Term of Reference (TOR)

For

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN (EMP)

For

Proposed New National highway (Feeder Route of Bharatmala Project Route 5) NH-348 B starts from Ulwe (Padeghar) connecting Jambhulpada, Kauli Belodak, Chiner, Sai , Barapada and NH-348 BB starts from Chirner connecting Koporli and terminating near Khopate Village

Submitted by

NATIONAL HIGHWAYS AUTHORITY OF INDIA

(Ministry of Road Transport & Highways Government of India)

PROPOSED TERMS OF REFERENCE FOR EIA STUDY

1. Introduction

Bharatmala Route 5 is a State highway, feeder route which is situated in Raigad district and it is going to upgrade into National highway NH348B & NH348BB. The new alignment NH348B starts from Ulwe (Padeghar) connecting Jambhulpada, KauliBelodak, Chirner, Sai, Barapada and NH348 BB starts from Chirner connecting Koproli and terminating near Khopate village.

The existing road is single lane which is going to upgrade so that the expansion of this existing highway will lead to enhanced connectivity opportunity within district as well as the surrounding areas.

The Proposed common alignment for all alternative start from Padeghar to Chirner and second alignment is from Chirner to Khopate village for Option 1 & 4 while for option 2 & 3 second alignment start from Koproli village and end at Khopate village.

Alternative alignment analysis has been considered for the proposed highway and details are as follow

1. The option 1 alignment starts from Padeghar and ends at Barapada which is Kharpada Toll naka. This alignment is 26.5 km which passes through approximately 19 villages. For better connectivity to the JNPT Port, the alignment is extended from Chirner village and ends at Khopate village at Uran Taluka in Raigad district. Option 1 alignment passes through the Eco sensitive zone of the Karnala bird Sanctuary which have notified boundary.
2. Option 2 alignment starts from Padeghar by passing through Chirner, Khoproli, Sarde, Punade village and the alignment ends at Edapally Panvel Highway nearby Jite Village. And another stretch of the alignment which start from Koproli village and end at Khopate village This alignment passes through two taluka that is Uran & Panvel. The total Length of Option 2 alignment is approx. 28.18km length (Approx)
3. The Third option alignment length is 29.6km approx, which begins with Padeghar and passes through Chirner, Koproli, Sarde, Vasheni, Rave and Kelavane and it also ends at Edapally Panvel Highway nearby Jite Village. And another alignment starts Koproli and end at Khopate village same as Option 2. This alignment passes through 3 Taluka that is Uran, Pen and Panvel.
4. The option 2 & 3 starts from Padeghar and passes through Chirner- Koproli but nearby Pandive village the alignment get bifurcated and option 3 alignment passes from village Sarde to Kelvane and ends at Edapally Panvel Highway nearby Jite Village (approx 1 km away) and third bifurcated alignment passes through village Sarde- Vasheni-Rave and it also ends at Edapally Panvel Highway nearby Jite Village (0.54 km away). In this both alternative have the another stretches of the alignment which is common and it start from Koproli to Khopate Village.
5. The 4th alternative alignment starts from Padeghar and by passes through chirner, juipunade and Kelvane and ends at Edapally Panvel Highway nearby Jite Village around 1 km away This alignment is 25.97 km approx. and another alignment passes through Chirner village and ends at Khopate village in Raigad district. Option 4 alignment also passes through reserved forest.

6. The proposed alignment will be a 4 Lane, Access Controlled Road, with service roads on either side. And in Option 2, 3 and 4 the tunnel is being proposed for the alignment. The project will also increase transportation connectivity at NH66, NH4, NH17, SH 54, JNPT road.

This road is single lane which is going to be upgraded so that the development of National highways will lead to enhanced connectivity opportunity within the district as well as the surrounding areas. Several State and National Highways are connected to the proposed project, which in turn connect to several important cities within Maharashtra and also in other states. The proposed road is interconnecting in the Raigad District. This route is important, as it provide link to NH66, NH4 & NH17, SH 54, JNPT road which will be benefit to Maharashtra & other State.

Option 1 (old)	Option 2	Option 3	Option 4
Alignment Start from Padeghar village and ends at Barapada Village. Another alignment starts from Chirner and ends at Khopate village	Alignment start from Padeghar and passing through Chirner it ends nearby Jite Village and another alignment starts from Koproli village ends at Khopate village	Alignment start from Padeghar and passing through Chirner, Veshni, Rave and ends nearby Jite Village and another alignment starts from Koproli village ends at Khopate village	Alignment start from Padeghar village and passing through Chirner, Kalambusare, Rave and ends nearby Jite Village Another alignment starts from Chirner and ends at Khopate village

2. Project Screening as per EIA notification 2006 and amended till date (Category-7(f))

Applicability of EC:

As per MoRTH Notification dated 5th December, 2017 this alignment has to be construed as New National Highway No.NH-348 B & NH-348 BB. As per the Ministry of Environment and Forests 2006 notification and its amendment dated 1st December 2009 & the notification of MOEF on dated Aug, 2015, all New National Highway are to be considered as 7(f) Category "A" project and will be appraised by Expert Appraisal Committee (EAC), MoEF&CC.

