Executive Summary of Environmental Impact Assessment Report

(English Version)

for Development of Multi Modal Corridor from Navghar to Chirner (near JNPT) in the State of Maharashtra

Length: 80 km

(June 2021)

Project Proponent

"Maharashtra State Road Development Corporation (MSRDC)"

(Government of Maharashtra Undertaking)

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CHAPTER-1: EXECUTIVE SUMMARY

1.1 PROJECT DESCRIPTION

The proposed Multimodal Corridor is 126.35 km long and it passes through twelve growth areas within MMR identified for future development. This EIA is carried out for the first 80 km of the alignment length i.e. Ch.0+000 to Ch.80+000. Within 80 Kms length there are six growth areas. The corridor majorly runs through agricultural land, forest land, railway, government lands affecting natural features like nallas, creeks, hills, mangroves and Coastal Regulation Zones.

The proposed project is passing through core zone of Tungareshwar Wildlife Sanctuary for about 860 meters and also passing through Eco-Sensitive Zone of Tungareshwar Wildlife Sanctuary and Sanjay Gandhi National Park.

The proposed MMC is a corridor, which will connect several National and State Highways en-route. The total length of MMC in Phase I is about 80 km. The RoW is varying from 45m to 126m.The MMC is proposed with a Right of Way 99 m to accommodate access-controlled highway lanes, service lanes, parking lane, pedestrian footpath and a metro facility at the center (30 m).

The project is located in Maharashtra and passing through Palghar, Thane and Raigad District of Maharashtra. The project is located in agricultural, built-up, commercial and industrial areas of abovesaid districts. The MMC alignment along with MMC phases are presented in **Figure- 1.1.** The Corridor is proposed to be commissioned in two phases:

Phase- I: Navghar to Chirner near JNPT (about 80.000 km)

Phase– II: Chirner to Alibag (About 47.000 km).

This is a green field project and there is no existing structure in the project stretch. The details of proposed culverts, bridges, grade separated structures are discussed in the subsequent sections. On the basis of detailed hydrological study with the help of google, topographical survey data, topo-sheets, history of flood, existing structure at up-stream or down-stream etc., Culverts and Bridges have been proposed. Also, Grade Separated structures have been proposed on the basis of highway requirement, traffic requirement and presence of Railway Level Crossing. The summary of structures is given in **Table 1.1.**

Table 1.1: Proposed Structures along the Corridor

Start of the Corridor:	Navghar
End of the Corridor:	Chirner
Length of the Corridor:	80 Km
ROW Details:	45 m- 126 m and average are 99 m.
Existing Carriageway Configuration:	Green field area
Proposed Carriageway Configuration:	Dedicated BRTS lane & 3 lane expressway on either side of the median with metro movement in center.
Median	30 m with metro corridor
Interchanges	8
Metro Stations	29
Major Bridges:	29 along main corridor and 17 along service road
Minor Bridges:	21 along main corridor and 13 along service road
Structures on ponds and Wetland	123
Vehicular Underpass (VUP)	21
Passenger Underpass (PUP)	2
Railway Over Bridge (ROB)	2
Flyover	28
Service Road	21 (Total length 35597.5 mts)
Tunnel	3 location and total length 2910 mts

The present EIA report is for Phase-I that is Navghar to Chirner (JNPT) (Km 0+000 to Km 80+000).

