



PROPOSED TERMS OF REFERENCE FOR EIA STUDIES

A. Project Road Description

1. PROJECT BACKGROUND

The Mumbai Metropolitan Region (MMR) is one of the fastest growing metropolises in India with a population of about 20.7 million with geographical spread of about 4,355 sq. km. Maintaining and enhancing the vitality of the metropolis and achieving sustainable growth are pivotal towards realizing the larger development objectives and quality of life goals of India. A Comprehensive Transportation Study (CTS) for the Mumbai Metropolitan Region (MMR), which is also known as TRANSFORM (Transportation Study for the region of Mumbai) was conducted by the Mumbai Metropolitan Region Development Authority (MMRDA) in consultancy with M/s Lea International Limited and technical assistance from World Bank under the Mumbai Urban Transport Project (MUTP) in July 2008. This Study provided the recommendation for planned development of transport system in MMR for the period up to 2031.

The CTS objectives were to ensure the following:

- A Competitive MMR
- A Livable MMR
- A Bankable MMR
- A Well Governed MMR

Working towards this objective, the TRANSFORM was conducted to identify the travel pattern of residents in the MMR. The aim was to provide seamless connectivity between the different MMR areas such that people can travel from their origins to destinations within a reasonable amount of time. One of the recommendations of TRANSFORM was to develop the Multi Modal Corridor (MMC) from Virar to Alibaug, also known as the Middle Ring Road.

As per the World Bank MUTP implementation support mission during 23rd July-6th August, 2008, it was proposed to obtain consultancy services for carrying out a “Feasibility study with alternatives analysis of a priority “Multi-Modal Corridor from Virar to Alibaug”. M/s LBG completed the Techno Economic and Financial Feasibility Study for the proposed Multimodal Corridor in year 2012. Further MMRDA has appointed M/s Egis India Ltd for carrying out the Detailed Project Report . The study includes the following stages.



- Alternative Analysis.
- Detailed Planning and preliminary engineering
- Implementation of the project within the time frame.
- Funding Plan like PPP (Public Private Partnership) or Public Frame.

The corridor is proposed to be commissioned in two Phases:

Phase I- Navghar to Chirner (near JNPT) about 80 Km

Phase IA from Chirner to Balavali (NH17) about 18 Km i.e connecting to MTHL to Nh 17 Via MMC and

Phase II- Balavali to Alibaug about 28 km.

MMRDA has now initiated Phase I of the project for obtaining MoEF&CC and CRZ clearance from Navghar to Chirner (near JNPT). The proposed phase I of the project road is traversing through 3 Districts of Maharashtra, viz. Palghar, Thane and Raigad.

Present status

- The proposed alignment has been recommended to MoEF&CC for CRZ Clearance by MCZMA during its 113th meeting on 8th to 11th August, 2016 vide letter number CRZ-2016/CR-128/TC 4 dated 17.10.2016.
- Earlier the alignment was passing through the core zone of Sanjay Gandhi National Park diverting approx. 18 ha of National Park land. However, after considering alternative alignment, it is passing through the core zone of Tungreshwar Wildlife Sanctuary diverting approx. 2.8295 Ha land.
- Approximately 110.4038 ha. of forest land will be diverted for the proposed project. Forest proposal has been submitted online on the MoEF&CC portal vide proposal number **FP/MH/Others/31355/2018** dated **25.01.2018**.
- Wildlife proposal for Tungreshwar Wildlife Sanctuary and Sanjay Gandhi National Park has been uploaded online on the MoEF&CC portal vide proposal number **FP/MH/ROAD/4021/2019** dated **24.03.2019** and for Thane Creek Flamingo Sanctuary vide proposal number **FP/MH/ROAD/4022/2019** dated **24.03.2019**.



- Public hearing has been conducted based on expired TOR vide letter no: **F.No.10-25/2014-IA.III** in Raigad, Palghar and Thane districts on 16.01.2018, 20.03.2018 and 15.05.2018 respectively.
- Total land of 1053.75 Ha will be purchased by MMRDA which includes 145 Ha. Govt Land, 878.20 Ha. Pvt Land and approx.33 ha. reserved forest land. The Land is to be purchased based on Gr dt 12.5.2017 for Direct Purchase (i.e Samruddhi Model.).
- Land Acquisition has been initiated in all districts simultaneously. Public notice has been published for Land Acquisition of Private Land in Thane, Palghar and Raigad District by Competent Authorities. Out of 100 villages, demarcation has been completed in 23 villages. Also, Joint Measurement has been completed in 4 villages.

