

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

(for Public Hearing Submission)

for

Proposed Industrial Estate

at

Plot A1 of SIPCOT, Eraiyur, Eraiyur Village, Veppanthattai
Taluk, Perambalur District, Tamil Nadu

Project Sector – 31, Schedule 7(c) – Industrial
Estates/parks/complexes/areas, export processing zones (EPZs), Special
Economic Zones (SEZs), Biotech Parks, Leather Complexes - Category B

ToR Identification No: TO25B3102TN5698049N dated 19/08/2025

Baseline Period: March 2025 to May 2025

Project Proponent

M/s. Phoenix Kothari Footwear Limited
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December 2025

EIA Consultant: Eco Services India Pvt. Ltd., Chennai
NABET Certificate No.: NABET/EIA/24-27/RA 0332

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CHAPTER 1 INTRODUCTION

1.1. PURPOSE OF THE PROJECT

M/s. Phoenix Kothari Private Limited has proposed to develop an Industrial Estate at Plot A1 of SIPCOT, Eraiyur comprising Survey Nos. 231pt, 232pt, 233, 234, 235pt, 241pt, 259, 261 pt, 266, 267, 268, 269, 270 pt, 271pt, 272, 273pt, 274pt, 275pt, 276 pt, 277pt, 278, 279 pt, 280pt, 281, 282pt, 283pt of Eraiyur village, Veppanthattai taluk and Perambalur district in a total land extent of 72.12 Ha (178.21 Acres).

Earlier the land area allotted for the proposed Industrial Estate by SIPCOT, Eraiyur was 72.34 Ha (178.76 Acres) which was mentioned in the ToR application, However it has been revised to 72.12 Ha (178.21 Acres) and accordingly the land use break up and project details has been revised.

The purpose of the project is to develop a dedicated and well-planned industrial zone to facilitate the growth of non-leather footwear industries and their allied sectors. It provides fully serviced industrial plots with common infrastructure, utilities and support facilities to promote sustainable industrial development in the region.

1.2. IDENTIFICATION OF THE PROJECT AND PROJECT PROPONENT

Phoenix Kothari Footwear Limited (PKFL) is a public limited company established in 2022 engaged in the large-scale manufacturing of non-leather footwear. The company part of the Kothari Group is setting up major facilities in Tamil Nadu. Through collaborations with global brands such as Crocs and other leading footwear companies, PKFL focuses on sustainable, high quality and export-oriented production, positioning Tamil Nadu as a global hub for non-leather footwear manufacturing.

The company has proposed this non-leather footwear industrial cluster/estate at State Industries Promotion Corporation of Tamil Nadu (SIPCOT) Industrial Park at Eriayur village, Veppanthattai taluk and Perambalur district. Phoenix Kothari Footwear Limited (PKFL) signed a lease deed with SIPCOT and a copy of the Lease Deed is enclosed as Annexure I.

As per the EIA Notification, 2006 and its subsequent amendments the project falls under Schedule 7(c) – Industrial Estates/parks/complexes/areas, export processing zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes - Category B. This project has one category B industry and has a land area of less than 500 ha. Accordingly, the project requires prior Environmental Clearance (EC) from the State Environmental Impact Assessment Authority, Tamil Nadu (SEIAA-TN). PKFL has engaged the services of Eco Services India Private Limited a NABET accredited EIA consultant organization to obtain Environmental Clearance for the project from SEIAA-TN.

1.3. BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY AND REGION

1.3.1. Nature of the Project

The proposed Industrial Estate is a Greenfield project exclusively for non-leather footwear industries comprises both EC category and Non-EC category units. The EC category includes Footwear Adhesive and Auxillary Chemicals Manufacturing Industry classified under Sector 5(f) – Synthetic Organic Chemicals Industry as per the EIA Notification, 2006 and its subsequent amendments. The Non-EC category includes non-leather footwear manufacturing units and their allied industries.

Phoenix Kothari Footwear Limited (PKFL) as the developer of the Industrial Estate will establish the required industrial infrastructure including internal road networks, water supply system, power supply arrangements through TNEB, stormwater drainage, greenbelt development and a solid waste management yard. PKFL will allot industrial plots to potential units based on factors such as proposed product, investment, technology adoption, technical capacity and compliance with applicable environmental regulations.

1.3.2. Size and Location of the Project

The proposed Industrial Estate at Plot A1 of SIPCOT, Eraiur, comprising Survey Nos. 231 (part), 232 (part), 233, 234, 235 (part), 241 (part), 259, 261 (part), 266, 267, 268, 269, 270 (part), 271 (part), 272, 273 (part), 274 (part), 275 (part), 276 (part), 277 (part), 278, 279 (part), 280 (part), 281, 282 (part) and 283 (part) of Eraiur Village, Veppanthattai Taluk, Perambalur District is planned over a total land extent of 72.12 Ha (178.21 Acres). The project has one Category B industry and has a land area of less than 500 ha.

The Government of Tamil Nadu for the establishment of footwear and allied industries has specifically designated the Eraiur SIPCOT industrial area. Hence, PKFL has selected this location for its proposed non-footwear manufacturing estate, leveraging the park's designation for related industrial activities.

The estate being proposed 1.8 km from the National Highway (NH) 38 connecting Ulundurpet and Perambalur make it an ideal site for the development, including its strategic geographic location, proximity to raw material source and the availability of robust infrastructure such as roads, power and water supply.

1.3.3. Importance to the Country and Region

The project strengthens India's position as an emerging global hub for non-leather footwear manufacturing reducing its dependence on imports and boosting export competitiveness in a rapidly growing international market. The project contributes to the "Make in India" initiative and supports the broader goal of expanding the country's manufacturing sector.

The projects location at Perambalur will be a major catalyst for the region's economic transformation. It is expected to generate direct and indirect jobs, uplift rural livelihoods and stimulate ancillary industries. The project also drives infrastructure development, enhances skill-training opportunities for local youth and women and brings long-term socio-economic benefits to the district considered industrially backward.

1.4. SCOPE OF THE STUDY

M/s. Phoenix Kothari submitted an application seeking ToR vide Proposal No. SIA/TN/INFRA1/543305/2025, dated 01.07.2025. The proposal was appraised in the 595th SEAC Meeting held on 21.07.2025. Based on recommendation of SEAC, the proposal was placed in the 868th SEIAA Meeting held on 08.08.2025 and was approved for grant of Terms of Reference (ToR). ToR was issued vide ToR Identification No. TO25B3102TN5698049N / File No. 12402, dated 19.08.2025.