Applicability of General Condition:

In Proposed alignment for Option 1 about 2 km of the proposed alignment is passing through 14 Ha of forest which falls under the Eco- Sensitive zone of Karnala Bird Sanctuary. As per 95.SO 230(E)[22.01.2016] Notification declaring Eco-sensitive Zone around the KARNALA Wildlife Sanctuary in the state of Maharashtra , Karnala Sanctuary has Notified boundary.

However, the General Conditions are deemed to be applied as the notification has not been gazetted and enforced.

3. Project Scoping

Scoping is required to determine detailed and comprehensive Terms of Reference (TOR) addressing all relevant environmental concerns. The EIA Report will be prepared based on the model Terms of References (ToR) given in Environmental Impact Assessment Guidance Manual for sector 7(f)- Highways by Ministry of Environment, Forest and Climate Change (MoEF&CC).

4. Approach of the EIA Study

As prescribed under Appendix III of the EIA Notification, 2006 and its amendment dated 1st December 2009 & the notification of MOEF on dated Aug, 2015, the proposed approach will include the following:

i. Collection of project information

ii. Collection of environment and social baseline data with reference to the biological, physical and social components of environment within study area

iii. Identification and analysis of applicable legislations

iv. Identification, prediction, quantification and evaluation of potential impacts of the proposed project

v. Recommendations for prevention measures, control measures and mitigation measures for adverse impacts (during construction, operation and decommissioning phase)

vi. Conducting additional studies such as Public hearing, risk assessment, traffic etc. as per the ToR granted by EAC.

vii. Preparation of Environmental Management Plan (EMP) including mitigation measures and monitoring program

5. Methodology of the EIA Study

i. Establishing the initial baseline data on environmental parameters viz., air, water, noise, land use, soil, micrometeorology, existing traffic and communication, biological, and socio-economic data in the study region.

   - A study area of 10 km radius from the project boundary to be identified;
   - Primary environmental baseline data proposed to be collected for a study period of March 2018 to May 2018.
   - Secondary data and information on various environmental aspects like hydrogeology, hydrology, drainage pattern, ecology, meteorology and socio-economic aspects (census data of the study area) will be collected from different institutions, government offices and available literature.

ii. Preparation of EIA report after identification of areas of concern and measures of their possible impact for the proposed project & proposing appropriate Environmental Management Plan (EMP) & Monitoring Plan;

iii. Conducting public hearing

iv. Incorporation of public hearing inputs in the EIA report

5.1 Baseline Studies

Secondary data and information on various environmental aspects like hydrogeology, hydrology, drainage pattern, ecology, meteorology and socio-economic aspects (census data of the study area) will be collected from different institutions, government offices and available literature. In order to establish the environmental conditions of the proposed site, baseline studies will be carried out including Land Environment, Water Environment, Air Environment, Socio-Economics and Demographics, Soil and Hydrology, Meteorology, within the study area. A study area of 10 km radius from the project boundary to be identified. Primary environmental baseline data proposed to be collected for a study period of March 2018 to May 2018.

The details of methodology to be used for conducting baseline studies is as given below:

A. Land environment

i. Description of the existing situation of the land along the alignment, study of the land use pattern, habitation, cropping pattern, forest area, environmentally sensitive places, notified industrial areas, river, lake etc. by using land use map of the study area to a scale of 1: 25,000 based on recent satellite imagery and also through secondary data sources, falling within an aerial distance of 10 km from the project boundary;

ii. Data of the proposed land and its availability (Details of villages, survey numbers of the area, tehsil, districts) for earmarking for the project;

iii. Inventory of the environmental features such as trees/ forests if any/ drainage lines, rivers and water crossings/ irrigation water courses/ water bodies/grazing lands/ cultural properties/ utilities/ community facilities/ schools/hospitals/ seasonal markets or cultural congregations etc, along the proposed highway should be prepared;

iv. Soil analysis data: Data pertaining to type, classification, characteristics, soil properties, etc. Area falling within 5 km from edges of the alignment on either side will be considered to monitor the baseline environment quality;

v. Geology: Baseline data on rock types, regional tectonic setting (reported fractures/faulting, folding, warping), and history of any volcanic activity, seismicity and associated hazards. Information on quarry yields, strength of rock, distance of quarries from habitat, restrictions for quarrying, environmental controls, statutory permissions, etc. shall be provided.

vi. Topography: Baseline data needs on existing situation of the land at the proposed project area, including description of terrain features (plain, rolling, hilly), slope and elevation.

vii. Identification of quarries, stone crushers and borrow areas;

Soil Monitoring and Analysis Plan:

Selection of Samples Details:	About 5 locations within study area (5 km) including project site Representative soil samples will be collected & analyzed for the following parameters.