2. PROJECT INTRODUCTION

A Multi Modal Corridor is a single corridor in which multiple modes such as buses, BRT, metro rail and cars, along with utilities such as water, sewage and gas lines are present in the same Right of Way. The Right of way (ROW) of the proposed Multi Modal Corridor is 99 meters in general except at interchanges and flyovers. The RoW is reduced to 45 m at National Park and Wildlife areas to avoid any direct encounter between Wildlife and traffic and minimize the adverse impact the National Park and Wildlife Sanctuary. **Figure 1.1** shows the concept of the Multi Modal Corridor.

The MMC was envisaged to provide connectivity to existing and future growth centers in the MMR. The MMC will help the growth of 7 Growth centers, such as Virar, Bhiwandi, Kalyan, Dombivali, Panvel, Uran and Taloja MIDC in the MMR Region. It would provide faster connectivity between the Urban Local Bodies (ULBs) located outside Greater Mumbai and improve accessibility to inter-city freight traffic.

The MMC will connect the major roads such as NH-8, Bhiwandi bypass, NH-3, NH-4, NH-4B, Mumbai Pune Expressway, NH-17 etc. The Corridor will provide faster connectivity to JNPT, Proposed Navi Mumbai Airport, MTHL Project and Dedicated Freight Corridor (DFC).

The Project area traverses through the plain and rolling terrain and passes through Thane and Raigad district of Maharashtra. The Corridor is running parallel to Bassien Creek up to Ulhas River (near Kalher).

3. THE COMPONENTS OF THE MULTI MODAL CORRIDOR:

- a. Access Controlled Highway – These would provide high-speed signal-free passage for all highway modes with entry and exit only through dedicated interchanges.
- b. Service Roads – These would be used to access the land use adjacent to the MMC without interfering with the traffic on the access-controlled lanes
- c. Metro Rail – This is envisaged to be in the median of the corridor with foot over bridges/underpasses to transfer passengers from the rail station to the adjacent land use.



Figure 1.1: Multi Modal Corridor

- d. Bus Rapid Transit – This would run along the access-controlled lanes of the Multimodal Corridor and the bus stops would align with the metro stations to provide seamless transfers. Depending on the demand, BRT may be the only transit mode in the MMC at the beginning with the metro rail to be added at a later stage.
- e. Non-Motorized Traffic Lanes – These would be separate lanes for non-motorized traffic so that it does not mix with motorized traffic. This would increase the homogeneity of traffic on all the lanes of the MMC resulting in higher speed and safety.
- f. Pedestrian Foot Paths and Parking – These facilities would be a part of the MMC

- g. Utilities – Corridors for utilities such as water, sewage and gas lines would be added either at-grade or underground.

4. BENEFITS OF THE MULTI MODAL CORRIDOR:

The following benefits are expected from the MMC:

- High speed movement between the MMR regions
- Choice of multiple modes to travel
- Easy and fast transfer between modes
- Cost savings over development of separate corridors for each transportation mode

The MMC is proposed with a Right of Way of 99 m to accommodate access-controlled highway lanes, service lanes, parking lane, pedestrian foot path and a metro facility at the centre. The conceptual cross section of the MMC is below in **Figure 1.2**.