The scope of the Environmental Impact Assessment (EIA) study has been finalized based on the Standard Terms of Reference (ToR) for Industrial Estates/ Parks/ Complexes prescribed by MoEF&CC and the Specific ToR issued by SEIAA and SEAC for the proposed Industrial Estate. Accordingly, the scope of EIA Study is as follows:

- To conduct baseline studies covering air, water, noise, soil, biodiversity and socio-economic environment within a 10 km radius of the project site.
- To justify the site selection, including analysis of alternate sites and zoning of proposed industrial units.
- To assess the impacts on air quality, land environment, water bodies, traffic, flora, fauna and the socio-economic environment.
- To prepare a detailed water balance, hydrology assessment and plan for achieving Zero Liquid Discharge (ZLD) for the industrial estate.
- To assess waste management systems, covering hazardous, non-hazardous, solid, liquid and solvent wastes along with disposal methods and mitigation measures.
- To prepare a greenbelt development and ecological conservation plan, ensuring 33% green cover, 15 m peripheral greenbelt and protection of neighbouring water bodies.
- To carry out a comprehensive Risk Assessment and prepare a Disaster/Emergency Response Plan, including provisions for evacuation of disabled persons, fire safety, chemical hazard management and natural disaster preparedness.
- To prepare an Environmental Management Plan (EMP) covering construction and operation phase mitigation measures, environmental monitoring plan, CER activities and regulatory compliance framework.

The regulatory/legal scoping of the project based on environmental laws and regulations is listed in Table 1.1

Table 1.1: Regulatory/ Legal Scoping of the Project

Regulatory Norms	Regulatory Authority	Type of Approval	Status of Approval
Tamil Nadu Combined Development and Building Rules, 2019	Directorate of Town & Country Planning (DTCP)	Layout approval	To be obtained after the receipt of Environmental Clearance.
Environmental Protection (EP) Act, 1986 i) EIA Notification, 2006	SEIAA-TN	Environmental Clearance (EC)	ToR accorded by SEIAA on 19.08.2025 and final application seeking EC is submitted herewith.
ii) Water (Prevention and Control of Pollution) Act, 1974	Tamil Nadu Pollution Control Board (TNPCB)	Consent to Establishment (CTE) and Consent to Operate (CTO)	The environmental safeguards for the project with respect to CTE will be issued as part of the EC approval process. CTO for the Industrial Estate to be obtained after establishment of the Industrial Estate. Note: The industries in the industrial estate will obtain CTE and CTO individually prior to establishment and post establishment of the industry, respectively.
iii) Air (Prevention and Control of Pollution) Act, 1981		Consent to Establishment (CTE) and Consent to Operate (CTO)	
iv) Other Solid Waste Management Rules	Tamil Nadu Pollution Control Board (TNPCB)	1. Hazardous Waste Authorisation 2. Biomedical Waste Authorisation 3. Plastic Waste Authorisation	Note: The industries in the industrial estate will obtain individually as applicable.

1.5. TOR COMPLIANCE

The compliance on the Terms of Reference issued for the project is given in **Table 1.2**.

Table 1.2: Terms of Reference Compliance Report

S.No	Terms of Reference	Compliance
SEIAA Standard Conditions		
1.	Impacts on Energy requirement.	The proposed industrial estate will lead to an increase in energy demand during both construction and operational phases. During construction, energy will primarily be required for operation of construction machinery and equipment, lighting and other temporary utilities, which will be sourced from the TNEB distribution network. Temporary diesel generator (DG) sets will be used as backup by individual units. In the operational phase, energy requirement will mainly arise from industrial operations, lighting of internal driveway and common utilities within the Industrial Estate. The total power requirement for the industrial estate will be 3000 kVA, which will be sourced from nearby TNPDCCL grid / substation. However, the impact on the regional energy supply system is expected to be moderate and manageable, as the required power will be obtained from the TANGEDCO Grid / Substation. To minimize the overall energy footprint, the project will adopt energy-efficient measures such as LED lighting systems and promote the use of renewable energy sources such as solar power enabled lightning devices for common area. Periodic energy audits and conservation measures will be implemented to ensure optimal energy utilization.
2.	Impacts on living System (air, water, soil & microorganism).	The impacts of the proposed project activity on the living system are covered in Section 4-4.3

S.No	Terms of Reference	Compliance
		and 4.4 of the EIA report.
3.	Impacts on terrestrial & aquatic within and surrounding areas.	Impact: Discharge of untreated wastewater into nearby surface water bodies, may lead to contamination and deterioration of water quality. Similarly, disposal of untreated wastewater on land could result in soil and groundwater. Mitigation Measure: - Sewage generation from the individual industries shall be treated in their own STP's and the treated sewage shall be utilized for greenbelt development and or flushing. - Effluent generated from the individual industries shall be treated in their own ETP's and the treated effluent will be reused for their process by the individual industries. - ZLD shall be mandated for every industry within the industrial estate hence there will be no discharge of effluent from individual industries within the Industrial Estate.
4.	As per the MoEF&CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall furnish the detailed EMP mentioning all the CER activities as committed with the action plan.	As per the MoEF&CC Office Memorandum No. 22-65/2017-IA.III, dated 25.02.2021, Phoenix Kothari has proposed INR 1.16 Crores towards Corporate Environmental Responsibility (CER). The budgetary allocation for the EMP during construction phase and during operation phase is given in Table 10.2 and 10.3 of Chapter 10.
5.	The proponent shall provide details on the adequate parking facility provided including vehicles of all the workers & visitors and a clean traffic plan.	Individual industries will provide parking facilities as per the requirements of Tamil Nadu Combined Development and Building Rules (TNCDBR), 2019 for the workers and visitors within their respective plots. To facilitate smooth vehicular movement, a wide and well-planned entry and exit point is proposed. Based on the Volume to Capacity (V/C) ratio derived from the traffic analysis elaborated in

