Journal of Chemical and Pharmaceutical SciencesISSN: 0974-2115

# Environmental impact assessment on outer ring road Chennai- a study

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**ABSTRACT**

The objective of the venture is to set up an Environmental Impact Assessment (EIA) report for the Outer ring road (ORR) which is being created by Tamil Nadu Road Development Company (TNRDC). The study distinguishes the significant Engineering effects of the Greenfield Outer ring street venture. The product ArcGIS has been utilized to decide the area utilization of the region at a separation of 1km on both the sides of the street. Investigation have been completed to know the degree of contamination in the study region. In light of the conclusions driven relief measures to lessen the negative effects have been proposed which might be connected to the progressive periods of development.

**KEYWORDS:** Environmental impact assessment, Outer ring road, Greenfield outer ring road, Land use, Mitigations.

## 1. INTRODUCTION

Environment Impact Assessment (EIA) is the study to anticipate the impact of a proposed movement/venture on nature. EIA analyzes different choices for an undertaking and tries to distinguish the one which speaks to the best blend of financial and ecological expenses and advantages. EIA inspects both valuable and unfavourable impacts of the undertaking and guarantees that these impacts are checked amid task outline. It proposes to measures to alleviate unfavourable impacts and mitigates the conservative of the Natural resources.

**Evolution of EIA (Stockholm Conference):** The United Nations Conference on Environment and Development (UNCED), from June 3 – 14, 1992 was held at Rio de Janeiro, Brazil. This gathering, called Rio-meeting, was one of the biggest as far as attendance .It had a parallel gathering, that of NGO's who couldn't partake in the fundamental conference. This gathering had acknowledged, expounded and altered a hefty portion of the 1972 Stockholm standards. Article 21 of Stockholm meeting was shaped as Agenda 21, Summit in Johannesburg. The Summit (or Rio+10) in Johannesburg, South Africa, was held from August 24 to September 4, 2002. It concentrated on building a pledge at the most elevated amounts of government and society to better actualize Agenda 21. The guide for accomplishing supportable improvement was detailed. Every nation ought to create National laws taking into account the prudent methodology with the rule of polluter pays for the harm.

**National Environment Policy 2006:** The National Environment Policy (NEP) is proposed to be an announcement of India's dedication to making a positive commitment to worldwide endeavours. This is according to our national duty to a spotless domain, commanded in the Constitution in Articles 48 A (n) and 51 A (g), reinforced by legal understanding of Article 21. It is perceived that keeping up a sound situation is not the state's obligation alone, but rather likewise that of each subject.

**Types of EIA:** Initial Environmental Evaluation (IEE); Limited Environmental Assessment (LEA); Rapid EIA (REIA); Comprehensive EIA (CEIA); Regional EIA (REIA).

**Need of the project:** The proposed Outer Ring Road (ORR) is being created to redirect Intercity Traffic through Outer Ring Road (ORR) around the Chennai City past the current streets. It will circumnavigate the city connecting the major interstates – NH4, NH205, NH45, NH5 and locale streets, along these lines making an immediate hallway entry round the city. A lot of business centers and lodging regions would come up along the Outer Ring Road (ORR). The greater part of the intra-city overwhelming trucks would lean toward this hallway rather than different streets. For each part of street activities, there are related some huge positive and negative effects on adjacent groups and the regular habitat. A portion of the major ecological effects of this anticipate incorporate loss of gainful horticultural terrains, water bodies, green spread, change in area use, quickened urbanization and so forth. Keeping in perspective of the above effects, natural appraisal was done for the present task so as to distinguish the pattern ecological profile of the undertakings region of impact due to the proposed advancement of the street furthermore to get ready Environmental Management Plan (EMP) with a specific end goal to moderate the recognized unfavorable effect on the environmental segments amid the configuration, development and operation phases of the venture street. Description of the Project Environment. The sub-sections below describe the physical, biophysical, social and cultural environment of the project area.

**Study Area:** The Outer Ring Road is a major transport corridor being developed along the periphery of Chennai Metropolitan Area (CMA) by the Chennai Metropolitan Development Authority (CMDA). It is 62.3 km long connecting NH 45 (GST Road) at Vandalur, NH 4 (GWT Road) at Nazarathpet, NH 205 (CTH Road) at Nemilicherry (Thiruninravur), NH 5 (GNT Road) at Nallur and TPP road at Minjur.

**Phase 1:** The Phase 1 of the project covers a distance of 29.65 km. 10 Grade separators at major junctions have been planned along this route. It also includes 50 bus bays on both sides and also truck lay-byes for parking of around 100 trucks.

**Segment I**: The Segment I extends from GST Road (Vandalur) to NH4 (Nazarathpet) covering a distance of 19.7 km. The development covers an area of about 265.38 Hectares.

**Segment II**: The Segment II extends from NH4 (Nazarathpet) to CTH Road (Nemilicherry) covering a distance of 9.5 km. The development covers an area of about 140.9 Hectares.

**Phase 2** The Phase 2 covers a distance of 33.1 km.

**Segment III:** The Segment III extends from CTH Road Nemilicherry (Thiruninravur) to GNT Road (Nallur) covering a distance of 18.8 km. The development covers an area of about 258.02 Hectares. Figure 3 shows the map showing the study area of the project.


