EXECUTIVE SUMMARY

0.1 INTRODUCTION
National Highways Authority of India (NHAI) has been entrusted with the implementation of NHDP Phase-V which involves six laning of 6500 km of National Highways comprising 5700 km Golden Quadrilateral and 800 km of other National Highways. The Ahmedabad-Vadodara road corridor is a part of Delhi-Mumbai leg of Golden Quadrilateral corridor. This section of NH-8 from Ahmedabad to Vadodara in the State of Gujarat is proposed to be taken up for six laning under NHDP Phase-V. The project is proposed to be implemented under Public Private Partnership (PPP) mode and executed as Design, Build, Finance and Operate (DBFO) contracts.

0.2 PROJECT ROAD
The project road is part of NH-8 passing through Gujarat State and starts from Ahmedabad (km 6.400) and ends near Vadodara town at the junction of Ahmedabad-Vadodara Expressway and NH-8 (km 108.700). The project road passes through the districts of Ahmedabad, Kheda, Anand and Vadodara in Gujarat State.

This section of exiting NH-8 is parallel to the Ahmedabad-Vadodara Expressway. Four laning of some sections of this National Highway was carried out in the past in phases, according to the priority, traffic level and availability of funds. Therefore it has different configuration of cross sections. The existing road has four lane divided carriageway in an aggregate length of 33.80 km length (including approaches to junctions), four lane carriageway without median in an aggregate length 8.6 km and two lane carriageway in 60.0 km length.

A two lane major bridge over river Vartak along with its approaches (km 33.430 to km 42.180) which forms Kheda Bypass constructed on BOT basis is also a part of the project road. **Fig. Es 1** shows the map depicting the location of project road.

0.3 PROJECT INTERVENTION
The proposed improvement will aim at improving riding quality and journey speed and reducing traffic congestion on the highway. The options of concentric widening and left or right side widening have been considered for the improvement project so as to utilize the existing right-of-way (ROW) as far as possible and to save the religious / community properties along the road. The carriageway width of this section of NH-8 for major portion of length is of two lane standard with paved shoulders on both sides and the balance length is of four lane standard. There is no median or divider in some section of the four lane carriageway. Otherwise, the four lane section has either divider or median in the balance length. Summary of salient features of the road has been summarized in **Table Es 1**.
Feasibility for Six Laning of Ahmedabad-Vadodara Section of NH-8 to be Executed as BOT (Toll) Project on DBFO Pattern Under NHDP Phase-V

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Table Es 1: Summary of Salient Features of Project Road

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Features</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Existing Chainage</td>
<td>Project road starts from km 6.4 of existing NH-8 from Ahmedabad Bypass and ends at km 108.700 of NH-8 near Vadodara town at the junction of Ahmedabad- Vadodara Expressway</td>
</tr>
<tr>
<td>2.</td>
<td>Length (Km)</td>
<td>102.300 Km.</td>
</tr>
<tr>
<td>3.</td>
<td>Improvement</td>
<td>Six laning of existing NH-8 Section between Ahmedabad and Vadodara</td>
</tr>
<tr>
<td>4.</td>
<td>Village/Towns.</td>
<td>Narol, Aslali, Jetalpur, Kheda, Nadidad and Anand are the major settlements.</td>
</tr>
<tr>
<td>5.</td>
<td>Rivers</td>
<td>Meshow, Vatrak, Mahi and Mini</td>
</tr>
<tr>
<td>6.</td>
<td>Existing Bridges</td>
<td>4 Major Bridges and 12 Minor Bridges</td>
</tr>
<tr>
<td>7.</td>
<td>Culverts Existing</td>
<td>170 Nos.</td>
</tr>
<tr>
<td>8.</td>
<td>Trees on ROW</td>
<td>Total: 39,590 No. (including 5,007 Nos. on Kheda Bypass)</td>
</tr>
</tbody>
</table>
0.4 ENVIRONMENTAL IMPACT ASSESSMENT OF THE PROJECT

The Environmental Impact assessment comprised of collection of environmental baseline conditions in the project area, identification of potential negative environmental impacts and their feasible remedial measures (including avoidance, mitigation and enhancements) and Environmental Management Plan.