S.No	Terms of Reference	Compliance
		Chapter 3 – 3.10 of the EIA Report the existing road infrastructure is sufficient to accommodate the additional traffic generated by the proposed Industrial Estate.
6.	The project proponent shall furnish the action taken to improve water usage efficiency in the building.	The following water conservation measures are proposed to improve water usage efficiency in the Industrial Estate by the individual industries. • The sewage generated from the individual industries will be treated in their own STP's. The treated sewage will be reused for green belt development and or Flushing requirement within the individual plots thereby reducing fresh water requirement. • The effluent generated from the individual industries will be treated in their own onsite ETP's. The treated effluent will be reused for their industrial process. ZLD will be mandated for every industry within the Industrial Estate. Hence, there will be no discharge of treated effluent outside the Industrial Estate. • The runoff will be diverted to internal storm water drains with rainwater harvesting pits for ground water recharge after filtration.
7.	The project proponent shall conduct detailed study of biodiversity flora & fauna including invasive / endemic vulnerable species.	A detailed baseline study on the biodiversity of the project site and its surroundings is provided in Chapter 3-3.8 of the EIA report.
8.	The project proponent shall furnish NOC obtained from competent authority that there is no encroachment of water bodies (including canals).	As the project site does not contain any water bodies, the possibility of encroachment upon water bodies, including canals, is not done.
9.	The project proponent shall conduct detailed soil investigation including micro flora /fauna.	A detailed soil sampling was carried out within the proposed project site. The analysis results and interpretations are given in Chapter 3-3.7 of this EIA report. Accordingly, the soil in the study area has good physical structure and suitable pH and salinity levels, making it fit for agriculture. However, it shows nutrient imbalance: nitrogen and organic

S.No	Terms of Reference	Compliance
		carbon are low, indicating poor fertility. Other parameters, including soluble cations and SAR, pose no hazards. Overall, the soil is physically suitable but requires improved organic matter and nitrogen management, along with careful control of phosphorus levels.
10.	The project proponent shall study impact on livelihoods of locals.	The anticipated impacts on livelihoods of locals and mitigation measures are presented in Chapter 4 Section 4.3.5 and 4.4.5 of the EIA report.
11.	The project proponent shall furnish List of trees available in the project area.	The existing tree species identified in the core zone of the project site is provided in the Chapter 3-Table-3.24.
12.	The project proponent shall study impact of activities on water bodies/wetlands.	The impacts of project activities on water environment are given in Chapter 4 in Section 4.3.4 and 4.4.3 of the EIA report.
13.	The proponent shall furnish details on the measures taken to make the Buildings energy efficient confirming to green building norms.	Phoenix Kotahri Private Limited will be responsible for developing the common infrastructure facilities such as roads, stormwater drains, water supply networks, street lighting, greenbelt and other common amenities within the industrial estate. Renewable energy systems, particularly solar energy, will be implemented and utilized for street lighting to promote sustainable operations. In addition, individual industries within the estate will be encouraged to adopt energy conservation measures in their process and industrial buildings.
14.	The disaster management and disaster mitigation plan shall be furnished and should be seriously adhered to avoid of calamities.	The detailed disaster management and disaster mitigation is provided in Chapter.7-7.1.3 of this EIA report.
15.	The project proponent shall conduct studies on the presence of invasive and alien species around the project the area and shall furnish mitigate measures to prevent their spread.	Study on invasive and alien species in and around the project site is done in Section 3.8 of the EIA report. The mitigation measures proposed to prevent the spread is regular deweeding activities in the green belt area. The weeds shall be shredded and composted to avoid regrowth.

S.No	Terms of Reference	Compliance
16.	The proponent shall furnish details on the actions taken to reduce anthropogenic GHGs such as CO ₂ , CH ₄ , nitrous oxide, etc., resulting from human activities.	The proposed project involves the development of an industrial estate focusing primarily on infrastructure creation such as roads, stormwater drains, water supply, power distribution and common amenities. Since the project is limited to infrastructure development and does not involve any manufacturing or process-related activities, there will be no direct emissions of greenhouse gases (GHGs) such as CO₂, CH₄ or N₂O resulting from human activities at this stage. However, emissions are anticipated from the individual industries proposed to be housed in the Industrial Estate. Each industry will be responsible for incorporating specific air pollution control measures and technologies to minimize anthropogenic GHG emissions as part of their project-specific environmental management plans.
17.	The proponent shall furnish details on the strategies adopted to decarbonize the building.	The individual industries will involve in implementing energy-efficient industrial sheds, advanced lighting systems and the integration of rooftop solar panels. The use of low-carbon construction materials will be prioritized and water recycling systems will be incorporated to further minimize energy consumption and enhance sustainability.
18.	The proponent shall furnish measures taken to mitigate the impact on critically endangered species, biodiversity, etc., due to the modification of the habitat.	There are no critically endangered species identified in the project site and its study area. The anticipated impacts on the biological environment and the proposed mitigation measures are provided in Chapter 4-4.3.6 and 4.4.8 of the EIA Report.
19.	The proponent shall develop emergency response plan in addition to the disaster management plan.	The detailed Emergency Evacuation plan is provided in the Chapter 7-7.1.4 of the EIA report. The Emergency Evacuation plan is attached as Annexure – X.
20.	The proponent shall furnish details on building-friendly pest control strategies developed using non	Not applicable, as the proposed project involves only infrastructure development. The construction and maintenance of individual

S.No	Terms of Reference	Compliance
	chemical measures so as to control the pest population thereby not losing beneficial organisms.	buildings will be carried out by the respective industries.
21.	The proponent shall furnish details on strategies developed to ensure the buildings in blocks don't trap heat and become local urban heat islands.	Not applicable, as the proposed project involves only infrastructure development. The design and construction of individual buildings will be undertaken by the respective industries, which will incorporate suitable strategies in their layouts and designs to minimize heat accumulation as per the norms. Additionally, greenbelt development, tree plantation will be incorporated around industrial units to reduce surface temperature and improve the overall microclimate of the site.
22.	The proponent shall develop detailed evacuation plan for disabled people and safety evacuation plan during emergencies.	A detailed evacuation plan is enclosed as Annexure – X.
23.	The proponent shall explain the methodology adopted to control thermal Environment and other shocks in the building.	Not applicable, As the proposed development is an Industrial Estate, The developer will be providing only common infrastructure facilities. The control of the thermal environment and other related measures within the buildings will be implemented by the individual industries at the time of their construction.
24.	The proponent shall provide details on the provisions for controlled ventilation and lighting systems.	Not applicable, The provision of controlled ventilation and lighting systems will be implemented by the individual industries during the construction and operation of their respective units, in accordance with statutory requirements and applicable standards.
SEAC Conditions – Site Specific		
1.	The PP shall submit details regarding the suitability of the proposed 5(f) activity, along with a report that includes information on the machinery, flow chart of the operation, storage of raw materials, storage of products, air	The details on the machinery, flow chart of the operation, storage of raw materials, storage of products, air pollution, water pollution, fugitive emissions and their control and waste management of the proposed 5(f) activity is detailed in Chapter 2, Section 2.6.1 of the EIA