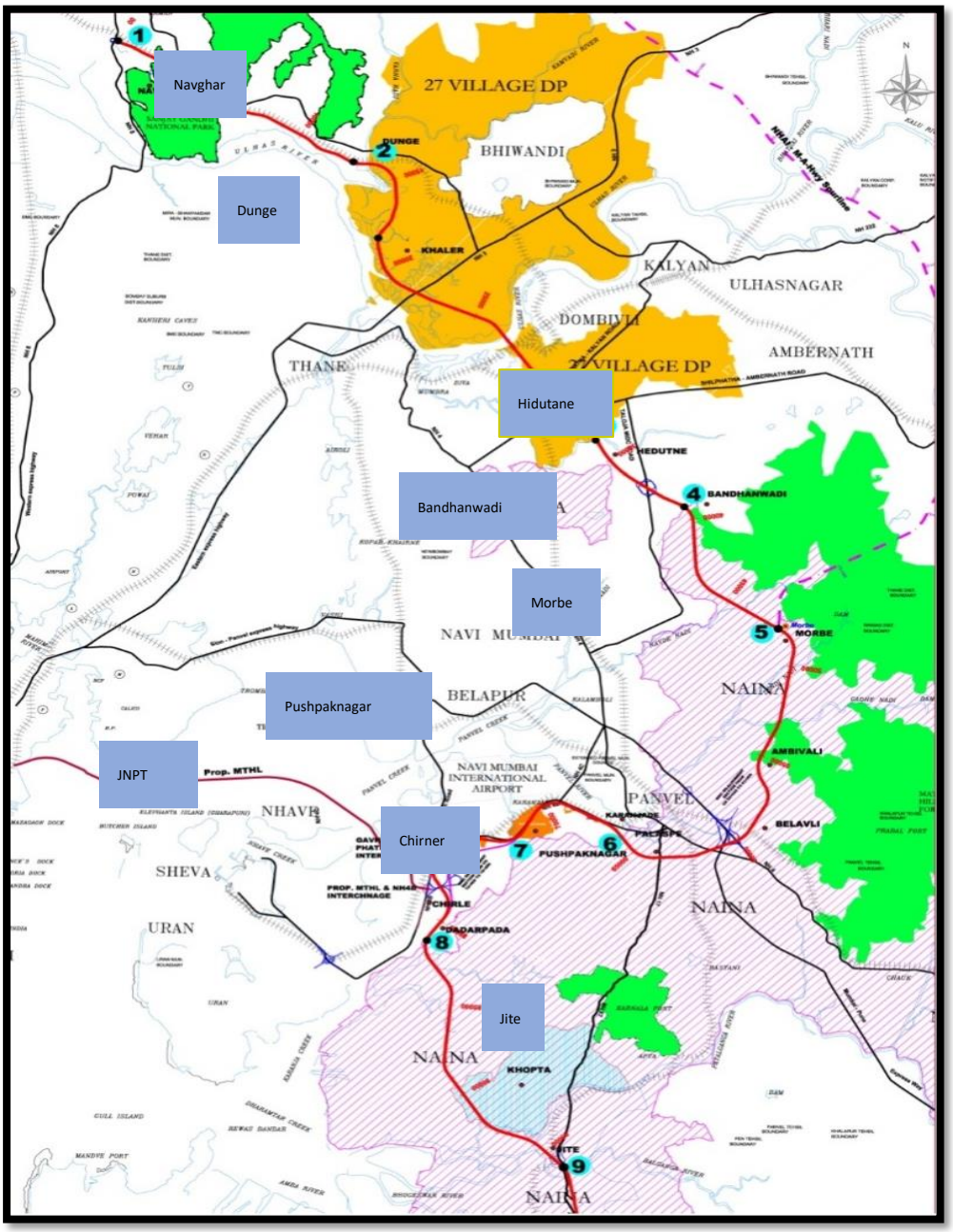

Figure 1-1: Proposed Corridor alignment

1.2 PROJECT PROPONENT

Maharashtra State Road Development Corporation (MSRDC), GoM, has initiated the first phase of Multi Modal Corridor (MMC) in the state of Maharashtra with funding from World Bank under Mumbai Urban Transport Project (MUTP).

In order to fulfil the above task, MSRDC has appointed M/s Louis Berger Consulting, Pvt. Ltd as consultants to prepare the Environmental Impact Assessment Report for construction of the Multi Modal Corridor from Navghar to Chirner (near JNPT) in the state of Maharashtra.