0.5 THE STUDY METHODOLOGY

The Environmental impact assessment in this project has an approach in which potential environmental impacts have been examined at successive levels of detail and specificity at each step in the process. Following is the methodology used:

- Collection and review of the documents and legal policies.
- Defining scope of work and project influenced study area as per the MoEF EIA guidelines for Highway project.
- Collection of secondary data.
- Generation of primary data - field surveys, public consultation, strip planning, tree counting.
- Documentation of secondary & primary data and defining the Environment.
- Analysis of alternatives.
- Assessment of potential impacts followed by identifying possible mitigation measures.
- Preparation of Environmental Management Plan (EMP)

0.6 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Review of the existing legislation, institutions and policies relevant to the Environmental Impact Assessment at the National and State levels has been done and clearance requirements for the project at various stages of the project have been identified.

Environmental Clearance

As per the EIA Notification of 14th September 2006, all new National Highway projects and expansion of national highway projects greater than 30 km and involving additional right of way greater than 20 m involving land acquisition and passing through more than one state will be categorised as Category A project and will require Environmental Clearance from MoEF. All state highway projects and expansion of national/state highway projects greater than 30 km and involving additional right of way greater than 20 m involving land acquisition will be categorised as Category B project and will require Environmental Clearance from the State Impact Assessment Authority.

The proposed project is a modification/up-gradation of existing 2/4 lanes to 6 lanes. The available ROW is generally 45m and at some locations it is more. The proposed ROW is 60m in most of stretches however; the proposed ROW is more than 100 m at all junctions (because of junction improvements). Thus the proposed project road falls under ‘Category A’ as per EIA Notification 2006 and subsequent amendments and thus requires prior Environmental Clearance from Ministry of Environment and Forests.

Tree felling permission would be required to be taken for cutting of trees that are existing within the proposed ROW. Also permission will be required to be taken from State Forest Department for land diversion of notified protected forest area.
The requirement of obtaining the clearances from authorities at the state level for the project is indicated in **Table Es 2**.

### Table Es 2: Clearance Requirement for the Present Project

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Activity</th>
<th>Statutory Authority</th>
<th>Relevant Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Permission for sand mining from river bed</td>
<td>Department of mining, Govt. of Gujarat. The Collector of the district will grant short-term mining lease.</td>
<td>Gujarat Minor Minerals Rules, 1966</td>
</tr>
<tr>
<td>2.</td>
<td>Setting of hot mix plants, crushers and batching plants</td>
<td>Gujarat Pollution Control Board</td>
<td>Air (Prevention and Control of Pollution) Act, 1981 and the Noise Pollution (Regulation and Control) Rules, 2000</td>
</tr>
<tr>
<td>5.</td>
<td>Waste water discharge from labour camps</td>
<td>Gujarat Pollution Control Board</td>
<td>Water (Prevention and Control of Pollution) Act, 1974</td>
</tr>
<tr>
<td>6.</td>
<td>Disposal of bituminous wastes</td>
<td>Local Civil Body to identify solid waste disposal sites</td>
<td>Hazardous Waste (Management and Handling) Rules, 1989</td>
</tr>
<tr>
<td>8.</td>
<td>Tree felling and removal from non-forest areas</td>
<td>District Level Committee constituted by the State Govt. and chaired by the District Collector</td>
<td>Procedural Guidelines developed by the Department of Environment, under the orders of the Hon’ble High Court; Tree removal will be guided as per state government rules.</td>
</tr>
</tbody>
</table>

**0.7 DESCRIPTION OF ENVIRONMENT**

As defined in the scope of works, baseline data on various physical, biological and social aspects has been collected, analyzed and compiled in order to get the picture of the existing environment condition in the project area.

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0.8 PHYSICAL RESOURCES

Topography
The project road passes through plain terrain. It can be observed that altitude in the project area varies from 150m to 300m. Major stretches of the project road lie in the western alluvial plains.

Geology
The project road passes through Holocene sediments represented by “Flood plain deposits” lithological unit of Katpur formation1.

The project area comprises of a thick cover of alluvium with few sporadic outcrops of deccan traps and limestone. The area is almost flat covered by brown sand and clayey soil.

Soil Type
The soil in different stretches of project road (passing through Ahmedabad, Kheda, Anand and Vadodara districts) is as follows:

Ahmedabad2: Fine loamy and mixed soil with slight to moderate salinity.

Kheda3: Very deep, well drained, calcareous, fine to coarse, loamy soil on gently sloping dissected flood plain, level flood plain and alluvial plain.