S.No	Terms of Reference	Compliance
	pollution, water pollution, fugitive emissions and their control and waste management.	Report .
2.	Water balance chart to be prepared and submitted along with EIA/EMP report.	The waster balance chart prepared for the industrial estate is given in Chapter 2, Section 2.7.5 of the EIA Report.
3.	The Industrial complex shall achieve Zero Liquid Discharge and to achieve the Zero Liquid Discharge, wastewater generated from various industrial operations shall be properly collected, treated to the prescribed standards and then recycled or reused for the identified uses. A detailed plan shall be furnished for the same.	The water balance, Figure 2.10 of the EIA Report shows that STP and ETP will be proposed by the individual industries to achieve Zero Liquid Discharge. The treated wastewater will be utilised for Green belt development, Flushing and Process requirements.
4.	Detailed land use breakup of proposed Industrial area with green belt implementation details has to be submitted to meet out the MoEF & CC requirement of 33%.	The detailed land area break-up of the industrial estates is given in Table 2.3 of the EIA report. Green belt equal to 43.03 acres (17.41 Ha) of the land area is proposed including common green belt and green belt area of individual industries. Note: As per ToR application, Green Belt Area of 39% was earmarked including common green belt area and green belt of individual plots. However, as per MoEF&CC OM dated 29th October 2025 the green belt area is revised as follows totalling to 43.03 acres (17.41 Ha). Common Green Belt – 10 % of Total Industrial Area Green Belt Area of Individual Industtrial Plots – 15% (Maximum) of individual plot area.
5.	Protection measures to be taken for ensure the conservation and development of nearby water bodies in the surrounding areas shall be submit along with the EIA/EMP report.	Conservation measures adopted to protect nearby water bodies are given in Section 4.3.4 and 4.4.3 of the EIA report.
6.	Submit the detailed mitigation measures for the impacts due to liquid waste discharge, air emissions, solvent emissions, handling of hazardous	The detailed mitigation measures due to liquid waste discharge, air emissions, solvent emissions, handling of hazardous waste and chemical odour are given Section 4.3 and 4.4 of

S.No	Terms of Reference	Compliance
	waste and chemical odour.	the EIA report.
7.	The PP shall furnish all the Hazardous wastes and Non-hazardous solid wastes to be generated and how its disposed scientifically.	The Hazardous waste and Non Hazardous wastes anticipated from the industrial estate is estimated in Section 2.7.6 of the EIA report.
Standard Terms of Reference		
1.	Project Details	
1.1	Reasons for selecting the site with details of alternate sites examined/rejected/selected on merit with comparative statement and reason/basis for selection. The examination should justify site suitability in terms of environmental damage, resources sustainability associated with selected site as compared to rejected sites.	The proposed project is strategically located within the industrial area earmarked by M/s. State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT) at Eraiur Village, Veppanthattai Taluk, Perambalur District, Tamil Nadu exclusively for footwear and its allied industries. Phoenix Kothari Footwear Limited has selected this location for its proposed non-leather footwear manufacturing cluster, leveraging the park's designation for related industrial activities. The Eraiur Industrial Park offers a range of advantages that make it an ideal site for the proposed development, including its strategic geographic location, proximity to raw material sources and markets and the availability of robust infrastructure such as roads, power and water supply. In addition, the park's location within a notified industrial zone minimizes potential conflicts with surrounding land uses and ensures compliance with regulatory and environmental requirements. Given these factors, there was no alternative site proposed by the project proponent.
1.2	The analysis should include parameters considered along with weightage criteria for shortlisting selected site.	The proposed project is part of an existing industrial park preferably for footwear and its allied industries. The industrial estate in proposed within the industrial park and hence analysis of alternate site was not done.
1.3	Zoning of the area in terms of 'type of industries' coming-up in the industrial area based on the resource requirement	The zoning of the industrial estate is given in Section 2.6, Table 2.5 of the EIA report. The details on the anticipated sewage and effluent

S.No	Terms of Reference	Compliance
	along with likely pollutants with quantity from the various industries.	generation, solid waste generation, air emissions from the EC category industry are given in Chapter 2 from Section 2.6.1 of the EIA report. The details on the pollutants likely from the Non-EC category industries will be detailed while applying for CTE and CTO from the TNPCB individually.
1.4	Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.	The roles and responsibility of the developer for compliance of environmental regulations under the provisions of EP Act is given in Chapter 10 of the EIA report.
1.5	Examine the details of National Highways/State Highways/ expressways falling along the corridor and the impact of the development on them.	The impact of incremental Traffic on the National Highway 38 (Ulundurpet to Permabalur) is estimated in Section 3.10 of the EIA report. Accordingly, The Volume to Capacity (V/C) ratio at the assessed location is 0.89. A V/C ratio of 0.89 implies that the roadway is operating within its design capacity and no significant adverse impact is anticipated from the projected increase in traffic volume.
1.6	Submit the details of the infrastructure to be developed.	Phoenix Kothari Private Limited as the developer of the industrial estate will develop infrastructure such as Internal Roads, Storm Water Drain, Solid Waste Management Yard, Common Greenbelt area. No other facilities are proposed. The individual industries will install STP, ETP, DG sets separately and maintain the same
1.7	Justification of the parameters, frequency and locations shall be discussed in the EIA.	The parameters, frequency and locations of environmental monitoring to be carried out during the construction and operation phase of the project is given in Chapter 10 of the EIA report.
2.	Environment Status/Baseline Data Methodology	
2.1	Examine baseline environmental quality along with projected incremental load due to the project taking into account of the existing developments nearby. (ii) Environmental data to be considered in	The baseline environmental quality of the project site and its 10 km radius study area was carried out during the period March to May 2025. The results are compiled in Chapter 3 of the EIA report. The projected incremental load due to the project