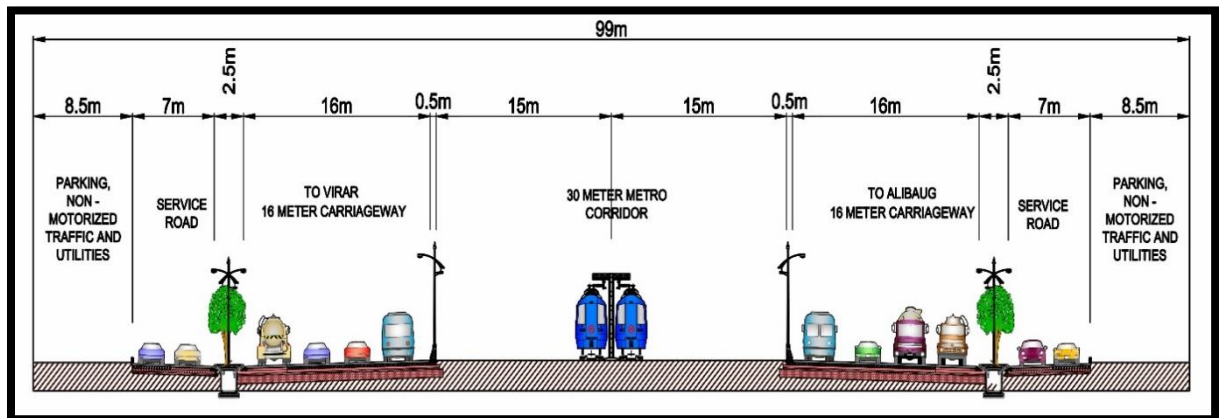


Figure 1.2: Conceptual Cross Section of MMC.

- Metro Rail Corridor: 30m wide,
- Access Control Highway for BRT and other traffic: 4 + 4 lane (each 16.5m wide)
- Pedestrian footpath with Storm Water Drain: 2.5m each side
- Service Road (2 lane): 7m each side
- Parking/non-motorized/utility: 8.5m each side

5. ALIGNMENT OF THE MULTI MODAL CORRIDOR:

The alignment of the Multi Modal Corridor from Navghar to Chirner (near JNPT)