Surface Water
The major surface water bodies intersecting the project highway include Meshow, Vatrak River, Mahi River and Mini River at chainage Km 30.800, Km 35.200, Km 92.400 and Km 97.700 respectively. Also the project road crosses canals at many locations. The water quality parameters measured in the past at Vatrak and Mahi river sections along the project road showed values within permissible limits except for Coliforms. It is observed that Mahi River is minimally polluted and Coliform concentrations in River Vatrak indicate sewage pollution of the river.

The proposed project area comes under Sub zone 3(a) for Mahi and Sabarmati Basin. Determination of Design Discharges has been done in line with the IRC codal stipulations. The Return Period Flood adopted in design is as follows.

- Waterway for bridges: 50 Years
- HFL for Bridges: 50 Years
- Scour for foundation design: 50 Year Flood multiplied by suitable factor
- Design of Roadside Drains/Culverts: 25 Years (both for rural and urban areas)

Ground Water
Water quality along the project road is good as reported by the local communities. Water from ground water resources is suitable both for drinking and irrigation purposes. Ground water quality monitoring results are indicative that there is no cause for concern. The

1 Source: District Resource Map, Ahmedabad and Gandhinagar Districts, Kheda District and Vadodara District published by Geological Survey of India, 2002
3 Source: District Resource Map, Kheda District published by Geological Survey of India, 2002
4 Source: District Resource Map, Vadodara District published by Geological Survey of India, 2002
ground water quality is good as reported by the local residents and the same is confirmed by the analytical tests carried out on some groundwater sources along the project area in the past.

It was observed that all the monitored parameters in the past are within the permissible limits specified for drinking water except for Total Dissolved Solids (TDS) at Dashrath Village in Vadodara District indicating presence of dissolved minerals in groundwater in the region.

As per Central Ground Water Board reports the net annual groundwater availability for the state of Gujarat is 15.02 BCM (Billion Cubic Meters), annual groundwater draft is 11.49 BCM and the stage of groundwater recharge is 76%. The alluvial plains in the project area provide better conditions for the recharge of groundwater.

**Climate**

The climate of this region is characterized by a hot summer and dryness in the non rainy seasons. Climate in a year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The south west monsoon season is from June to September while the months of October and November form post monsoon season.

**Temperature**

The period from March to May experiences continuous increase in temperature. May is generally the hottest month. The weather is intensely hot in summer. With the onset of monsoon by about mid-June there is appreciable drop in day temperature but nights are as warm as nights during summer. With the withdrawal of the monsoon by about the end of September, there is slight increase in the day temperatures and secondary maximum in day temperature is reached during October. However the nights become progressively cooler. From November, both day and night temperatures begin to decrease rapidly. January is generally the coldest month.

**Humidity**

During south-west monsoon season the humidity is generally high. Rest of the year the air is comparatively drier. The driest part of the year is summer season when the relative humidity in the afternoons is less than 25%.

**Cloud Cover**

During south-west monsoon season, the skies are generally cloudy or overcast. Rest of the year, the skies is mostly clear or lightly clouded.

**Wind**

Winds are generally light and moderate in summer. They become stronger when westerly to south-westerly winds prevail during the south-west monsoon season. In October winds are from west and north east. In November and December winds are mainly from north–east direction. In January and February winds are again from west and north-east directions. In the summer season the winds are pre-dominantly from south-west and north-west direction.

**Natural Disaster Hazard**

Gujarat state is highly prone to multi hazards due to its geographical positioning, close proximity to sea, arid and semi arid nature, presence of big rivers and presence of large number of chemical industries. According to seismologists, 23% of area in Gujarat lies in seismic zone V with a probable intensity of 6 to 9 on Richter scale. Almost 75% of the
remaining area lies in seismic zone III and IV showing moderate to high damage risks of earthquake. The state has the longest coastline (1600 km) in India and it falls in the region of tropical cyclones generated in the Arabian Sea and most of project road area is in flood zone.

Gujarat is also one of the fastest growing states of India with a rapid spurt in growth of chemical industries. Gujarat has a very high level of exposure to chemical hazard risks. The area from Mehsana to Vapi is heavily industrialized and popularly known as Golden Corridor (from economic point of view). Besides, there is also a possibility that the natural hazards and chemical hazards will collide, aggravating the human and economic impact.

**Land Use Pattern**

The land use pattern of the project area is mainly agricultural land followed by settlements, industrial and commercial areas.

**Air Quality**

Ambient air quality of the study area is good as reported by the local people. The air quality parameters (PM$_{2.5}$, PM$_{10}$, SO$_2$ and NOx ) measured in the past at various locations along the project road showed values within permissible limit.