S.No	Terms of Reference	Compliance
	relation to the project development would be (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health.	taking into account of the existing developments nearby is done for the Air Environment and the results are attached as Annexure XI.
2.2	Site justification of the identified industry sectors from environmental angle and the details of the studies conducted if any.	The Eriayur SIPCOT industrial park is designated for Footwear Manufacturing and its allied industries. This proposed industrial estate /cluster by Phoenix Kothari Private Limited is planned within the designated SIPCOT industrial park. Baseline studies were conducted to analyse the present scenario of the project site and its 10 km study area. The results are given in Chapter 3 of the EIA report. Also the study area does not have any sensitive habitats or eco sensitive zones.
	Identify, predict and assess the environmental and sociological impacts on account of the project.	The environmental and sociological impacts of the proposed project during its construction phase and operation phase is detailed in Chapter 4 of the EIA report.
3.	Remote Sensing/ GIS	
3.1	Analysis should be made based on latest satellite imagery for land use with raw images.	The latest satellite imagery IRS P-6 LISS IV was used to understand the Land Use and Land Cover of the Study Area. The results are given in Chapter 3, Section 3.2.
3.2	Check on flood plain of any river.	The project site does have any water bodies such as Lake, Pond, Canals or rivers flowing through it. However, the Chinnar river the nearest river is 1.11 km away from the project site. Hence check on flood plain of rivers was not done.
4.	Land Use, Land Acquisition, R&R	
4.1	Submit the details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site.	The Land Use and Land Cover of the project site was analysed. The Land Use and Land Cover Map is shown as Figure 3.4 and the Land Use break-up of the study area is given in Table 3.1.
4.2	Submit details of environmentally sensitive places, land acquisition status, rehabilitation of communities/villages and present status of such activities.	The project site falls in Plot A1 of SIPCOT Industrial Park, Eriayur. Phoenix Kothari Private Limited has signed a Lease Deed with SIPCOT towards development of the industrial estate. Hence, there is no land acquisition

S.No	Terms of Reference	Compliance
		involved. The environmental setting of the project site including environmentally sensitive places in the study area is given in Table 2.2.
4.3	Examine the impact of proposed project on the nearest settlements.	The impact of Proposed project on Chapter 4, Section 4.3 and 4.4 of the EIA report.
4.4	Submit details regarding R&R involved in the project	There is no Resettlement and Rehabilitation involved, as the project site is located inside an Industrial Park earmarked for Industrial use.
4.5	The project boundary area and study area for which the base line data is generated should be indicated through a suitable map.	The project boundary area and study area for each of the environmental parameters is indicated in google imagery in Chapter 3 of the EIA report.
5.	ESZ, CRZ details	
5.1	Details regarding project boundary passing through any eco- sensitive area and within 10 km from eco- sensitive area.	There are no eco sensitive zones such as Wild life sanctuaries, Bird Sanctuaries and National Parks in the 10 km study area of the project site.
6.	Forest And Wildlife related details	
6.1	An overall green area of at-least 33% of the Industrial Area should be developed with native species. The green area shall be 40% in case of critically polluted area. Green buffer in the form of green belt to a width of 15 meters should be provided all along the periphery of the industrial area.	The detailed green belt area break-up of the industrial estates is given in Section 2.7.3 of the EIA report. Green belt equal to 43.03 acres (17.41 Ha) of the land area is proposed including common green belt and green belt area of individual industries. Note: As per ToR application, Green Belt Area of 39% was earmarked including common green belt area and green belt of individual plots. However, as per MoEF&CC OM dated 29th October 2025 the green belt area is revised as follows totalling to 43.03 acres (17.41 Ha). Common Green Belt – 10 % of Total Industrial Area Green Belt Area of Individual Industrial Plots – 15% (Maximum) of individual plot area.
6.2	Submit the details of the trees to be felled for the project.	The details of trees to be felled given in Chapter 3, Section 4.4.7.
6.3	Submit the present land use and permission required for any conversion such as forest, agriculture etc.	The project land is part of the SIPCOT industrial park earmarked for industrial activities. Hence, permission for conversion of Land is not

S.No	Terms of Reference	Compliance
		required.
7	Court/ Litigation Related	
7.1	Submit Legal framework for the implementation of Environmental Clearance conditions - to be clearly spelt out in the EIA report.	The Legal framework for the implementation of the environmental conditions/ management measures is listed in Table 1.1 of the EIA report.
7.2	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	There are no litigations pending against the project site.
8.	Water Environment/Quality/Hydrology	
8.1	Ground water classification as per the State Ground Water Authority	The ground water classification as per the State Ground Water Authority of Tamil Nadu is Over Exploited. (Source: G.O (Ms.) No. 36 Dynamic Ground Water Resources Assessment for Tamil Nadu as on March, 2024 - Categorization of Firkas dated 18.07.2025.)
8.2	Submit the source of water, requirement vis-à-vis waste water to be generated along with treatment facilities, use of treated waste water along with water balance chart taking into account all forms of water use and management.	The water requirement for the project site will be sourced from SIPCOT's water supply scheme. A letter of concurrence for SIPCOT is attached herewith as Annexure XII. The water balance of the industrial estate is given in Chapter 2, Section 2.7.5.
9.	Rain Water Harvesting	
9.1	Rain water harvesting proposals should be made with due safeguards for ground water quality	Storm water drains with rain water harvesting pits will be constructed by the individual industries. Phoenix Kothari Private Limited will construct storm water drains with rain water harvesting pits along the internal roads proposed as access to the industrial plots. The details are given in Chapter 2 of the EIA report.
9.2	Maximize recycling of water and utilization of rain water. Examine details.	The wastewater from the industrial estate will be treated in the individual STP's and ETP's installed by industries. The treated water will be used individually for flushing, gardening and process requirement within each industrial plot.
9.3	Examine soil characteristics and depth of ground water table for rainwater	The soil characteristics and depth of water table in the study area were analysed as part of the