1.3 ENVIRONMENTAL CLEARNCE REQUIREMENT

The proposed corridor is a new alignment with Right of Way (ROW) requirement of 99 m. Hence, as per EIA notification 2006, the proposed Project falls under "Category A" and attracts the conditions of obtaining prior Environmental Clearance from Ministry of Environment, Forest & Climate Change (MoEF&CC). Therefore, Environmental Clearance will be required for the Project. In addition, there is requirement of Forest diversion in this Project; therefore, Project will require Forest Clearance.

1.4 TERMS OF REFERENCE (TOR)

Initially TOR meeting held during 26-28th November 2014 in its EAC 141st meeting. The ToR for EIA study was issued by MoEf&CC on 12th Jan 2015. Subsequently draft EIA study was carried out and public hearing conducted in project Districts. However due to change in alignment, the revised TOR proposal was submitted online on 3rd June 2019 and it was considered by the EAC in its 217th meeting held on 27th June 2019. Subsequent to discussions and details provided by the Project Proponent, the "Terms of Reference (TOR) was issued by MoEF&CC on 18th July 2019.

The Government of Maharashtra transferred the said project from MMRDA to MSRDC during Board of Director meeting held on 4th July 2020 and Authority meeting held on 7th July 2020. Subsequently ToR was amended for change in project proponent. The ToR transferred from MMRDA to MSRDC through MoEF&CC letter dated 18th Feb 2021.

1.5 BASELINE ENVIRONMENT

Baseline data on environmental attributes has been collected from primary and secondary sources. The baseline environmental conditions will help in comparing and monitoring of the predicted negative and positive impacts resulting from the project during construction and operation phases. Accordingly, mitigation measures / management plan can be suggested for the project. The baseline monitoring of air, water, noise and soil was undertaken by NABL and MoEF&CC accredited agency during December 2019 to February 2020.

Climate: The project districts being coastal are characterized by high humidity throughout the year. The year is divided into four seasons. The cold season, December to February (not less than 18^{0}C) followed by the hot season from March to about middle of June. The period from the middle of June to September is the south-west monsoon season. October and November constitute the post monsoon or transition period.

Rainfall: The area receives maximum rainfall during south-west monsoon period i.e. June to September. About 90 % of the annual rainfall occurs during the monsoon season. Only 10 % of the annual rainfall occurs in the period from October to May. Thus, surplus water for ground water recharge is available only during the southwest monsoon.

Temperature: April is the hottest month with mean daily maximum temperature at 39.9°C and the mean daily minimum temperature at 22.2°C.In the interiors towards east, mean daily maximum temperatures in October and November are 5-6°C ,less than that in the summer months. In the period of December to February, the weather is cooler than in the post monsoon months.

Relative Humidity: The air is humid throughout the year. Relative humidity on an average is 86% during the southwest monsoon season. In the rest of the year the relative humidity is between 64% and 75% in coastal regions. In interior parts the humidity is about 40% in summer.

Winds: Winds are very strong and blow from southwest or west during the monsoon season. During the period of October to March, winds are moderate and blow from directions between northeast and east in the mornings and from northwest in the afternoons. In April-May there is strengthening in wind and it blows mostly from northwest.

Air Quality: The air quality of the project area is well within the prescribed limits of CPCB except for particulate matter in Nagle village, Wadgar village, Bharodi village and chikla phata village. The particulate matter exceeds from permissible limit of CPCB. However gaseous pollutants are within the CPCB limits. The higher value of particulate matter is due to industries, construction activities, Brick Kilns, traffic, and human activities due to dense population in this area.

Noise Levels: The Baseline Noise level noise level exceeds the CPCB standard of noise for all locations except Mourbe village. The daytime high noise level is due to industrial activities, commercial, construction activities and rail and road traffic in this area. The nighttime noise is due to industrial and prevailing road traffic movement in this area.