**Figure.1. Chennai Outer Ring Road Plan**

**Physical Environment:**

**Climate:** In general temperature are fairly uniform with coolest months occurring from December to march while hottest temperature typically occurs from March to July. Rainfall is bimodal in with long rains occurring from august to November.

**Topography:** Outer-Ring Road section traverses predominantly flat terrain with a few rolling sections especially at bridge locations.

**Figure.2. New Bitumen Outer Ring Road**

**Potential Impacts and Mitigation Measures**:

**Reduction in Green House Gas (GHG) Emissions:** Motorized transport is by far the most dominant and is a major source of pollution and emitter of GHG, especially in the urban areas. Emission of GHG by vehicles is due to traffic congestion, poor servicing, and large number of old second hand vehicles, poor infrastructure and poor road conditions. The preferred alternative for the proposed road project will result in the least quantities of GHG emissions since it will drastically reduce traffic congestion and reduce residence time of vehicles along the corridor from 2 to 3 hours to 10 minutes.

**Reduction in Travel Time and Costs:** Construction of the dual carriage way will significantly shorten the travel time to International Airport due to reduced traffic congestion. Currently it takes 2 to 3 hours to traverse the 13 Km road corridor. After the construction of the road, it will take 10 minutes to travel through the Outer Ring Road. The travelling public will benefit from an improved carriageway with better transport movement and safer infrastructure. This will lead to a reduction in travel times associated with increased speeds due to a better road and improve movement of persons and goods and ultimately increase economic activity. The overall impact will therefore include an improvement of the living standards of the host population through better incomes due to access to bigger markets and social services.

**Figure.3. Nemilicherry, ROB Flyover, outer ring road, Chennai**

**Creation of Employment:** During the construction period, over 1000 new jobs will be created in the form of skilled and unskilled labour. The majority of unskilled labour will be sourced from the project district. Indirect employment will be in the form of suppliers and other forms of sub-contracted works that will be required for construction. Support to businesses such as food kiosks may also be set-up near the contractor's camps and along the road. In the operation phase of the project more job opportunities will arise in various sectors such as the transport industry, commerce and trade. Taken together, job creation will help to reduce the problem of unemployment with attendant improvement in income for the workers' household and revenue.

Improved Access to Social Services: Upgrading of the road will improve access to schools, health facilities, business centres, places of worship such as mosques and churches. The project road will also benefit the poor people who do not own private cars and rely on public transport.

**Reduced Traffic Congestion:** The duelling of the road will facilitate efficient, fast and cost effective transport. This is likely to lead to increased use of public transport and a corresponding decrease in the use of private cars. The impact will be further reduction in traffic congestion. This also will have positive impact on reducing the level of air pollution in the urban areas because of greenhouse gas emissions from vehicles. Factors such as cost of gasoline, improvement in travel time even for parts of a journey may motivate people to consider using public transport rather than use of personal cars.

**Figure.4.Reduced traffic congestion by outer ring road**

**Air Quality:** During construction, increased traffic volume and movement of construction equipment, construction activities (extraction, transport and stockpiling of materials, excavation, compaction etc) will cause deterioration of air quality due to generation of dust. Another source of air pollution is emissions from equipment and vehicle exhaust. The impact due to dust generation during construction shall be mitigated by sprinkling water, while that due to emissions shall be mitigated by ensuring adequate maintenance of construction equipment, including engine fine tuning, avoiding unnecessary idling of the equipment. Improved Travel Safety and Comfort: The road project will generally increase travel safety and comfort. With the improvement of the road, public transport business will be more competitive and it is likely that transporters may opt for better and bigger public transport buses.

**Drainage and Hydrology:** Stakeholders indicated that there are serious storm water drainage problems along Outer Ring Road, especially between Umoja and Donholm junction. Overall, the hydrology and drainage of the road will be improved due to the upgrading of the road structures, such as bridges, culverts and other cross-drainage facilities like roadside drainage. Sedimentation of culverts and road side drainages will be eliminated due to provision of control devices and cover vegetation and water stagnation within and the on the road side will be eliminated.

**Increased Land Value:** The project road will increase land value in the impact area and modify its use and occupation patterns along the corridor. The project area could be attractive to big investors.

**Negative Impacts Loss of Assets**: In the implementation of the road improvement and up-grading to dual carriage-way, it is estimated that 445 informal businesses will be displaced from the road reserve and will require to be compensated. The Nairobi City County has eight possible locations mainly existing markets where some of the traders along the road corridor could be relocated. Although the existing capacity of the market stalls is reckoned to be fully occupied, the markets can be expanded to accommodate the affected persons. These activities include: Garages, Furniture Shops, Building Materials and Hardware, Car Sale Yards, Car Wash, Metal Fabrication. To mitigate the impact all affected people who are entitled to compensation will be compensated accordingly before commencement of construction activities.

