

# EXPLORE THE DESIGN AND ENVIRONMENTAL IMPACTS OF KMP EXPRESSWAY

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**Abstract:** The ultimate aim of this papers to study and explore the design and Environmental impacts of KMP expressway. The objective of this study is to identify all significant design and Environmental impacts arising from the construction and implementation of this project. The study seeks to establish present environmental conditions at the project site by available information supported by field studies and data available from secondary sources, wherever necessary; to predict the impacts on relevant environmental attributes due to the construction & operation of proposed project. It is essential therefore to recommend adequate mitigation measures for minimal impacts and to prepare an Environmental Impact Assessment (EIA) report including Environmental Management Plan (EMP) so as the construction works to be carried out in sound environmental standards. The necessity of this study arises from the fact that any project of this size should be examined at various stages to achieve the objective of safe operation of KMP expressway. It ensures safety for all vehicles passes through KMP Expressway and minimizes the risk and severity of accidents with minimal cost and environmental safety.

**Keywords:** Environmental Management Plan, Environmental Impact Assessment, KMP Expressway

## 1. Introduction

Haryana is one of the partner states of National Capital Region. To gainfully exploit the potential of being in close proximity of the national capital and to meet the requirement of various land users for the developed land. Both inter and intra city traffic is increasing day by day as the state has developed some infrastructure in the NCR sub-region of Haryana. Moreover the connecting traffic from and to NH-1, NH-2, NH-8 and NH-10 is also increasing through Delhi. The Hon'ble Supreme Court of India has ordered on 16.12.2001 and 15.07.2002 in writ petition (civil) 13029 of 1985 i.e. M. C. Mehta vs. Union of India that no heavy medium and light goods vehicle will ply on interstate route through Delhi. There can be no corridor or bypass joining different National Highways through Delhi. The corridor, if and when constructed will have to Bye pass Delhi. The Kundli-Manesar-Palwal Expressway in the state of Haryana has been conceived in the light of orders of Hon'ble Supreme Court of India [1]. In this context the Government of Haryana through Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) has proposed to develop an expressway connecting above mentioned highways and bypassing Delhi [2]. The present document is an executive summary of the environmental impact assessment study of the project, which is a statutory requirement under the Pollution Control Laws of Uttar Pradesh Pollution Control Board for the project to be cleared.

## 2. Project Description

It is projected that 135,650 km of overall duration of the planned Kundli-Manesar-Palwal Expressway. The scheme is shared in five areas, i.e. Gurgaon, Mevat, and Palwal. Sonipat, and Yehajar. HSIIDC has already obtained road width of 100 meters in the path of the new highway. This route begins at NH-1 in Kundli, passes via NH-10, Bahadurgarh, Crosses NH-8 in the vicinity of Manesar and finally meets the NH-2 near Palwal. The planned expressway is a 6-lane (3 + 3) dual carriageway, divided highway designed for maximum access control and fitted with intersection grade separators. There would be no sluggish motion in cars on the highway.

The new motorway spans many seasonal lakes, drainage canals, sales lines and nallahs with wide and tiny bridges. The entire embankment has been built for around 132 km, out of the 135.650 km highway. In general, the path on a slope is around 2 m or higher than the surrounding ground. The overall projected costs of the entire project are 3340.81 Crores, including 1020 crores, invested already on work on the route. The unit cost of Rs 24.64 crore per km of road was measured. Some parts of the proposed road pass through the forest land. About 35.63 ha of forestland is involved, the clearance for the forest land has already been taken from the MoEF. Certain operations being scheduled include the installation of junctions, culverts and irrigation works, toll pitches and secondary systems, temporary entry, roads of diversion and the site of WWM plants and other related road maintenance facilities. Offshore research involves the excavation and disposal of building spoils from local quarry areas, job camps and storing of products, the soil from near-by site and ground at landfill sites.

The project will have multiple benefits. It will facilitate construction of all weather high speed access controlled expressway which will decongest the increasing traffic on the existing network of roads. Moreover, this highway provides many advantages such as [4]:

- Quick and secure networking, which saves people's electricity, time of travel and transport.