Ground Water: The pH concentration of Ground water varies from 6.76 to 7.66 and desirable limits of the pH concentration between 6.5–8.5, total dissolved solids (TDS) concentration of ground water varies from 298–374 and desirable limits of TDS concentration between 500 – 2000 mg/l, and calcium concentration of Ground water varies from 34-97 and desirable limits of calcium concentration between 75-200 mg/l, the magnesium concentration of Ground water varies from 4.8-26 and desirable limits of the magnesium between 30-100 mg/l, sulphate concentration of Ground water varies from 14.2-34.4 and desirable limits of sulphate concentration between 200-400 mg/l, the fluoride concentration of Ground water varies from <0.1 - 0.32 and desirable limits of the fluoride between 1-1.5 mg/l, the total hardness concentration of Ground water varies from 120-263 and desirable limits of the total hardness between 200-600 mg/l, hardness is generally caused by the ca and mg ions present in water.The dissolved oxygen (DO) concentration of Ground water varies from 2.3 - 2.9, the Biochemical oxygen demand (BOD) concentration of Ground water varies from less than <2.0 and chemical oxygen demand (COD) concentration of Ground water is less than <4.0. The concentration of all other parameters is found to be well within the IS 10500 limits at all monitoring locations of Ground water. In general ground water quality of project area is good.

Surface Water: The pH concentration of surface water varies from 6.8 to 7.31 and desirable limits of the pH concentration between 6.5–8.5, total dissolved solids (TDS) concentration of surface water varies from 172–8612 and desirable limits of TDS concentration between 50 – 2100 mg/l, and the sulphate concentration of surface water varies from 15 - 552 and desirable limits of sulphate concentration between 400-1000 mg/l, the fluoride concentration of surface water varies from <0.1 - 0.42 and desirable limits of the fluoride 1.5 mg/l, the total hardness concentration of surface water varies from 101-1697 and desirable limits of the total hardness between 200-1000 mg/l, the dissolved oxygen (DO) concentration of surface water varies from 6.2 - 7.1 and desirable limits of the dissolved oxygen between 4-6 mg/l, the Biochemical oxygen demand (BOD) concentration of surface water varies from 2.3 – 6.8 and desirable limits of the BOD 2 – 3 mg/l, and the chemical oxygen demand (COD) concentration of surface water varies from 11.3 - 34 and the desirable limits of COD 5-6 mg/l. The Faecal and Total coliforms were present in surface water of the project area. The concentration of all other parameters is found to be well within the CPCB Standards at all monitoring locations of surface water, Except Ulhas River where Turbidity, Chloride, conductivity, total hardness, DO, BOD and COD levels were high then the CPCB limits of surface water. The higher concentration of these parameter is

high due to mixing of sea water in Ulhas River.

Physiography: The topography of the project area is plain terrain in few locations, the alignment is crossing through low lying areas and foot hills and rolling terrain, built-up areas, railways lines, rivers, streams, CRZ, forest, national parks, wildlife sanctuary etc. Physiographically, the project districts fall in the Western Coastal plain of Maharashtra, which forms a part of the Konkan Plain, which are marked by rugged topography.

Geological Description: The area of the MMC has been classified as volcanic rocks and minor basic intrusions. The general area of the project consists mostly of nearly horizontal dispersed lava flows of Deccan Trap Basaltic Formation of Mesozoic Era. The thickness of the Igneous Bedrock in the area is anticipated to be more than 1500m. The igneous rocks are generally of horizontal deposition. However, the inclination of the rock layers near the Mumbai region ranges between 5 degrees to 15 degrees with the horizontal.

Hydrogeology: Deccan Trap Basalt of upper Cretaceous to lower Eocene is the major rock formation and intruded by a number of dykes. The western part of the district consisting Basalt flows are altered to Laterite. Recent deposits comprising Beach Sand and Alluvium occur along the coast and in the river mouth; however, they do not form potential aquifer.