**Land Acquisition:** A total of 177 properties will be affected by the road widening to dual carriageway and may entail compulsory acquisition for the road improvement purpose. This is the total number of parcels that have title deeds including those that have encroached on the land reserved for the improvement. The property owners of land that is legitimately in their possession will be compensated at the statutory rates (replacement costs and disturbance including loss of any business, if applicable) inclusive of any other relief applicable.

Traffic Management: Construction focusing on the project road and the intersections will generate traffic problems which will require good traffic management planning to ameliorate this. Traffic management planning for the construction phase shall include the preparation of detailed phased construction plans which will guide traffic flow during each stage of construction, in order to keep traffic flowing. Suggestions of possible roads for traffic diversion has been studied and highlighted. The movement of heavy vehicles bringing in materials shall be accompanied by

alert vehicles. The contractor shall ensure that effective road signs have been placed at all key spots including diversions.

**Figure.5. Three lane Carriage ways**

**Risks of Accidents:** Increased traffic volume and activities during construction are likely to cause accidents. The mitigation measures proposed include

(i) Approximately 10 foot bridges have been designed to be constructed every 500m along the corridor.

(ii) A road safety awareness campaign will implemented during and after construction, targeting all the local communities, including transporters, road users, school children, teachers, parents, patients, and hospital staff .

(iii) A Children's Traffic Safety Park will be constructed and used for education and awareness on Road Safety issues.

**Occupational Health and Safety Considerations:** The Contractor shall develop a Health and Safety Plan on occupational health and safety of staff/workers and community health and safety of people living nearby or potentially affected by the project road. The considerations of environmental health and safety shall include.

(i) An assessment of traffic accident hazards, including spillages of transported substances into waterways and emergency response planning.

(ii) Provisions for pedestrian and non-vehicular traffic during construction periods.

(iii) Training and awareness programs for community in road safety.

(iv) Occupational health and safety of the construction staff.

(v) Securing of excavations and trenches.

(vi) Safety equipment and signage during construction and operation of the road project.

**Figure.6. Safety Sign and Service Road**

**Generation of Noise and Vibrations**: Noise and Vibration are expected during construction due to machinery operation and transport activities. There are many types of foundation vibration sources caused by construction works, and they are mainly caused by piling foundation works, foundation improvement works, land compaction operation, and the operation of heavy transport vehicle. The increased noise and vibrations will cause agitation, impair communication or weaken foundations of existing buildings leading to cracking walls. The impact to the public due to increased level of noise and vibrations during construction will be mitigated by ensuring adequate maintenance of the vehicles, including proper fine tuning of engines. In addition, all equipment shall be fitted with exhaust mufflers. The Contractor will need to undertake assessment of building structures within the work areas with respect to their capacity to withstand compaction vibrations. The contractor shall not be allowed to carry out construction works close to residential areas during the night. As for construction workers, all workers working in severe noise environment such as the quarries and crushers shall be equipped with ear plugs.

**Environmental impact assessment of roads and highway projects:** The streets and thruway undertakings are help of any nation. They are likewise essential for the building the country and are mirror of nation's improvement. Be that as it may, the majority of these street and roadway ventures because of their area, course arrangement and related exercises are perpetually joined by noteworthy natural and social effects amid various stages (viz., Pre-development, Construction and Operational stage) of the undertaking. The way of these effects could be either positive or negative contingent on their capability to positively or antagonistically influence the encompassing environment furthermore the occupant group. While positively seeing the positive effects on the earth and group, it is additionally basic to build up a suitable and sound Environmental Management Plan (EMP) and execute it on the field/affected zone of the venture to minimize and relieve different antagonistic ecological and social effects.

## 2. METHODOLOGY

Methodology of the project which involves finalizing the study area and then scoping which is determining the preliminary identification of the most critical environmental issues surrounding a project that requires an

assessment. The impact analyses of study are in all aspects such as quality of air, water, agricultural, land use and many other aspects. After that mitigation measures are proposed then the EIA report has to be prepared.

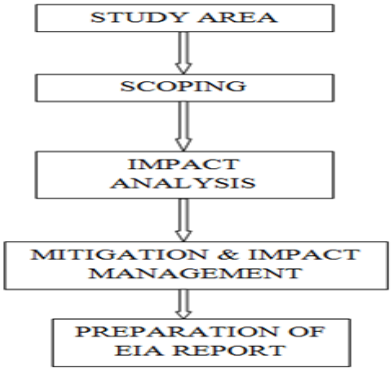


**Figure.7. EIA Process**

**Social Impacts of Outer Ring Road:** It have an Impact on community activities, Displacement & Resettlement of affected people, Cultural Heritage and Human health and Safety.

## CONCLUSION

From the EIA investigation of external Ring Street the above said effects are recognized and comparing moderation measures are proposed to maintain a strategic distance from the effects because of the external ring street. Despite the fact that the venture will be helpful to mechanized clients it will bring about a few effects to soil, clamour and financial effects. Testing of water tests must be completed at different focuses along the study zone, to decide the water quality at different guides so as toward decide the whether any progressions are seen after the advancement of the streets. Clamour test must be done close by of the street side at a chainage of 500m to know the commotion contamination brought about from the vehicles. On the off chance that unnecessary clamor is mapped, the formation of cradle areas might be proposed.

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