- The people's employability.
- Local manufacturing, farming and arts and crafts production.
- Tourism and pilgrimage growth.
- Farm goods storage, refining and distribution.
- Return on injury prevention.
- Downward emission control.
- Open up fresh career possibilities.
- Improved access to medical and educational facilities and quick transport of perishable goods such as fruit, vegetables and milk items.
- Life for residents and so on better quality of life.

The initiative would help local economies because it will generate opportunities and improved connectivity through constructing and raising emissions. The initiative would support all demographic groups and does thus not impact any communities negatively or adversely. Each segment includes an executive overview of the project's environmental impact report.

### 3. Methodology

The EIA study covers mainly the setting of an existing environmental scenario, study of specific projects activities and assessment of likely environmental impact, leading to recommendations for the necessary environmental control measures. Environmental Impact Assessment is also considered. Within the existing policy, legal and administrative framework, the EIA study has been completed taking account of all regulatory agencies' applicable environmental laws, regulations and guidelines.

#### Reconnaissance Survey

A detail reconnaissance survey has been carried-out on field study to establish the existing environmental scenario.

#### Collection of Secondary Data

Besides inputs from the client, other secondary data sources (Forest Department, Irrigation Department, Archeological Department of Government of Haryana and Other Institutions etc.) have been identified and available relevant secondary data & published literature with respect to physical, biological and social environment of the study corridor has been collected, reviewed and analyzed to provide the overview for details environmental assessment of the project corridor.

#### Field Observation for Generation of Primary Data

The findings involves the environmental set-up of the research corridor in general, in the right of way (ROW) and of the right of way in particular (10 km on each side of the project road).

The primary data produced by the field analysis supplements the secondary data appropriately.

#### Establishment of Baseline Environmental Status

- By way of evaluation, compilation and study, a baseline environmental status was established;
- secondary information / literature / collected;
- Primary data gathered and produced in field trials and surveys.

#### Establishment of Environmental Management Plan

The EMP calls for preparations for successful preventive measures to reduce negative effects as a consequence of project operations. For the successful application of the EMP, structural improvement, including upgrading and preparation has been suggested. Throughout building and service, the environmental protection system was told.

The cost to recover the greenery due to loss in construction and the cost of restoration of ecosystem and environment has been provided under the environmental enhancement plan. The detailed Environmental Management Plan has been developed following the guidelines under the National environmental policy so as to have minimal damage/loss to the environment during project implementation and construction process.

#### Structure of EIA Report

This EIA study was submitted in compliance with the specifications of the Consultant ToR and the EIA Notification to the Indian Ministry of Environment and Forestry (MoEF).

#### 4. Study Period

The data collection and field monitoring started at site from November 2015 and the same continued for three months. The EIA Report presents the data collected within 10 km of study area, during 1st December 2018 to 31st March 2019. Ambient Air, Noise, soil and water quality samples were collected and analysed by Arihant Laboratory (NABL Accredited Lab), Sonapat, Haryana.

#### Study Area

The data collected was from project site and other stations around it (in 5 km radius around project site).

#### Primary/ Baseline Data Collection- Methodology

Ambient Air, Noise, soil and water quality samples were collected at important locations to assess environment quality and to prepare a baseline database. The detailed methodology for baseline data collection and sampling procedure is given.

#### Secondary Data Collection

Additional data is obtained from other secondary sources such as Water Supply Ministry, India Meteorological Ministry (IMD), Central Ground Water Board, India Geological Survey, State Ground Wasser Department and State Pollution Control Board.

And through interaction with authorities and locals (Consultant's survey). A detailed survey has been conducted for the study of environmental scenario of existing project site from Kundli to Palwa .

In general and on the right-hand side of the route, field measurements provide environmental baselines (ROW), particularly for the study corridor (10 km on both sides of the project path).