**Noise Level**

Noise is not a major problem in the study area except at market places and congested areas of major towns and the monitored data were within permissible limits.

**ECOLOGICAL RESOURCES**

The project area passes through vegetation cover of uniformly distributed trees along the road. Tree inventorisation within the proposed ROW revealed that there are about 39,590 trees (including 5,007 Nos. on Kheda Bypass) comprising of *Azadirachta Indica* (Neem), *Acacia Nilotica* (Desi Bawal), *Prosopis Juliflora* (Gando bawal), *Eucalyptus Globulus* (Nilgiri), *Mangifera Indica* (Mango), *Phyllanthus emblica* (Amla), *Syzygium cumini* (Jamun), *Cassia Fistula* (Amaltas) which are likely to be affected due to the widening activity. Some of the trees along the existing chainages are mature with good girth size.

**Protected Forest/ Reserved Forest**

The entire stretch of trees along the project road is classified as protected forest as per Gujarat Government Gazette dated July 5, 1973. Reportedly, the plantation was carried out by Social Forestry Division of the Forest Department in phases. There is no reserved forest within 10 km distance on either side in the entire stretch of the project highway.

**Wildlife and Bio-diversity**

Project road does not pass through any National Park/Wild Life Sanctuary. Domesticated animals constitute the major proportion of faunal density in the area surrounding the project highway. No endangered species has been reported in the area. No endangered species of avian fauna has been recorded in the influence zone of the proposed project. No wildlife has been found during the field visit. Some of the common species of fauna in the project area includes Monkey, Nilgai, Jackal, Wild Cat etc.

**SOCIO CULTURAL ENVIRONMENT**

The project highway traverses through 48 number of villages/ settlements and is often dotted with religious and cultural properties, which though not of archaeological significance are nevertheless, very significant to the community. Cultural properties along the project highway were identified and documented based on site surveys. Agriculture
Feasibility for Six Laning of Ahmedabad-Vadodara Section of NH-8 to be Executed as BOT (Toll) Project on DBFO Pattern Under NHDP Phase-V

continues to be the primary occupation of the majority of people along the project road. The main crops grown in the area are rice, jowar, bajra, wheat and maize.

Archaeological and Cultural Sites
There are Archeological Sites located within 15 Km from the project road. However the impacts due to the project road on these are insignificant.

Industries
Many industrial units are located along the project road with the prominent ones being cold storage units, auto-parts related and transport companies. A total of about 140 industrial units are located along the project road.

0.11 PUBLIC CONSULTATION
Community consultations were held with Project Affected Persons (PAPs), other stakeholders and the general public to determine their views about the proposed road and incorporate their suggestions while finalizing the alignment. Village level consultations were held at the villages of Bareja, Jetalpur, Kheda Chowkdi, Dabhan, Aslali, Dumaral, Dashrath and Padamala. The people were generally in favour of construction of the road, as it would reduce traffic congestion, increase safety and improve socio-economic status of the area. On the basis of community consultations following recommendations have been made:

- Compensatory plantation of trees; as per state forest department for each tree removed in accordance with state guidelines.
- Adoption of stringent control measures for air and noise pollution during construction and operation particularly near settlements and junctions.
- Provision of adequate cross drainage structures.
- Prevention of deterioration in surface water quality through sediment control and adoption of a protocol for material handling & storage.
- Safety measures at work site through traffic management and provision of personal protective equipment for work force.
- Protecting sensitive receptors like schools and hospitals close to ROW from high noise level.
- Impacting minimum number of cultural properties like temples/shrines coming close to ROW.
- Employment of local labour during construction stage.
- Provision of pedestrian/cattle underpasses at needed locations

0.12 ANALYSIS OF ALTERNATIVES
An analysis of “With” and “Without” Project scenario reveals that the positive impacts outnumber the negative impacts due to the proposed development. The negative impacts are envisaged only during the construction period which will be limited, time-bound and restricted to construction stage only. Further mitigation measures will be adopted to limit the impacts during the construction phase.

The proposed expansion will aid in infrastructure development and will act as a catalyst to boost the economic progress. It was revealed during discussions with various stakeholders that after the operation of the expressway between Ahmedabad and Vadodara, the traffic has reduced considerably on NH 8 and this has affected the economic growth. The commercial activities along the project road have witnessed decline in sales and this has also affected some small handicraft units whose business thrived solely on commuters plying on the highway. With the proposed expansion which
will ensure smooth traffic, it is envisaged that commercial establishments will revive their business and this will inturn boost the economic development.