Duration:	March 2018 to May 2018
Parameters:	Bulk density, porosity, salinity, texture class (percentage wise silt, clay and sand), pH, electrical conductivity, cation exchange capacity, NA, K, N, Mg, P, sodium absorption ratio(SAR), water holding capacity, Fe, Cu, Zn, Mn, Ni, permeability, physico-chemical analysis and relevant metals

B. Air and Noise Environment

The study on air and noise environment shall broadly cover the following:

i. Identification of air/ noise pollution sources, location of sensitive features

ii. Monitoring the existing status of ambient air/ noise quality within the impacted region

iii. Information will be collected on traffic volume for roads near intersections by conducting traffic volume monitoring. The traffic volume counts will be recorded continuously for 24 hours at one time during the study period to assess the existing total daily traffic, peak hour traffic and traffic composition

iv. Collection of meteorological data, viz. wind speed and direction, humidity, ambient temperature, rainfall etc. through secondary sources.

v. Estimation of quantities of air emissions including fugitive emissions from the proposed project;

vi. Identification, quantification and evaluation of other potential emissions (including those of vehicular traffic) within the impact zone and estimation of all the emissions/ impacts;

vii. Prediction of changes in the ambient air quality;

viii. Prediction of future noise levels resulting from the proposed project and related activities including increase in vehicular movement;

ix. Delineation of mitigation measures at source, path ways and receptors

Air Monitoring and Analysis Plan:

Number of station	**:**	About 6 locations around project site
Duration	**:**	March 2018 to May 2018
Parameters	**:**	PM_{10}, $PM_{2.5}$, NOx, SO_x and CO.
Method of sampling and Analysis	**:**	As per the methods suggested by CPCB under NAAQS Standard
Other Details	**:**	Identification of air pollution sources, significant environmental features, location of sensitive features.

Noise Monitoring and Analysis Plan:

Number of station	**:**	About 6 locations around project site
Duration	**:**	March 2018 to May 2018
Parameters	**:**	Continuous sound level meter

Method of sampling and Analysis	**:**	IS: 4954 as adopted by CPCB.

C. Water Environment

Water environment includes both surface and ground water environment. Study on water environment shall broadly cover the following:

i. Study of surface water, ground water (existing sources) within right of way and within 500 m from the right of way

ii. Availability of water and its actual demand;

iii. Precautions for ensuring water/ ecological quality of streams and water bodies;

iv. Details of water quality; proposals for waste water treatment and management;

v. Sources of sewage generation, treatment method, etc.;

Water Monitoring and Analysis Plan:

Number of station	**:**	Surface / Ground water within project area depending upon the availability (river/ lake/ nalla/ open well/bore well etc)
Duration	**:**	March 2018 to May 2018
Parameters	**:**	Color, odor, temperature, pH, turbidity, total hardness (Mg & Ca), TSS, TDS, total alkalinity, chloride, sulphate, nitrate, Na, K, salinity, total nitrogen, total phosphorous, DO, BOD, COD, phenol, O & G, heavy metals, total coliform, fecal coliform
Method of sampling and Analysis	**:**	Standard methods for Examination of Water and Wastewater published by American Public Health Association (APHA) and IS-3025.

D. Socio-Economic Data

The socio-economic study shall broadly cover the following:

i. Details of settlements in study area of 10 km radius for:

- Demographic pattern including literacy rate, male female ratio
- Settlements on and around the proposed Alignment
- Present Occupational / employment / livelihood pattern
- Basic amenities details
- Health status of the communities, existing infrastructure facilities
- awareness of the population about the proposed activity

ii. Activities likely to come up in surrounding areas due to influence of project etc.

E. Biological Environment

i. Assessment of flora and fauna in the study area consisting of core and buffer zone (10 km radius) (enumeration of species, documentation on the basis of life forms, habitats)

ii. Collection of primary/secondary data (authenticated/ based on actual field surveys) on forest and non-forest flora in impact zone with respect to above parameters and forest area and floristic structure, rare and endangered species, endemic species, ethno-botanical aspects, medicinal plants, major & minor forest produce, afforestation/ social forestry

iii. Information on sanctuaries/ national parks/ biosphere reserves. If the alignment affects sanctuaries/ national parks/ biosphere reserves/forest etc. necessary clearances or diversion proposal will be dealt with separately.

iv. Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index, etc. within the study area in different ecosystems, wetland area wherever applicable

v. Estimation of number and types of trees which would be cut during deforestation for proposed activity and facilities

vi. Estimation of damage to flora and fauna due to proposed activities, land use/ landscape changes

vii. Study regarding the existing animal crossings/bypasses/underpasses etc. as applicable across the habitation areas shall be carried out.