The environmental baseline components assessed on the proposed project site are defined in the following sections:

- Geology
- Seismicity
- Land-Use Pattern
- Air Environment
- Water Environment
- Noise Environment
- Biological Environment including Forest, Wetland & Sanctuaries
- Religious and Cultural Property
- Recreational Resources
- Cultural Heritage Sites (Archeological and historical Monuments)

Nevertheless, evaluations of other fields are of a contextual nature which cannot be quantified, and have an effect on the environmental circumstances related to the design, development, and execution of the project. Qualitative assessment has been carried out in all situations.

Positive and Negative impacts on physical, ecological and socioeconomic environment related to the proposed project location and design due to construction of 6-lane expressway (Kundli- Manesar section- 83.00 km) have been undertaken.

#### Potential Impacts

There are three separate classes of environmental parameters.

#### Physical Environment

It includes air, water and land environment. The holistic approach for safeguard of all the components is a must for survival of life.

#### Biological Environment

The local biota including fauna, flora, avifauna, aquatic flora etc. will be disturbed due to project activities.

#### Social Environment

The resettlement and rehabilitation, employment generation, loss of agriculture land etc. Especially the impacts have been assessed over the study area or study corridor of 10 km on either side of the road. If explicitly mentioned, average regional impacts are marginal. Recommendation of effective cost reduction strategies meets effect recognition. The following parts cover these consequences as well as preventative, mitigative, compensatory and reinforcement steps to be implemented at the planning,

constructing and service phases. Possible effects on the environmental elements as a consequence of project operations across various stages of the project process are summarised in Table 5.1. In many phases of the project process, including project venue, planning, installation and working, the impacts on these environmental components were further evaluated.

### **Environmental Impacts During Operation Phase**

#### **a) Land Use & Encroachment**

During operation phase no major impact is envisaged in the land environment. Land use of the nearby areas will be changed from agricultural to commercial and residential. In the operation phase, the temporary structure and camps would be dismantled. No labour or heavy machinery will be there to affect the land and soil quality. After completion, afforestation and landscape give a beautiful aesthetic view to the project road. Commencement of the road increases the commercial, industrial development and residential settlements along the road. Encroachment of squatter's is likely to take place at various open lands unless and until specific measures are not taken.

#### **Mitigation Measure**

- Impact on land environment will be positive due to plantation on embankment and median of the road.
- Settlements of squatters should be strictly controlled by vigilance
- Guidelines to control the land-use should be developed and administered
- Local authority, the collector and revenue officer, should make a contingency plan to control the encroachment within RoW.

#### **Water Environment**

Surface runoff from the project site will increase significantly due to increase in surface area. This result into local flooding and increase in soil erosion rates. Ground water recharge will be adversely affected in the region if no steps have been taken in the design phase and its implementation during construction. The scheme has also been planned to take control of the runoff with longitudinal and medium drains; the drain to the closest cross drainage system.

#### **Mitigation Measures**

- Roadside drains will be cleaned regularly at least once every year prior to onset of monsoon
- In the event of any accidental spillage of motor oil or any other toxic chemical, contingent action plan will be designed.
- Water chutes shall be constructed at regular interval to drain off surface water and proper dissipation measures shall be adopted at the end of slope of the embankment.

#### **Air Environment**

The effect on air quality is primarily due to the airflow on the expressway during the operating process.

Gaseous emission from the vehicular exhaust (CO, SO<sub>2</sub>, NO<sub>x</sub>) will be the major contributors in degradation of ambient air quality. The severity of the impact will depend upon:

- number and type of vehicles plying on the road
- rate of emission from vehicles
- prevailing Meteorological condition of the region

Predictions have been produced to assess the long-term effect of air quality modelling techniques on environmental quality in the area.

a model based on the Gaussian Diffusion equation it was anticipated that the long term variation in air quality during the project life are expected due to change in traffic with time on the road. Considering the peak hourly traffic on the expressway for the year 2016 and 2018, the change in air quality scenario has been predicted.

#### **Mitigation measures**

- Enforcement of rules & regulation along with public awareness will be used to control the vehicular emission.
- Vigilant checking is required to ensure that all the vehicles plying on road must have emission within permissible limits
- Road side plantation along the embankment of expressway

For stability class D conditions for lower wind speeds of 1 m / s, the air quality scenario was established. Two district wind situations, i.e. parallel wind case and crosswind case, were planned for this situation.