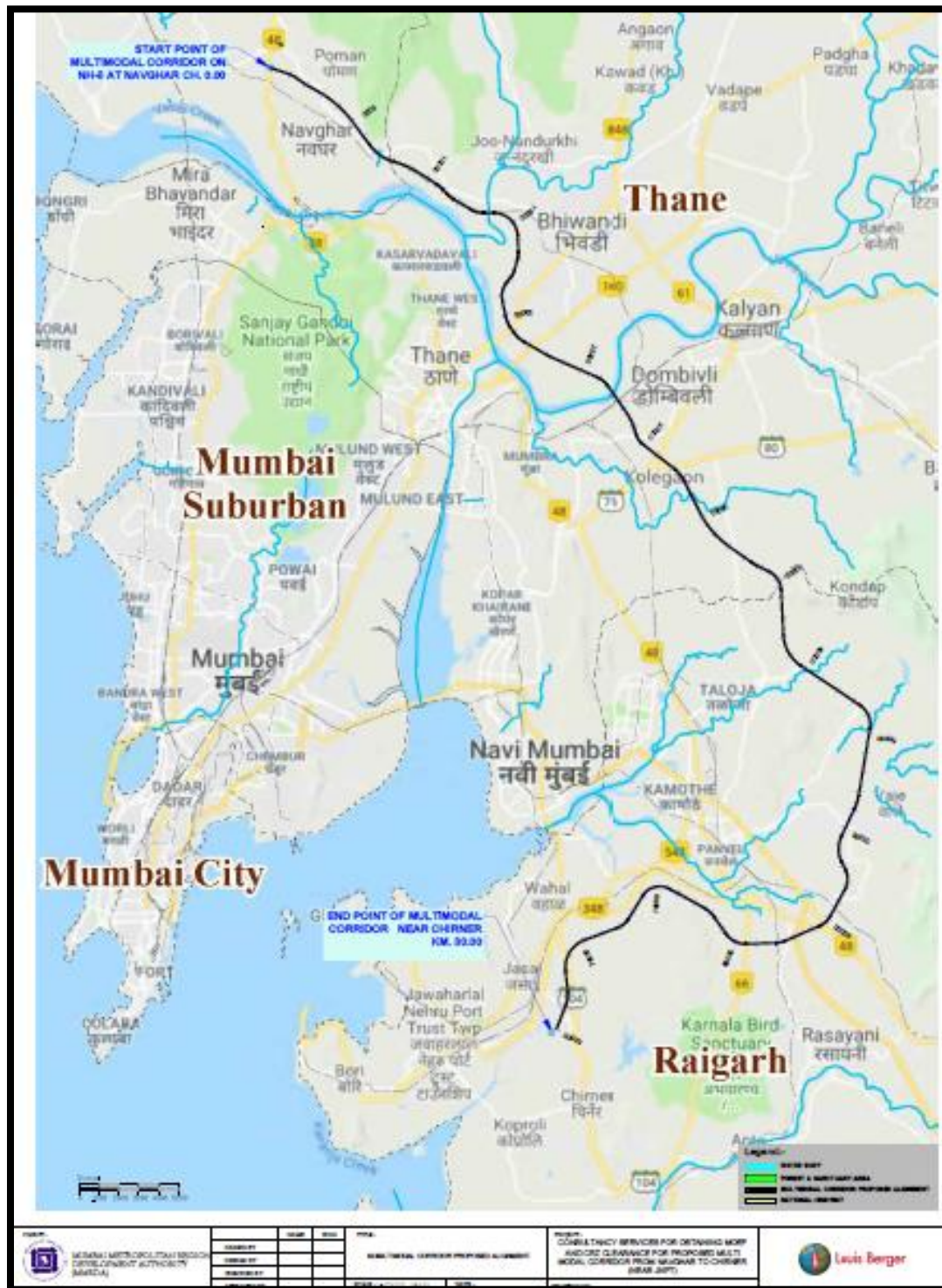


Figure 1.3: Alignment route map of proposed MMC



6. RECONNAISSANCE SURVEYS

The team of consultant comprising Highway Engineers, project coordinator, Environment and Social expert has visited the site on 15th to 16th July, 2014 for reconnaissance survey for the project alignment. Further, during April to May, 2018 baseline monitoring for ambient air, water, noise and soil was conducted at the project site by M/s Vardan Enviro Lab, Gurugram, Haryana.

6.1 Preliminary Environmental Screening

The objective behind the strategic environmental screening was to delineate the affected environmental features / issues, e.g. waterways, forest areas, plantations / trees, cultural heritage, market places / human settlements, agricultural land, air, water, natural resources, noise etc. within the 99 meters corridor in the project area, in order to define the impacts and to minimize the adverse environmental impacts by suggesting best engineering solutions / options at optimal costs and further to categorize and define the scope of Environmental Impact Assessment (EIA) study to be conducted.

Major part of the project area is occupied by Deccan Trap and faulted scrap Alluvium, weathered granites/gneisses, lower Gondwana sandstones, weathered, fractured and jointed massive basalts and vesicular basalts form the major phreatic aquifers; and weathered, fractured granites are noticed as main water-bearing zones at deeper levels. It is observed that the discharge of dug wells tapping alluvium and vesicular basalt ranges between 80 and 235 m³/day respectively and jointed massive basalts and weathered gneisses ranges from 44 to 177 m³/day and 61 to 77 m³/day respectively.

6.2 Likely affected Eco-sensitive Zones

The proposed alignment is falling within 10 km radius of the following protected areas and their eco-sensitive zones:

- i. Sanjay Gandhi National Park
- ii. Tungareshwar Wildlife Sanctuary
- iii. Thane Creek Flamingo Sanctuary
- iv. Karnala Bird Sanctuary (Eco-Sensitive Zone is at a distance of 8 m from the proposed alignment.)
- v. Matheran Eco-sensitive zone (Eco-Sensitive Zone is at a distance of 105 m from the proposed alignment.)



6.3 Water Resources

The main hydrological features along the project area are coastal creeks, Ulhas river, canals, drains and other intermittent water bodies. The project road is crossing over five rivers (Kamvadi River, Ulhas River, Kasadi River, Navde River, Lendi River, Gadhe River) and few small drains at different locations where structures are proposed.

A number of water sources like pond, ditches, nalla and river bodies are found along the project area. The project will have direct as well as indirect impact on these water bodies. Most of these water bodies are pond or ditches, mud but rich in biological resources.

7. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a valuable tool used to examine the potential adverse and beneficial consequences of a proposed development project, so that due consideration can be given to these aspects in further stages of project planning and design and eventually during construction and operation.

The EIA involves identification and evaluation of the potential direct and indirect effects of a project on the individual environmental and social components, as well as any interactions between these. It also identifies ways and means through which unacceptable impacts can be avoided, offset or minimized and beneficial impacts are enhanced.

The overall objective of the EIA is to ensure that potential environmental problems are recognized at an early stage in project preparation, so that these can be properly addressed during subsequent stages.

EIA shall be used as a key management tool used to shape a project in such a way, so as to optimize its environmental performance in much the same way as engineering and economic studies are used in project preparation. It shall also play a major role in the decision-making process when project alternatives are being compared.