Seismology: As per GSHAP data, the state of Maharashtra falls in a region of moderate to high seismic hazard. As per the 2002 Bureau of Indian Standards (BIS) map, Maharashtra also lies in Zones II, III & IV. Parts of this state has experienced seismic activity in the M6.0-6.5 range.

Soil quality: As evident from the monitoring results the pH values of soils are in the range of 5.35 to 6.87. The soil type varies from loamy sand, sandy loam, clay loam and loam. The nutrient status of soil is also a key element in agriculture. The results also show that the soils of the study area have good amount of primary nutrients i.e., Nitrogen (N), Phosphorus (P) and Potassium (K) content. From the results, it can be observed that the soil in the project area is fertile with high agricultural productivity with appropriate use of fertilizer.

Flora: About 5135 trees and plants exist in proposed ROW of project corridor which are going to be affected by the proposed activity. Approximately **220.24 ha** area of forest and mangroves are falling within proposed corridor. The forest clearance will be obtained for the project. The forest clearance will be obtained for the project.

Fauna: The project corridor traverses approximately 3 Kms through Eco-Sensitive Zone of SGNP. Corridor is not passing through core zone of sanctuary. The Corridor is ppassing through Sanjay Gandhi National Park at two locations. No core area will be diverted. Only 1.6997 Ha of ESZ will be affected of SGNP. Also, the proposed corridor is passing through core zone of Tungareshwar Wildlife Sanctuary (TWLS) for a length of 860 meters. Also, total length of 2.700 km of proposed corridor is passing through the ESZ of TWLS. Core area affected is 0.00 Ha and ESZ affected of TWLS is 2.8295 Ha. The wildlife clearance will be obtained for the project.

CRZ: The proposed alignment is passing through the CRZ area. The CRZ mapping of the project area was carried out by IRS Chennai for various categories of CRZ areas. The affected Mangroves area is approximately 5.92 Hectares. The CRZ clearance will be obtained for the project.

Social: The project corridor is passing through three districts that is Thane, Palghar and Raigad. The area is predominantly agricultural, followed by commercial and industrial establishments. The majority of workers engaged in non-agricultural activities. There are

seven religious' properties along the corridor. Also, corridor is passing through four locations where cattle's cross the corridor. Total land acquisition for the corridor is 1288 Ha and affected structures are approximately 400. There are 311 Project affected families.

1.6 IMPACT AND MITIGATION

The major impacts in any developmental project is change is land use. As this project is green-field and require large area of land for corridor construction. The Land use of the area will change drastically. In addition, during operation phase of the project, the ribbon development also the alignment will further change the Land use from agriculture use to commercial use of land. The major impacts and their mitigation measures associated with land are given as follow.

1.6.1 Landuse

Impacts: Approximately 220 Ha of Forest land needs to be diverted. Also, approximately 5135 trees will be removed due to project.

Mitigation: Forest Clearance will be obtained prior to construction and Project proponent would abide conditions such as Compensatory Afforestation. The compensatory plantation will be carried out as per the State Government Policy

1.6.2 Social

Impacts: A total of 1288 Ha of land has to be acquired for the Project, out of which 700 ha is agricultural land. There would be impact on approximately 400 structures along the corridor. There are total 311 Total Project Affected Families (PAF). Seven (7) cultural properties exist along the project corridor out of them, 3 shrines will be impacted due to the proposed MMC project.

Mitigation: Compensation for the affected land, property and other assets would be awarded based on the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 20I3 (LARR Act 2013).

1.6.3 Water Resource

Impacts: There are 23 number of streams, 13 number of ponds and one bore well which will be directly and indirectly affected due to proposed development. Also, there is one bore well which will be impacted due to proposed development. The ground water was monitored at six locations along the proposed corridor. It was observed that ground water quality is genellay good in project area.