0.13 IMPACT ON ENVIRONMENTAL RESOURCE

Impacts on environmental parameters and proposed mitigation measures are detailed in the matrix at Table Es 3.

**Table Es 3: Summary Impact Mitigation Matrix**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topography</td>
<td>Impacts very low, but permanent.</td>
<td>No mitigation measure is required.</td>
</tr>
<tr>
<td>Geology</td>
<td>Impacts low level through removal of stones aggregate and sand from identified quarries.</td>
<td>No mitigation measure is required.</td>
</tr>
<tr>
<td>Soils</td>
<td>• Physical &amp; chemical contamination of soil.</td>
<td>• Dumping of construction waste at approved locations protected by berms.</td>
</tr>
<tr>
<td></td>
<td>• Compaction and structural damage.</td>
<td>• Reuse of construction waste.</td>
</tr>
<tr>
<td></td>
<td>• Soil erosion.</td>
<td>• Storage of construction material in accordance with the IRC norms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoiding work during periods of heavy rainfall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rehabilitation of borrow area for productive use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conservation of topsoil for reuse in planting pits and rehabilitation of borrow areas, sodding /grass turfing and implementation of soil erosion control plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provision of silt fencing and sedimentation traps</td>
</tr>
<tr>
<td></td>
<td><strong>Climate</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature/Rainfall/Humidity</td>
<td>Low spatially restricted short-term impact.</td>
<td>• No mitigation measure is required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Productivity</td>
<td>• Land will be diverted for this project including agricultural land affecting productivity at the micro-level. Impact significant at micro level and insignificant at macro-level.</td>
<td>• Payment of compensation for loss of lands under agriculture.</td>
</tr>
<tr>
<td>Induced Development</td>
<td>• Insignificant change in</td>
<td>• Civil authorities to plan and</td>
</tr>
</tbody>
</table>

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### Subject

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>the land use pattern</td>
<td>guide any induced development using the prevailing regulatory framework.</td>
</tr>
</tbody>
</table>

#### Water Environment

**Surface water**
- 3 rivers and 19 ponds will be impacted due to the project.
- Degradation of some water quality parameters like pH, COD, BOD, TDS, Turbidity etc.
- No impact on availability.
- Use of sediment traps, silt fencing sodding grass turfing, etc. for minimization of soil movement, use of cofferdams for construction of abutments and bridge pier. Cofferdams to be made of such material that cannot be brought into suspension by flowing waters.
- Minimization of disturbance of stream substrate to only that necessary for placing abutments or piling.
- Tarpaulins or other catchment devices will be slung under the bridge to prevent entry of debris, wastes and toxic items into the stream
- Provision of adequate cross drainage structures.
- Implementation of a protocol for storage of topsoil construction waste away from water sources.
- Location of onsite refueling station away from water resource.
- Use of oil/water separators to extract floating.
- Avoidance of lead-based paints in painting components of the bridge
- Monitoring of water quality during construction and operation.

**Ground water quality**
- 3 wells, 4 borewells and 4 hand pumps are located along the existing road within the 50 m from the central line on either side of the road.
- Not very significant
- Out of these water sources a few numbers will be impacted due to eccentric and concentric widening of the road.
- Relocation of impacted ground water facility in consultation with
subject | potential impact | mitigation measures |
---|---|---|
Environment | impact on quality and no impact on availability. | • Provision of separate water facilities for construction camp.  
• Provision of rainwater harvesting structures every 500 m along project road in Vadodara (15 Km stretch) and Ahmedabad (16 km stretch) Districts. |
Air | • Increased gaseous pollution along with fugitive dust emissions. | • Asphalt plant, Crusher, Batching Plant, will be sited 1000 m in down wind direction from nearest settlements.  
• Vehicles and construction equipments to be maintained properly; to maintain PUC certificate.  
• Transportation and delivery construction materials & waste properly covered to avoid spills & dispersion.  
• Construction of wind breaking walls near stone crusher units will avoid dust laden air travelling to built-up areas and sensitive locations. |
Noise | • Construction phase impact low to moderate spatially restricted and reversible.  
• During operation phase beneficial impact in the initial phase and persistence of such beneficial impact will depend on the future traffic volume & quality of maintenance of road. | • Construction plant & machinery to be located 1 Km away from settlements.  
• Displacement of people and demolition of structures will be avoided to the extent possible.  
• Construction vehicles and equipments fixed or mobile to be equipped and maintained with effective muffler system.  
• Proper Traffic management near sensitive receptors.  
• Putting up “no horn” signage near sensitive receptors.  
• Provision of earplugs to workers.  
• Noisy construction to be restricted during the hours between 7 am and 7 pm. |
## Subject