The proposed project may pose direct and indirect impacts on the environment. The overall objective of the Environmental Impact Assessment is to identify major environmental issues



associated with the proposed project and to propose mitigation measures to avoid or minimize their adverse impact.

The following principle tasks will be undertaken for EIA study of the proposed project:

- Preparation of Form-1 and TOR,
- Preparation of document and submission of proposal for CRZ mapping to authorized agencies
- Collection and review of documents, policies and establishing liaison with the Environmental authority like MPCB, NBWL/SBWL, MCZMA
- Public/Stakeholder consultation,
- Environmental screening & scoping,
- Collection of baseline environmental data,
- Determination of the major impacts on the environment and analysis of alignment alternatives,
- Development of management plan to mitigate negative impacts, preparation of Environmental monitoring plan and cost estimate.
- Identification of institutional and monitoring needs to implement the environmental management plan.

8. PHASE 1 – PROJECT PREPARATION:

8.1 Preparation of Form-1 and TOR

After award of the assignment, a preliminary screening and scoping exercise will be carried out to identify and to highlight the key environmental issues, such as wildlife sanctuaries, national parks, landslides, soil erosion, Reserved Forest, Protected Forest, sensitive receptors etc. and the impacts likely to occur during the pre-construction, construction, operation and maintenance phases of the project. On the basis of this preliminary exercise, the scope of EIA will be determined and accordingly Form -1 and TOR will be prepared and submitted for approval to MOEF&CC.

8.2 Preparation of Proposal for CRZ Mapping

Detailed study will be carried out along the approved alignment to collect information for preparation of proposal for CRZ mapping. All the required maps and data will be collected and complied for finalization of CRZ proposal. The CRZ mapping will be conducted by the Government/ MoEF&CC approved agencies for CRZ mapping. After completion of mapping, CRZ proposal will be submitted to the State/ Central authorities for final clearance. The CRZ maps have



already been prepared by Institute of Remote Sensing, Anna University, Chennai and submitted to MCZMA. The area under different CRZ mapping are as follows:

CRZ Class	Extent of project area falls inside the CRZ (as per 2011 CRZ Notification) in sq.m
CRZ – IA (mangroves and 50 m buffer)	692734
CRZ I A (Reserve Forest)	12597
CRZ I B	480133
CRZ II	-
CRZ III	723934
CRZ IV B	25187
Total	2047285

After detailed deliberation of MCZMA, it was decided to recommend the proposal to MOEF&CC, New Delhi with subject to conditions in the 113th meeting of Maharashtra Coastal Zone Management Authority held on 08th-11th August, 2016 vide letter no. CRZ-2016/CR-128/TC 4

8.3 Collection and Review of Documents, Policies and Establishment of Liason

The consultant will collect and study the following and any other documents pertaining to the proposed project and assess the availability of data:

- Environmental policy, Acts including legal and administrative framework applicable to the project from various authorities,
- Requirements of the MoEF&CC/MPCB/MMRDA
- Data and maps about project areas,
- Consultation with environmental authorities,
- Relevant documents map and aerial photographs

Applicability of various rules, regulations and guidelines with respect to the road project will be determined in order to follow the same during the EIA study and report preparation.

8.4 Public Consultation



Public consultation will be carried out especially with project affected persons, NGOs and stakeholders. Their views/outcome will be incorporated in the report with suitable suggestions for compensation, if any.

8.5 Environmental Screening and Scoping

The study area will comprise the road corridor and the surrounding area that may be affected by the project. The boundaries of the study area will be established as per the MPCB/MOEF&CC guidelines.

A screening exercise will be carried out based on the reconnaissance survey to identify and to highlight major environmental issues and risks which will have negative environmental effects caused by the project such as soil erosion, wetland, ponds, flood area, water quality, air quality, noise level, natural habitats, biological diversity, vegetation, plantation, Reserve Forest, Protected Forest, trees along the road/within the road corridor etc. On the basis of the associated environmental impact and discussion with stakeholders, NGOs, public representatives, government officers, prioritization and categorization of the project will be made.