Mitigation Measures: Providing major bridges (29 Main Carriageway + 17 Service Road) and minor bridges (21 Main Carriageway + 13 Service Road). Total 135 numbers of culverts including balancing culverts are provided. Also there are 123 structures over ponds and wetlands have been provided. Also, the water quality will be monitored during construction and operation phase of the project for checking and control of water quality.

1.6.4 Soil

Impacts: The Monitoring results also show that the soils of the study area have good amount of primary nutrients i.e., Nitrogen (N), Phosphorus (P) and Potassium (K) content. From the results, it can be observed that the soil in the project area is fertile with high agricultural productivity with appropriate use of fertilizer.

Mitigation: The soil quality will be monitored during construction and operation phase of the project for checking and control of soil quality. Also, other measures to control the soil pollution and contamination will be implemented during construction and operation.

1.6.5 Wastewater

Impact: Total 250KLD water will be used for construction. However, 120 KLD will be used for workers camp and labour camp during construction, which will generate 96 KLD wastewater. Also 60 KLD water will be used during operation which will generate 48 KLD wastewater.

Mitigation: The wastewater would collect from site on regular basis and treated in nearby common effluent treatment plant. If water would discharge outside. Also measures of water conservation will be adopted during construction and operation stage.

1.6.6 Solid and Construction Waste

Impact: It is anticipated that 500 kg/day municipal waste will be generated during construction phase and 125 kg/day waste will be generated during operation phase of the project. Total 954000 Cum muck will be generated while excavation of three tunnels.

Mitigation: Waste should be stored within a temporary refuse collection facility, in appropriate containers prior to collection and disposal. Regular, daily collections are required by an approved waste collector and recycler. Out of total muck 70% quantity of will be utilised in making aggregate and road embankment and balance 30% quantity will be utilised for filling of Metro corridor.

1.6.7 Air Pollution

Impacts: There will be dust and gaseous pollution during construction stage due to construction activities and construction vehicles and equipment's. The baseline concentration of particulate matter is generally high at all locations, therefore cumulative concentration after incremental concentration is exceeding the CPCB limits of particulate matters during operation stage. However, concentration of gaseous pollutants is within the limits of CPCB standard.

Mitigation: The Baseline concentration of particulate matter is already exceeding the CPCB standard limit, therefore resultant concentration during operation phase of the project is exceeding the CPCB limits. The gaseous pollutants are within the limit during operation phase. However, contributions of new technologies, green bet development, and better fuel have not been considered for prediction of air pollution. It is expected that situation of dust pollution will be better than the current situation in future. The measures like water sprinkling, use of bag filter and other dust control measures, regular maintenance of vehicles and equipment's and PUC under control certificate will be used as air pollution control measures. Also tree plantation will be carried out in open spaces for pollution control.

1.6.8 Noise

Impacts: There will be generation of noise during construction stage due construction activities and vehicles and equipment's used for construction. The predicted and resultant noise levels during operation stage will slightly exceeds the CPCB National standard of Noise due to increase of traffic on this corridor.

Mitigation: An integrated strategy is proposed for the prevention and control at different stages for the reduction of noise propagation from sources to receptors. The first step is to control emission of noise at the source itself, followed by noise control within the sound transmission path and lastly is the option of protection at the receiving end like construction of the masonry walls / provision of Noise barriers. The provision of noise barrier is given as mitigation measure. To reduce noise and vibrations, compound wall /noise barriers will be proposed as per design requirement. As per research carried out in the developed countries, a masonry wall

has Noise Reduction Coefficient (NRC) value between 0.1 to 0.5. Most of the sensitive receptors have their own compound wall. The provision of noise barriers will be designed and provided as per the requirement. Series of trees plantation as per IRC/MoRTH guidelines are also proposed along the corridor within available ROW.