S.No	Terms of Reference	Compliance
	harvesting.	baseline studies. The soil characteristics of the Project site are given in Chapter 3, Table 3.23 of the EIA report. Also the ground water level in the study area is given in Chpater 3, Section 3.3.6
10.	Waste Management, Drainage and STP details	
10.1	Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area, and any obstruction of the same by the project.	The contour map of the project site and the study area is given in Figure 3.2 of the EIA report. Also the contour plan of the project site is enclosed as Annexure VI.
10.2	Examine details of solid waste generation treatment and its disposal.	Details of solid waste generation, treatment and its disposal are given in Chapter 2, Section 2.7.6 of the EIA Report.
11.	Soil Environment	
11.1	Examine soil characteristics and depth of ground water table for rainwater harvesting.	The soil characteristics and depth of water table in the study area were analysed as part of the baseline studies. The soil characteristics of the project site are given in Chapter 3, Table 3.23 of the EIA report. Also, the ground water level in the study area is given in Chpater 3, Section 3.3.6.
12.	Energy And Resources	
12.1	Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption.	Solar powered LED lights are proposed for the lighting of roads. Also individual industries will adopt the following energy conservation measures 1. LED powered lights 2. VFD in pumps and blowers 3. Solar power from roof top solar panels
13.	Air Environment	
13.1	In case DG sets are likely to be used during construction and operational phase of the project emissions from DG sets must be taken into consideration while estimating the impacts on air environment. Examine and submit details.	DG sets proposed as part of the industrial estate has been considered to analyse the impacts on the existing Air Environment. The results are and the modeling results are attached as Annexure XI.
14.	Road/transport Safety And Traffic Aspects	
14.1	Examine road/rail connectivity to the project site and impact on the traffic	The details of road and rail connectivity to the project site are given in Table 2.2 of the EIA

S.No	Terms of Reference	Compliance
	due to the proposed project.	Report. The impact on the traffic due to the proposed project is given in Section 3.10 of the EIA Report.
14.2	Present and future traffic and transport facilities for the region should be analysed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.	The present traffic scenario has been analysed and the results are furnished in Section 3.10 of the EIA report. The future anticipated traffic is used to estimate the Volume / Capacity ratio of the National Highway 38. The Volume to Capacity (V/C) ratio is sufficient to accommodate the additional traffic generated by the proposed Industrial Estate. Wide entry and exits are planned in the Industrial Estate to avoid congestion.
14.3	A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.	Addressed in Chapter 3, Section 3.10 of the EIA Report.
14.4	Examine the details of transport of materials for construction which should include source and availability.	Construction materials both renewable and non-renewable ones include wood, gravel, sand, steel, concrete, cement, bricks etc. will be required during the construction phase of the industrial estate and the individual industries. The materials will be sourced from the local markets and by road.
15.	Noise Environment	
15.1	Examine noise levels - present and future with noise abatement measures.	The existing baseline noise level in the study area is assessed and the results are given in Section 3.5, Chapter 3 of the EIA report. The incremental noise levels during the construction and operation phase of the project is given in Section 4.3.2 and Section 4.4.2 of the EIA report.
16.	Environmental Management Plans And Mitigative Measures	
16.1	Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.	The Environmental Management Plan and the budgetary allocation for construction and operation phases of the project is given in Chapter 10 of the EIA report. The detailed Environmental Monitoring Plan is addressed in Chapter 6 of the EIA report.
16.2	Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural	A comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster is given in Chapter 7 of

S.No	Terms of Reference	Compliance
	and man-made disaster.	the EIA report.
16.3	Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry.	Noted.

CHAPTER 2

PROJECT DESCRIPTION

2.1 TYPE OF THE PROJECT

M/s. Phoenix Kothari Private Limited is a proposed Industrial Estate at Plot A1 of SIPCOT, Eraiyur of Eraiyur village, Veppanthattai taluk and Perambalur district in a total land extent of 72.12 Ha (178.21 Acres). The industrial estate is exclusively for non-leather footwear industries.

The project falls under the Schedule of 7(c) – Category – B (Land area <500 Ha and housing Category B category industry, as per the EIA Notification 2006 and its subsequent amendments.

2.2 NEED FOR THE PROJECT

There is a growing need for non-leather footwear sector in Tamil Nadu. As demand for eco-friendly and affordable footwear increases, industries require a well-planned space with proper infrastructure and facilities. The proposed industrial estate will bring together various manufacturing units in one location, making production easier, faster and more efficient. It will also create new job opportunities, support local economic growth and attract investors to the region. Overall, the industrial estate will help strengthen the state's position as a leading hub for non-leather footwear manufacturing.

2.3 LOCATION OF THE PROJECT

The Industrial Estate is proposed at Plot A1 of SIPCOT, Eraiyur comprising Survey Nos. 231pt, 232pt, 233, 234, 235pt, 241pt, 259, 261 pt, 266, 267, 268, 269, 270 pt, 271pt, 272, 273pt, 274pt, 275pt, 276 pt, 277pt, 278, 279 pt, 280pt, 281, 282pt, 283pt of Eraiyur Village, Veppanthattai Taluk and Perambalur District in a land extent of 72.12 Ha (178.21 Acres).

It is located 1.8 km from the National Highway (NH) 38 connecting Ulundurpet and Perambalur and is well connected by roads. The site is surrounded by built-up land (Industries and Settlement) in the North, and all other sides by agricultural and vacant lands.

The index map highlighting the location of the project site is shown in Figure 2.1. The google imagery showing the proposed project site is shown in Figure 2.2 and the coordinates of the project boundary is provided in Table 2.1. The environmental setting of the project site is given in Table 2.2. The project site photographs are attached as Annexure V.