Public hearing has been conducted in Raigad, Palghar and Thane districts on 16.01.2018, 20.03.2018 and 15.06.2018 respectively

9. DETAILED ENGINEERING:

9.1 Collection of Baseline Data

Based on the available base map of the project area, topography and other available information from official and the non-official sources on environmental issues stemming from existing roads, on field investigation and consultation with stake-holders, representative baseline data on physical and biological environment (such as climate, and meteorology, air, noise, surface water quality and topography, flora and fauna, rare and endangered species, significant natural habitats, biological diversity sites, sensitive habitats including parks and reserves, cultural property/religious places, educational institutions, induced development and health) will be generated. All the information collected from the field and secondary sources will be collated and incorporated in the report.

Baseline Monitoring has been conducted by M/s Vardan Enviro Lab, Gurugram, Haryana during April to May 2018.



9.2 Baseline Surveys

The baseline data required by Ministry of Environment Forests and Climate Change, GoI includes the following components and will be generated along the ROW and adjacent areas:

- CRZ mapping including HTL, LTL and CRZ Zones (Zone - I,II,III or IV)
- CRZ boundaries, ecologically sensitive zones such as mangroves, sand dunes etc.
- Boundary and other facilities of the proposed project site
- Presentation of Maps in 1:25000 and 1:4000 scale with all the above details
- Water, land, noise and air (natural physical resources);
- Fisheries, forestry, major trees, wildlife eco-systems (biological resources);
- Sensitive receptors like Forest, Sanctuaries, notified polluted areas, schools and hospitals, religious and archeological monuments and places
- Navigation, flood control and land use (human use values); and
Socio economic, aesthetic and cultural heritage (quality of life values)

The environmental resources and features will broadly cover the following

9.3 Identification of Issues and Hot Spots

For the project corridor, the environmental features will be tabulated along with their kilometer location and level of sensitivity. Using this approach, hotspots will be identified to help focus mitigation plans. This method will be used for all stretches that require future environmental analysis.

9.4 Pollution Indicators

Although virtually all of the information required for establishing the environmental mapping of the project in the initial environmental screening is derived from secondary sources, the preliminary identification of the critical issues in the project area is better understood by carrying out well determined pollution monitoring. In addition to review and assess the accuracy of key information, it has to be checked through field observations.

Such pollution monitoring surveys are proposed to be taken up at pre-selected locations (depending on the earlier established environmental capacity of road sections) with the objective of attaining a comprehensive picture of the whole corridor. Since this task is cost effective, the selectivity of the quantum of survey will be very important.



It is proposed to conduct the following surveys for one season except monsoon season:

- Air quality surveys which include monitoring pollution levels in terms of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO),
- In particular near urban areas, a dust accumulation survey will be carried out with respect to total Respirable Suspended Particulate Matter (RSPM) and PM_{2.5}
- Noise level survey
- Water quality survey of important surface water bodies and drinking water sources

9.5 Determination and evaluation of major impacts and analysis of alignment alternatives

The potential impacts will be assessed based on available maps, surveys and discussions with local officials, NGOs and the public.

(i) *Impact due to project location*

Deforestation and loss of vegetation cover, deterioration of ecologically sensitive areas, soil erosion, and impact on biological diversity, natural habitats, cultural properties, effect on water resources and other biophysical and physical issues will be assessed to find out the project location impact.

(ii) *Impact due to project design*

Environmental implications such as disruption of natural drainage pattern, impact on cultural property, impact on surface water, landslides, soil erosion, agricultural land, interference with movement of wildlife, livestock, and road crossing for animals due to design of road alignment and pavement as well as bridges and culverts will be assessed.

(iii) *Impact due to project construction*

Stream and water bodies, sedimentation, water logging of borrow pits and quarries, disposal of construction spoils, air and water pollution, noise level, fuel and oil spills, sanitary conditions and health risks associated with construction camps and workers camping in the area will be assessed. Construction impact on indigenous people, cultural property, biological diversity and induced development such as development of markets, residential settlements, temporary shacks and tourism will also be assessed.

Air and water quality, noise pollution and vibration from blasting will be assessed and suitable mitigation plan along with guidelines will be prepared.



(iv) Impact due to project operation

Surface spills and surface runoff, pollution, roadside waste, traffic safety issues will be analyzed based on traffic growth projection and mitigation measures will be incorporated in the EIA Report.

(v) Health and potential health impacts due to the project

During the design, construction and operation phases, associated impacts on health will be assessed and feasible and cost-effective remedial measures to minimize health risks will be explored.