1.6.9 Critical Habitat

Impact: There will be direct and indirect impact on critical habitats. The direct impact is acquisition of wildlife area in core zone and Ecosenstive Zone (ESZ). There will be impact on 2.8295 Ha land of Core Zone of Tungareshwar Wildlife Sanctuary. However, there is no impact on Core Zone of Sanjay Gandhi National Park (SGNP). There will be impact on 9.70 Ha ESZ of TWLS and 17.27 Ha ESZ of SGNP. Also, the corridor is passing through 11 Kms ESZ of Thane Creek Flamingo Sanctuary. There would be impact on Coastal Regulation Zone due to project corridor. The 5.92 Ha of mangroves will be affected due to project.

Mitigation Measure: Major section of the alignment passing through the concerned protected areas has been designed to tunnels and elevated road that would work as wildlife overpass and wildlife underpass within the sensitive location. The tunnel and the elevated sections would allow free movement of wildlife along the concerned protected areas. This will also restrict animals coming on to the road and hence avoid wildlife deaths because of accident. No construction work to be carried out during nighttime along the proposed alignment passing through notified ESZ of Sanjay Gandhi National Park, Core zone and ESZ of Tungareshwar Wildlife Sanctuary. Informative sign boards at appropriate places along the alignment. Coastal Biodiversity plan will be implemented during construction and operation phase. Compensatory plantation for affected mangroves as per MCZMA. The forest, wildlife and CRZ clearance will be obtained for the project. The conditions of clearances will be abide by during construction and operation phase of the project.

1.7 PROJECT BENEFITS

- Savings in travel times – from faster vehicle speeds and reductions in congestion of Greater Mumbai-Navi Mumbai the projected overall savings in travel time and fuel consumption and it will also reduce the emission of dust.
- reduced vehicle operating costs – from improved riding surfaces.
- reduced road maintenance costs – from higher quality infrastructure.
- reduction in exhaust emission due to better road and metro operation.
- reduced accidents – mainly as a result of reduced travel time and congestion but also because of the provision of safety infrastructure and warning signs, though this latter element was impossible to quantify – it was, however, estimated that the benefits from a 50% reduction in accidents; and
- A large volume of generated traffic is, however, also forecast. This is traffic stimulated by the reduction in travel costs and associated with new economic development.
- Improved access to the Greater Mumbai, Bhiwandi, Panvel, JNPT
- new businesses, including that from increased passing trade
- reduced cargo delays – from faster vehicle speeds and reductions in travel time.
- Project will help in ribbon development along the project corridor

- Enhance the connectivity of corridor side villages and markets
- Enhance the local employment opportunity along with various developmental works.

It will enhance economic development, Security, movement of people, provide employment opportunities to locals, strengthen tourist development, ensure road safety and provide better transportation facilities and other facilities such as wayside amenities as per IRC guidelines.

1.8 PROJECT COST AND EMP COST

The total estimated project cost for the Proposed Multi Modal Corridor from Navghar to Chirner (near JNPT) (Ch.0+000 to Ch.80+000) is about Construction Cost-Rs. 15382.29 Cr. and Land Acquisition Cost-Rs.18225 Cr. The Environment Management cost is approximately (10.41 Crores) Ten Crore Forty One Lakh.

1.9 CONCLUSION

This EIA was focused on interactions between the Project activities and various resources/receptors that could result in significant impacts. The major impact would be change in landuse. Also, there would be some air & noise pollution, waste generation, impact on agricultural land, impact on properties along the corridor. There would be impact on wildlife due to bifurcation of TWLS and SGNP habitats. Also, project will impact on CRZ area and Mangroves. However, the project will enhance the economic development of the region and provide fast and safe movement options to people of the area. The forest, wildlife and CRZ clearance will be obtained for the project. The compensatory plantation and avenue plantation will improve the green cover of the area. With best management practices and a proper environmental management and monitoring plan during construction and operation stages, the proposed project is not expected to cause any significant adverse effects on the surrounding environment.