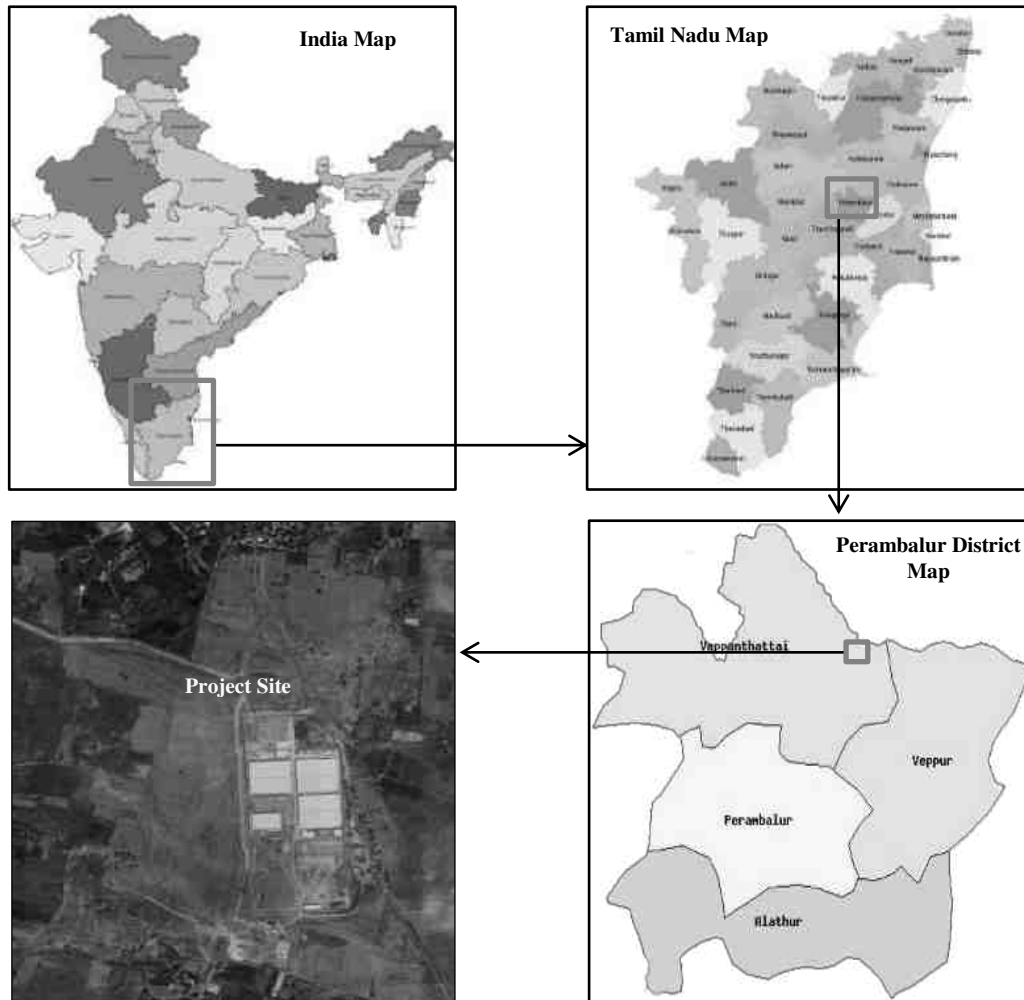


Figure 2.1: Index map of the project site

Imagery source: Google Earth (2025)

[Online] Available at: <http://www.google.com/earth/index.html>



Figure 2.2: Google Image of the Project Site

Table 2.1 – Coordinates of the Project Boundary

S.No	Latitude	Longitude	S.No	Latitude	Longitude
1	11° 20' 32.879" N	78° 58' 19.819" E	16	11° 20' 56.012" N	78° 58' 52.762" E
2	11° 20' 38.564" N	78° 58' 23.307" E	17	11° 20' 56.348" N	78° 58' 54.276" E
3	11° 20' 44.654" N	78° 58' 24.088" E	18	11° 20' 45.808" N	78° 58' 59.494" E
4	11° 20' 48.248" N	78° 58' 30.856" E	19	11° 20' 40.367" N	78° 58' 58.378" E
5	11° 21' 0.767" N	78° 58' 34.394" E	20	11° 20' 40.690" N	78° 58' 53.331" E
6	11° 21' 3.860" N	78° 58' 25.206" E	21	11° 20' 59.976" N	78° 58' 42.446" E
7	11° 21' 8.194" N	78° 58' 26.131" E	22	11° 20' 37.370" N	78° 58' 43.693" E
8	11° 21' 8.172" N	78° 58' 22.867" E	23	11° 20' 37.797" N	78° 58' 53.780" E
9	11° 21' 9.376" N	78° 58' 22.892" E	24	11° 20' 34.858" N	78° 58' 56.933" E
10	11° 21' 6.349" N	78° 58' 37.026" E	25	11° 20' 34.238" N	78° 58' 56.674" E
11	11° 21' 19.256" N	78° 58' 40.200" E	26	11° 20' 36.457" N	78° 58' 48.118" E
12	11° 21' 18.302" N	78° 58' 43.471" E	27	11° 20' 30.723" N	78° 58' 47.169" E
13	11° 21' 12.194" N	78° 58' 44.833" E	28	11° 20' 32.267" N	78° 58' 39.739" E
14	11° 21' 4.088" N	78° 58' 48.946" E	29	11° 20' 32.278" N	78° 58' 27.143" E
15	11° 21' 0.160" N	78° 58' 50.292" E	30	11° 20' 33.195" N	78° 58' 23.312" E

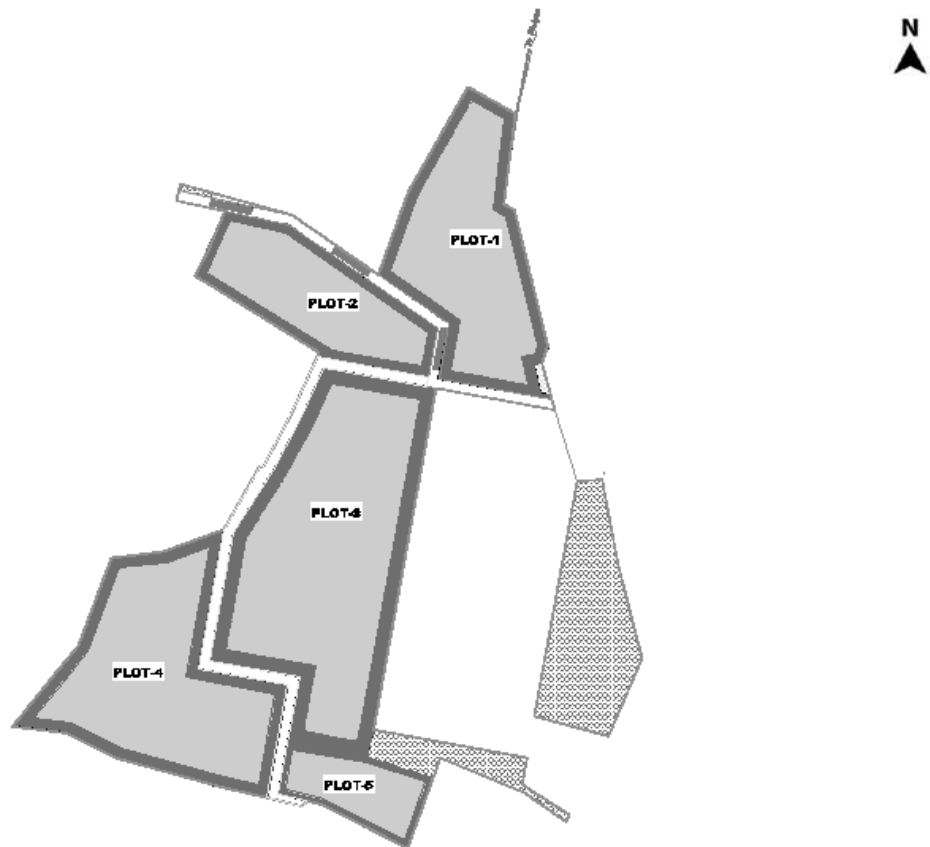
**Figure 2.3: Tentative Layout of the Industrial Park**