(vi) Evaluation of impact

Each parameter (such as biological diversity, pollution, natural habitats, indigenous people, cultural property, induced development) of the environmental impact will be assessed according to its relative importance. The matrix method will be used for evaluation and assessment of the associated impacts.

(vii) Analysis of alignment alternatives

During the feasibility study, three alignments have been analyzed out of which the best feasible option has been selected. This assessment also considered alignment design, construction technology and operative / implementing procedures.

The alignment selection was based on:

- Minimum disturbance to ecology / geology,
- Minimum removal of vegetation and trees,
- Improvement to road geometrics,
- Minimization of land acquisition.

9.6 Environmental Management Plan, Monitoring Plan and Cost Estimate

(i) Management plan to mitigate negative impacts

The environmental impact of the project during construction and after its completion will be reviewed. The review will include among other things, effect on people's livelihoods, noise, air quality, biological diversity, natural habitats, landscape and protected areas as well as temporary and permanent damage to the environment, particularly forests areas with known archeological value along the proposed alignment/project impact zone, potential risks from toxic and hazardous



chemicals and indirect environmental impacts such as induced industrial development along the alignment. Data will be derived from existing published data, field survey and consultation with key stakeholder groups.

The consultant will take an overview of studies under the EIA report taken up for this region and check out various issues by integrating environment and an Environmental Management Plan will be formulated to mitigate or minimize environmental impacts.

Appropriate mitigation measures for all identified adverse impacts and alternative approaches, if any, will be proposed. A short and concise EMP will be designed, suggesting the relevant mitigation measures, institutional responsibility for implementation and monitoring during and after construction. The mitigation plan will include feasible and cost-effective measures to prevent or reduce significant negative impacts such as those to land, water, air, biological diversity, natural habitats, protected areas, buffer zones, wild life reserves, national parks and historical/cultural monuments, drainage, soil and road safety to acceptable levels.

(ii) Environmental Monitoring Plan

A monitoring plan will be prepared to help in monitoring the implementation of the recommended mitigation measures and the impact of the proposed road work during construction and after completion. The plan will define certain indicators of environmental performance that can be monitored on a regular basis. The Environmental Monitoring Plan must detail but not limited to:

- Requirement of monitoring facilities and methods adopted
- Frequency, location, parameters of monitoring as per CPCB or MPCB norms
- Compilation and analysis of data
- Reporting system for monitoring results, which must specify frequency of Report submission (half yearly or quarterly) to higher management and also other stakeholders (i.e., panchayats).
- Location for display of the monitoring results, i.e., Project site office, concerned panchayats, district administration office etc.
- Records on action or corrective measures taken if any non-compliance is found.

(iii) Identification of institutional and monitoring needs to implement Environmental Management Plan

The capability of Project Implementation Authority particularly at local and regional level will be reviewed to ensure that the proposed management and monitoring plan based on the EIA will be properly implemented. The sectorial arrangement, management procedures and training, staffing



budget and financial support will also be assessed. Institutional strengthening and monitoring framework will be suggested as required.

(iv) Cost estimate

Incremental costs for mitigating/minimizing adverse environmental impacts including cost for landscaping, maintaining biological diversity and natural habitats, pollution control (air, water, and noise), environmental monitoring, training, compensatory and avenue plantation and supervision will be estimated and grouped in a separate bill of quantities (BOQ) for the project.

10. COMPLIANCES OF ALL THE POINTS OF THE TOR

All the points of the approved TOR (from MOEF&CC) will be incorporated into the EIA Report and will be submitted to the MPCB for conducting public hearing.

10.1 Public Hearing

The draft EIA Report will be prepared as per the guidelines of MOEF&CC followed by approved TOR (MOEF&CC) and submitted to MPCB for conducting public hearing in all the concerned districts. On the basis of received minutes of public hearing, all the point will be suitably incorporated in the Final EIA Report.

Public hearing has been conducted in Raigad , Palghar and Thane districts on 16.01.2018 , 20.03.2018 and 15.06.2018 respectively based on the expired TOR vide letter no F. No. 10/25/2014-IA. III.

10.2 MOEF&CC Clearances

We will be assisting MMRDA in obtaining Environmental and CRZ clearance by preparing final EIA along with salient features, checklists of the project and will be submitted to the MOEF&CC, presentations will be done to Expert Appraisal Committee (EAC) for Environmental Clearance and their suggestion will be incorporated if any.