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecology</strong></td>
<td></td>
</tr>
<tr>
<td>Flora</td>
<td></td>
</tr>
</tbody>
</table>
| There are about 39,590 trees (including 5,007 Nos. on Kheda Bypass). | • Provision of sound screens near sensitive receptors during construction phase.  
• Provision of noise barriers near sensitive receptors during operation phase.  
• Compensatory plantation, along roadside: two trees be planted for each trees removed as per State Government guideline. |
| Fauna            |                     |
| The project road passes through Protected forest area along the entire stretch but no endangered / rare species was reported during the field visit. | • No mitigation measures required. Construction workers will be made aware about the provision of the Wild life (Protection) Act 1972 as forest areas come within the area of indirect influences in some stretches. |
| **Socio Environment** |                     |
| Socio Environment | • Displacement of people.  
• Demolition of Structures.  
• Acquisition of agricultural land.  
• Influx of construction workers.  
• Resettlement of people as per provisions of RAP.  
• Displacement of people and demolition of structures will be minimized to the extent possible.  
• Compensation for loss of land under agriculture will be provided.  
• Ensure employment of local labour in unskilled and semi skilled sector.  
• Setting up migrant workers camp at least 1 Km away from settlements. |
| Archeological Monuments / Historical structure. | • There are archeological monument present in immediate COI  
• No mitigation measure required. |
| Religious Structures/cultural property | • There are a total of 116 religious structures along the ROW out of which a few may get impacted.  
• May avoid such condition by relocation of impacted structure in consultation with the community.  
• Through eccentric and concentric widening |
<table>
<thead>
<tr>
<th>Subject</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public health and road safety</td>
<td>• Psychological impacts of project affected people.</td>
<td>• Continued consultation with PAPs and the competent authority for speedier settlements of appropriate compensation package and resettlement.</td>
</tr>
<tr>
<td></td>
<td>• Migration of worker may lead to sanitation problem creating congenial condition for disease vectors.</td>
<td>• Ensure sanitary measures at construction camp to prevent water borne diseases and vector borne diseases.</td>
</tr>
<tr>
<td></td>
<td>• Discomfort arising of air and noise pollution.</td>
<td>• Provide appropriate personal protective equipments like earplugs, gloves gumboots, and masks to the work force.</td>
</tr>
<tr>
<td></td>
<td>• Hazard of accidents.</td>
<td>• Safe traffic management at construction area.</td>
</tr>
</tbody>
</table>

0.14 ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN

Environmental Monitoring and management Plan ensures that the environmental mitigation measures and enhancement programme are properly implemented and the responsibility for implementation is clearly demarcated. Monitoring of environmental quality during construction and during operation reflects the success of implementation of the mitigation measures. Monitoring will be conducted by the project authority with the help of an independent monitoring laboratory approved by MOEF/CPCB Monitoring parameters, locations and frequency for air, water, noise quality testing have been suggested. Monitoring of survival rate of plantations also has been suggested. Monitoring of survival rate of plantations also has been suggested. Monitoring of survival rate of plantations also has been suggested. Monitoring of survival rate of plantations also has been suggested. Monitoring of survival rate of plantations also has been suggested.

An environmental budget for Rs. 9, 23, 47,500 (Rupees Nine Crores Twenty Three Lacs Forty Seven Thousand and Five Hundred Only) has been drawn up. This provides for compensatory plantation, enhancement of sites, and cost of monitoring. This amount has been integrated into the budget.

0.15 CONCLUSIONS

The proposed expansion will aid in infrastructure development and will act as a catalyst to boost the economic progress of the state. It was revealed during discussions with various stakeholders that after the operation of the expressway NE-1 between Ahmedabad and Vadodara, the traffic has reduced considerably on NH 8 and this has affected the economic growth in the region. Commercial activities along the project road have witnessed decline in sales and this has also affected some small handicraft units whose business thrived solely on commuters plying on the highway. With the proposed expansion which will ensure smooth traffic, it is envisaged that commercial establishments will revive their business and this will in turn boost economic development.

With best management practices and a proper environmental management & monitoring plan in place during construction and operation stages, the proposed project is not expected to cause any adverse effects on the surrounding environment.

• • •