The result of these simulations both for CO & NO<sub>x</sub> for the year, 2008, 2013 and 2018. It is observed that the predicted CO levels in the year 2008 case range from 0.04-0.11mg/m<sup>3</sup>, for 2013 the range is between 0.09-0.23 mg/m<sup>3</sup>, for 2018 the range is between

0.14-0.36  $\mu\text{g}/\text{m}^3$ . On comparison with the 24 hourly Average National standards for CO of 4  $\text{mg}/\text{m}^3$ , of mixed industrial use, it is seen that in the year 2018, the CO levels are within the prescribed standards. The project therefore has no negative impact on ambient air quality in terms of CO. The predicted NO<sub>x</sub> levels in the year 2008 range from 50-116  $\mu\text{g}/\text{m}^3$ , whereas for the year 2018 the range is between 161 – 412  $\mu\text{g}/\text{m}^3$ . On comparison with the 24 hourly Indian standards for NO<sub>x</sub> of 80  $\mu\text{g}/\text{m}^3$ . It is seen that in the year 2018, violation of NO<sub>x</sub> standard are expected at a distance of 10m, 20m and 30m from the road edge. This is because of heavy hourly traffic on this section. However, future changes in fuel quality and emission factor may lead to lower values. On comparison with the 24 hourly WHO standard of 400 $\mu\text{g}/\text{m}^3$ , the NO<sub>x</sub> Levels are almost with the limits.

## 5. Conclusions

The overall duration of the project is projected at 135,65 km for Kundli-Manesar-Palwal Expressway project. Work started after environmental approval was received and nearly 68% of land research was completed under EC 's jurisdiction. The 52,33 km (Manesar- Palwal) portion of the highway is now finished and open to public transport. Throughout the development process of the full project and farther into the service phase for the constructed road segment, all the necessary environmental protection activities recommended under the EIA are being implemented.

## Major Environmental Impacts

Through properly implementing the steps described in the EMP, the resulting possible harmful environmental impacts will be mitigated at an appropriate degree. Many acts taken in regard to the proposal planned are:

- The Environmental Management Plan (EMP) is included in the contract agreement made between the concessionaire and Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) in order to reduce the detrimental impacts on the project appreciably.
- Alternative arrangement would be made for shifting of high tension wires and public utilities before the commencement of civil works (i.e. construction) and it must be the part of project planning.
- Attempt shall be made to keep removal of trees as possible as minimum. Afforestation programme shall be made as specified and green-belt should be developed at designated sites; simultaneously, the road construction works. The entire available open space should be filled with the plantation of trees to recover the greenery loss under the Forest Act -1980.
- No rare/endangered species of trees and fauna have been observed along the alignment.
- The Bird Sanctuary and Sultanpur National Park is situated on the path Gurgaon-Farukh Nagar, 50 km from Delhi, 15 km away from Gurgaon, and 2.3 km from the Project Zone, district of Gurgaon, area Zoo.
- Work camps must be set up further from protected lands in such a manner that agricultural property and natural goods would not be intruded.
- Heavy Machineries and Stock-yards will be established at the degraded land to minimize oil and grease pollution. In addition to this, management plan should be followed strictly to control pollution problems and minimal damage to the nearby surroundings.
- Protection measures, erosion control, noise barriers, rain water harvesting structure, enhancement plan etc. should be made in the project design.
- Environment requirements at borrows, quarry, plant site, construction sites should be made in accordance with the Environmental Management Plan.
- Proper precautions are taken during construction so that no major blockage of drainage system is anticipated due to the project.
- The overall impact of noise during construction will be for short- term (for day time only) and can be mitigated.
- Hence, it may be concluded that the project will have significant positive Environmental, Economic, Social, and National impacts. Keeping in view the above approach in design and implementation of all above aspects during the road construction the project will be environmentally feasible in the long run.

## 6. Recommendation For Future Study

The above listed deficiencies are exceptional and must be addressed promptly after the site inspection. This is therefore worth analyzing, as a summary of the RSA and risk management, the effects of introduction of safety measures.

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