0. EXECUTIVE SUMMARY

0.1 PROJECT BACKGROUND

The National Highways Authority of India under the Ministry of Road Transport & Highways (MoRT&H), Government of India, has decided to Widen, improvement & up gradation of exiting 2 lane carriageway to 4 Lanes from proposed Km 184.912 to Proposed Km 318.772 of Hassan to Bantawal Section of NH-48 (new NH-75) in the State of Karnataka.

0.2 NEED OF THE PROJECT

The existing project road section of NH-48 Project road passes through 27 Km of settlement areas and 41 Km of Hill section where landslides are frequent. This results in congestion and delay to both through as well as local traffic. To alleviate the traffic congestion and delay problems bypasses to Palya, Balupet and Sakleshpur have been proposed besides widening to 4 lanes. The details of the needs and benefits from the project are as follows:

- The project road shall be provide good connectivity to Bangalore and Mangalore via Hassan
- This increased road capacity and improved pavements shall reduce travel time, lower the cost of vehicle use, increase access to market, jobs, education and health services and reduce transport costs for both freight and passengers.
- The project is seen as a major generator of economic momentum, and shall benefit in a very significant way through better access and connectivity to big cities.
- The project in conjunction with other state policies and initiative is expected to assist to industrial development bottlenecks, reduce transportation cost, and thereby benefit all sections of the society.
- The foremost benefit for the local communities would be the increased levels of road safety.
- The existing NH-48 stretch is known to have high rates of accidents. The provision of bypass will reduce the accidents and traffic congestions.

0.3 PROJECT ROAD

The existing project road of Hassan to BC section of NH–48 starts at Km189.700 and ends at Km 328.00 for a total length of 138.300 Km. The proposed road starts at Km 184.912 and ends at Km 318.772 for a total length of 133.860 Km.

0.4 PROJECT INFLUENCE AREA

The project districts are Hassan and Dakhsin Kannada in Karnataka state. The project districts are bounded by Udupi, Chikkamagalooru and Chitradurga in the north, Arabian Sea in the west, Kodagu, Mysooru and Kerala State in the south and Mandya and Tumkooru in the east. The ROW varies between 10 m to 30 m in plain and rolling terrains (Km 189.700 to Km 226.000) and 10 m to 12 m 10-12 in ghat section (Km 261.000 to Km 328.000). The proposed RoW is 45 m throughout in Plain and rolling Sections & 30 m in Hill Forest Section and while the Corridor of Impact (CoI) is 60 m & 45 m respectively. The PRoW for Toll Plaza varies from 90 m-130 m. 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 / intermediate undivided carriage way. To cater to the future traffic, the project proposes to:

- Develop 4 lanes carriageway 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, 3 bypass and 1 major realignment has been proposed
- The proposed works shall be limited to a proposed ROW of 45 m in all throughout except for hilly & forest areas where it shall be 30 m; for bypasses the PRoW is 45m except Sakleshpura Bypass where 60m RoW has been proposed & in toll plazas where the PROW varies between 90m-130m
- To facilitate the movement of the local traffic intermediate lane service roads of 5.5 m carriageway on both sides have been proposed at urban or semi urban locations at 13 locations for a total length of 14400 m(single side's length)
- 3 vehicular underpasses, 3 pedestrian underpasses, 1 foot over bridge, 4 elephant underpass, 1 ROB & 3 flyovers have been proposed to ease access of local traffic and population. The exact locations shall be in consultations with the NHAI authorities
- 4 elephant underpass have been proposed as advised by Forest Department
- 2 Toll plazas at Km 193.020& km 314.075 are proposed
- Truck Parking facilities are proposed to be provided at Km 202.530 and Km 298.830 on both sides of the road.
- 22 bus bays and 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:

- Tree felling permission from Divisional Forest Officer / District Administration
- Forest clearance for the diversion of forest land
- Prior Environmental Clearance from MoEF as per Environmental Impact Assessment Notification dated 14th September 2006 and its subsequent amendments as length of the project road section is more than 100 km involving additional ROW of more than 40m on

existing alignment

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 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 climate of Karnataka is subtropical, with 4 main seasons i.e., winter, summer, southwest monsoon and post-monsoon. Maximum daily temperatures in winter reach 30°C, while in the summer months temperatures rise about 40 °C. Annual precipitation ranges from roughly 20 inches (500 mm) in the more arid portions of the eastern plain to nearly 160 inches (4,000 mm) in the wettest parts of the coastal plain. The project district Dakshin Kannada itself is a coastal district and receives heavy rainfall. Most of the state's annual precipitation falls between June and September; much of the remainder is brought by a less-significant northeast monsoon that blows during the post-monsoon season. The winter months are particularly dry.

Geology

Geomorphologically Dakshina Kannada District can be divided broadly into three well-defined physiographic units viz.

- Coastal plain: a narrow, thickly populated and intensely cultivated area adjoining the coast
- The Upland pediplain area interspersed with low hills between the Western Ghats and the coast, which is moderately cultivated with a considerable extent of fallow land, which can be put to agricultural use
- The Eastern hilly area in the eastern part of the district is hilly with thick forest cover, which forms part of the Western Ghats. The hills of the area range in elevation from 1200 to 1500m a.m.s.l. and are capped with laterite, which form plateau usually of oval or elongated configuration

The district Hassan is also divided into three distinct geomorphic unit i.e.

