandya District, the stage of development for the whole district was computed as 37.93 %. About 27.14 % area of the district is over exploited, 11.43% area of the district is critical and 62 % of the area is safe. In District Ramanagar, about 45% area of the district is overexploited, 42.5% semi critical and only 12.5% of the area is safe. Surface Water includes drainage channels (rivers, streams, and canals) and stagnant water bodies (lakes, ponds, tanks and other impounded water bodies). A highway project can significantly alter the hydrological setting of the project area by acting as an impediment to the natural drainage system of the region. Seven representative surface water and ground water monitoring stations were selected based on their importance as source of irrigation and water supply, size, future impacts and quantum of water available. By and large, the water quality is satisfactory and the major physical and chemical parameters are within limits set by the Bureau of Indian Standards² for drinking water.

0.9.2 Biological Environment

Forest Resources

The alignment of the proposed project road passes through forest areas in 2 locations where requirement for forest land diversion is involved. These forest areas are falling under the jurisdiction of Mandya and Ramanagara Forest Division, Karnataka Forest Dept. No eco-sensitive area covered under Wild Life (Conservation) Act, 1972 (like National Park, Wild life Sanctuary, Biosphere Reserve etc.) is coming within 10Km aerial distance of the project road section.

Trees within ROW

A total of 2431 out of 3000 trees within the proposed ROW are likely to be affected. The predominant tree species are *Eucalyptus* sp., *Prosopis juliflora*, Neem (*Azadirchta indica*) and *Acacia nilotica*. The other species located within the project corridor are peepal and sissou besides other miscellaneous species.

Fauna

Domesticated animals like cattle, goats and sheep mainly constitute the faunal population within the project area. All these animals and birds as per IUCN's conservation status fall in Least Concern category.

0.9.3 Social Environment

Census Profile

The project highway passes through the district of Chamarajanagar, Mandya and Ramanagara in Karnataka. As per the 2011 census, Karnataka has a total population of 6,11,30,704 and the total male and female population in the state is 3,10,57,742 and 3,00,72,962 respectively. The population density per sq km is 319. The literacy rate of the state is 75.60 while the sex ratio is 968. The sex ratio

of the project district is more than the state level while the literacy rate is below the state level. Population density of Chamarajnagar and Ramanagara is less than state level while the same is more in Mandya.

The detailed socio-economic analysis of people, structures and property likely to be impacted by the proposed project has been presented in the Report on Resettlement Action Plan.

Workforce in Project area

The people in the village are mostly engaged in the agricultural work and economy is largely based on agriculture. Many people are also working as a labourer in nearby area.

Linguistic Distribution

Kannada is the major language spoken by the majority of the people in the project corridor.

Settlement

There are a total of 44 settlements varying in size and populations along the project corridor.

Educational Institutes

Some of the educational institutions are located on the edge of the road and is a serious concern from the point of safety. Signage and Safety measures need to be built in the proposed road design at these locations.

Places of Historical Importance / Cultural Heritage

There are no Historical Importance / Cultural Heritage structures on the project road.

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.

Agriculture Pattern

The major occupation of the project districts is agriculture. Major crops are rice and ground nut. Also coconut, sugarcane, sunflower, cotton and mango plantations are there in few areas.

Highway Amenities

There are number of amenities and utility services located along the highway like Dhaba, hospitals, 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.

Truck Parking Lay-bys & Rest Areas

Truck parking lay-bys are proposed for 1 location at Km 376+550 and 54 Bus Bays/ Shelter has been proposed

Land Use / Acquisition of the Proposed Corridor

A total of 242.62 hectares of land including forest, private and government will be acquired for the construction of bypass, junction improvement and widening etc.

0.10 PUBLIC INTERACTIONS & CONSULTATION

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. The issues raised by the public have been 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 levels during the construction activities, which shall again be within prescribed limit after the construction activities are over. CO level shall remain within prescribed standards.

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. A total of 250 trees are proposed as compensatory afforestation besides transplantation of 6000 trees & planting of 12000 trees for avenue / block plantation. As the space for compensatory afforestation might not be adequate along the project road, this plantation shall be taken up by the forest department, after payment of the cost for raising and maintaining the saplings for three years. 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 duly monitored by the Independent Engineer who shall report to the Project Proponent. Presently the Project Proponent 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.

The environmental specialist of the engineer shall be Postgraduate in Environmental Science or Environmental Management or Zoology or Botany or Ecology or Environmental Planning / degree in civil engineering and specialisation in environment and 15 years of experience and a minimum of 5 years in Supervision of implementation of Environmental Management Plan of highway projects.

For effective implementation and management of the EMP, The BOT / Annuity Concessionaire shall contrive to establish a Safety, Health and Environment (SHE) Cell headed by an Environment Officer to deal with the environmental & safety 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 IC and the Environmental Officer of the contractor. His prime responsibility shall be to apprise the Environmental Specialist of the IC 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 IC in preparing documentation for good practices in environmental protection.

This Environmental Officer 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 project proponent. 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 project proponent 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 project proponent's 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 project proponent's 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 during construction & operations is INR 24.43 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.