Details of baseline study of biological environment to be carried out:

Number of station locations: Core and buffer zone (10 km radius)

Duration: March 2018 to May 2018

5.2 Methodology for Impact Assessment

i. Preliminary environment impact assessment of the alignment as per provisions of the applicable legislations;

ii. Identification of environmental and ecological sensitive areas, water bodies, forests and heritage structures through the satellite imageries;

iii. Based on the proposed design, incremental impacts are to be assessed;

iv. Identification of the potential significant impacts based on Aspect-Impact Matrix;

Table 5-1: Aspect-impact matrix

Components	Physical Environment										Biological Environment						Socio-Economic Environment							
	Aesthetics & Visual impacts	Air Quality	Noise Quality	Soil Quality	Local Drainage &	Land Use	Surface water quality	Surface Water	Ground water	Ground water quality	Terrestrial Habitat	Endangered Flora &	Migratory Routes/Corri	Aquatic Habitat	Agriculture	Livestock	Loss of land/liveliho	Cultural Heritage	Common property	Behavioral conflicts	Job & Economic	Infrastructure	Occupational Health &	Community Health &
Project Planning & Construction Phase Impacts																								
Local procurement																								
Land purchase/acquisition																								
Top soil stripping & storage																								
Material sourcing & transportation																								
Excavated material & debris stockpiles																								
Operation of construction machineries/equipment																								
Storage & handling of raw materials																								
Sourcing of water																								
Surface run-off																								
Disposal of domestic waste																								
Wastewater generation																								
Workforce need/Influx of workforce																								
Power Generation &community development																								
Physical presence of site																								
Land-use																								
Traffic																								
Gaseous emissions																								
Domestic waste water generation / Solid waste generation																								
Non-routine/accidental events																								

v. Prediction, quantification and evaluation of potential impacts of the proposed project based on Impact-significance matrix;

Severity of Impact (A)	Extent of Impact (B)	Duration of Impact (C)	Impact Significance (A X B X C)	
1	1	1	**1**	**Low**
1	1	2	**2**	
1	2	1	**2**	
1	1	2	**2**	
2	1	2	**4**	
1	2	2	**4**	
3	1	2	**6**	**Medium**
1	3	2	**6**	
2	2	2	**8**	
3	2	2	**12**	
2	3	2	**12**	
2	2	3	**12**	
3	3	2	**18**	**High**
3	2	3	**18**	
2	3	3	**18**	
3	3	3	**27**	
- Impact is Beneficial -			**++**	**Positive**

vi. Recommendations for prevention measures, control measures and mitigation measures for adverse impacts (during construction, operation and decommissioning phase)

vii. Preparation of environmental management plan with project specific mitigation and monitoring measures based on Impact-significance matrix.

viii. Environment impact assessment or initial environment examination be carried out in accordance with MoEF&CC Guidelines, as applicable.

ix. Environment Monitoring Programme will be designed to monitor the critical environmental parameter like ambient air quality, source emissions, noise, water and wastewater quality, soil etc.

x. Additional Studies i.e Public consultation and details regarding road safety features will be furnished in this section.

xi. Project Benefits: Improvements in the physical infrastructure, social infrastructure; employment potential–skilled; semi-skilled and unskilled and other tangible benefits shall be explained.

5.3 Environmental Management Plan

Environmental Management Plan (EMP) will be prepared to mitigate adverse environmental impacts (if any) due to implementation of the project and to protect sensitive environmental resources. Such EMP will cover the construction as well as operational activity. The EMP will include:

i. Implementation budgets, sources and timing of funding, schedule of tasks and responsibility of tasks

ii. Internal and external monitoring plans

The Environmental Impact Assessment (EIA) Report shall contain the following chapters:

Chapter-1: Introduction

Chapter-2: Project Description

Chapter-3: Description of the Environment

Chapter-4: Anticipated Environmental Impacts and Mitigation Measures

Chapter-5: Analysis of Alternatives

Chapter-6: Environmental Monitoring Program

Chapter-7: Additional Studies

Chapter-8: Project Benefits

Chapter-9: Environmental cost benefit analysis

Chapter-10: Environment Management Plan

Chapter-11: Summary & Conclusion

Chapter-12: Disclosure of Consultants engaged