- The Western and north-eastern hilly terrains constituting part of the Western Ghats
- The Central transition zone and
- The Eastern Maidan (plain) region

Ambient Air Quality

The air quality in the project area is generally clean. The Ambient air qualities were monitored at 9 locations and it is found that all the pollutant parameters are well within the prescribed limit of National

Ambient Air Quality Standards. The maximum concentration of PM_{10} is 67.87$\mu g/m^3$ at Ballupet, while the minimum concentration is 48.75 $\mu g/m^3$ at Gundia Forest Area. For $PM_{2.5}$ the maximum readings was found 21.35 $\mu g/m^3$ at Nelyadi, while the lowest value of $PM_{2.5}$ was recorded to be 15.3 $\mu g/m^3$ at Kalladka. The concentrations of SO_2, NO_2 & CO are also well within the stipulated standards at all the places.

Noise Quality

Ambient noise quality was monitored at 9 locations along the project stretch. The noise monitoring study shows that noise levels are well less than the noise standards in all of the locations during day & at night. 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

Weathered and fractured gneiss is the predominant aquifer found in the project districts followed by schistose and granitic aquifers, which occur as isolated patches in a few taluks. As per CGWB, part of 2 project blocks in each Project District fall under overexploited category. Those are 50% of Hassan Block in Hassan district & 40% of Bantawal in Dakshin Kannada. Whereas, part of Belthangadi (10%) and Puttur (10%) Block fall under semi critical category. Water table as per CGWB is 1.39 - 8.32 mbgl (post monsoon in Hassan district) & 0.75 - 8.65 mbgl (post monsoon in Dakshin Kannada district). The major rivers of the project area are Nethravathi, Kumaradhara, Hemavathi, Yagachi etc.

0.9.2 Biological Environment

Biodiversity Hot Spot

A biodiversity hotspot is a biogeographic region in the world with a significant reservoir of biodiversity that is under threat from humans. It is a method to identify those regions of the world where attention is needed to address biodiversity loss and to guide investments in conservation.

Around the world, 25 areas are identified so far with another nine possible candidates. These sites support nearly 60% of the world's plant, bird, mammal, reptile, and amphibian species, with a very high share of endemic species. India has two such major biodiversity hotspots and they belong to the Eastern Himalayas and the Western Ghats, through which the project road section passes.

Forest Resources

The alignment of the proposed project road passes through the jurisdiction of 2 forest divisions i.e. Hassan (Hassan District) and Mangalore (Dakshin Kannada District). To accommodate the proposed project an extent of 70.618 ha forest land is required to be diverted. Out of that 27.194 ha falls in Hassan district and 43.424 ha in Dakshin Kannada district.

National Park, Sanctuary, Biosphere Reserve

The project road section doesn't fall within 10 Km radius of any National Park, Wild life Sanctuary, or Biosphere reserve. No notified animal corridor/migration route is present along the road as per secondary information obtained from Wildlife Trust of India.

Trees within ROW

Tree enumeration was carried out by the Forest Department, Karnataka and 8996 & 15361 trees shall be affected in Mangalore & Hassan Forest Divisions respectively. Other than these, a total of 54921 small shrubs, young trees less than 16 cm girth, canes and Bamboo clumps are also likely to be affected.

Flora & Fauna

These forests of the project area include unique flora and fauna with rich biological diversity and genetic resources, apart from many medicinal herbs and shrubs.

Some of the unique fauna are 91 species of birds are found in the region, out of that, 14 species of birds are found to be endemic to western Ghats itself.

0.9.3 Social Environment

Census Profile

The project highway passes through the district of Hassan and Dakshin Kannada in Karnataka. As per the 2011 census, Karnataka has a total population of 61130704 and the total male and female population in the state is 31057742 and 3,00,72,962 respectively. The literacy rate of the state is 75.60 while the sex ratio is 965. The sex ratio and literacy rate of the project districts are more than the state level.

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

Cropping Pattern and Crop Productivity

The main crops of project districts are Paddy, Coffee, Coconut, Arecanut, Black Pepper, Potato, Ragi, Sugercane and Cocoa. Rice is generally cultivated three seasons in a year, Karthika or Yenel (May–October), Suggi (October to January) and Kolake (January to April).

Linguistic Distribution

Kannada is spoken by a vast majority of the people in the project districts. However, other widely spoken languages are Tulu, Konkani and Beary Bashe.

Settlement

There are a total of 45 major 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, though a number of such locations are present in the project districts.

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.

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

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. Truck parking lay-byes are proposed for 2 locations at Km 202.530 (Near Balupet) & Km 298.830 (Near Mani)

Land Use / Acquisition of the Proposed Corridor

A total of 328.33 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 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

To accommodate the proposed project an extent of 70.618 ha forest land is required to be diverted. Out of that 27.194 ha falls in Hassan district and 43.424 ha in Dakshin Kannada district. Natural wildlife movement may be hindered due to high speed traffic movement.

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 NPRR, 2007. 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 as per the directions of forest department shall be complied with. 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 105.25 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.