Table 2.2: Environmental setting of the project site:

S. No.	Particulars	Details																																											
1.	Latitude	11°20'49.07"N																																											
2.	Longitude	78°58'36.73"E																																											
3.	Total Land Area	72. 12 Ha (178.21 Acres)																																											
4.	Present Land Use	The proposed project site is a vacant land. The project site has settlements and industrial establishments. The land use is now allotted for industrial development.																																											
5.	Nearest Town	Perambalur (15 km SW)																																											
6.	Nearest Highway	National Highway (NH) 38 Ulundurpet – Perambalur highway (1.8 km W)																																											
7.	Nearest Railway Station	Ottakovil Railway Station (19.23 km SE)																																											
8.	Nearest Airport	Thiruchirapalli International Airport (70 km SW)																																											
9.	Nearest Harbor	Chennai Port (258 km NE)																																											
10.	Water Bodies	<table><tr><th>S.No.</th><th>Name of watercourse / water bodies</th><th>Distance (Km)</th><th>Direction</th></tr><tr><td>1.</td><td>Vellar River</td><td>5.23</td><td>North</td></tr><tr><td>2.</td><td>Mangalam Lake</td><td>0.75</td><td>West</td></tr><tr><td>3.</td><td>Eraiur Lake</td><td>2.15</td><td>North West</td></tr><tr><td>4.</td><td>Mettucheri Lake</td><td>6.09</td><td>North West</td></tr><tr><td>5.</td><td>Chinnar River</td><td>1.11</td><td>North</td></tr><tr><td>6.</td><td>Keeranur Lake</td><td>4.50</td><td>North</td></tr><tr><td>7.</td><td>AyyanPeraiyur Lake</td><td>4.23</td><td>North West</td></tr><tr><td>8.</td><td>Elumur Lake</td><td>6.75</td><td>South</td></tr><tr><td>9.</td><td>Ayikudi Lake</td><td>7.70</td><td>South East</td></tr></table>				S.No.	Name of watercourse / water bodies	Distance (Km)	Direction	1.	Vellar River	5.23	North	2.	Mangalam Lake	0.75	West	3.	Eraiur Lake	2.15	North West	4.	Mettucheri Lake	6.09	North West	5.	Chinnar River	1.11	North	6.	Keeranur Lake	4.50	North	7.	AyyanPeraiyur Lake	4.23	North West	8.	Elumur Lake	6.75	South	9.	Ayikudi Lake	7.70	South East
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9.	Ayikudi Lake	7.70	South East																																										
11.	Eco-sensitive areas as notified under EP Act 1986	Nil within 10 km																																											
12.	Protected areas notified under Wild Life Protection Act, 1972 (53 of 1972)	Nil within 10 km																																											
13.	Critically Polluted Area as notified by CPCB	Nil within 10 km																																											
14.	Reserve Forest	<table><tr><th>S.No</th><th>Name of Reserve Forest</th><th>Distance (km)</th><th>Direction</th></tr><tr><td>1</td><td>Peraiyur RF</td><td>2.15</td><td>North West</td></tr></table>				S.No	Name of Reserve Forest	Distance (km)	Direction	1	Peraiyur RF	2.15	North West																																
		S.No	Name of Reserve Forest	Distance (km)	Direction																																								
1	Peraiyur RF	2.15	North West																																										

			2	Sirukudal RF	3.55	South West	
15.	Interstate Boundary	Nil within 10 km					
16.	Defense Installation	Nil within 10 km					
17.	Areas occupied by sensitive man-made land uses (<i>hospitals, schools, places of worship, community facilities</i>)		S.No	Description	Distance (km)	Direction	
			1	Nehru Higher Secondary School	0.48	North	
			2	St. Josephs Global School, Eraiyur	2.12	West	
			3	Wisdom Matriculation Higher Secondary School	3.29	North	
			4	Venkateshwara Temple	1.84	East	

2.4 SIZE OR MAGNITUDE OF OPERATION

The total area of the Industrial Estate is 72.12 Ha (178.21 Acres). Land area breakup for the Industrial Estate is given in Table 2.3. The master plan layout of the Industrial Estate is enclosed as Annexure II.

Table 2.3: Land area break-up

S.No	Description	Extent	Extent	Percentage Coverage
		Acres	Hectares	
a	Industrial Estate Area (a=b+c+d+e)	178.21	72.12	100.00
b	Industrial Plot area including Green Belt Area	145.47	58.87	81.63
c	Common Amenities (Solid Waste Management Yard)	0.19	0.08	0.11
d	Road Area	11.34	4.59	6.36
e	Common Green Belt Area	21.21	8.58	11.90

2.5 PROPOSED SCHEDULE FOR APPROVAL & IMPLEMENTATION

The details of the estimated project schedule for approval and implementation is given in Table 2.4.

Table 2.4: Estimated Project Schedule for Approval and Implementation

S.No.	Description	Timeline
1.	Obtaining Environmental Clearance from SEIAA-TN along with the environmental safeguard as part of the Consent to Establish	March 2026

	from MS-TNPCB	
2.	Development Activities	April 2026 to December 2026

2.6 TECHNOLOGY AND PROCESS DESCRIPTION

The proposed Industrial Estate comprises both EC category and Non-EC category units. The EC category includes Footwear Adhesive and Auxillary Chemicals Manufacturing Industry classified under Sector 5(f) – Synthetic Organic Chemicals Industry as per the EIA Notification, 2006 and its subsequent amendments. The Non-EC category includes non-leather footwear manufacturing units and their allied industries. The zoning of the industrial estate for EC and Non EC category industries is given in Table 2.5.

Table 2.5: Zonation of the industrial estate

S.No	Type of Industries	Non Leather Footwear Industry Type	Percentage of Allocation
1	5 (f) - Synthetic Organic Chemical Industries	Footwear adhesive manufacturing unit	5%
2	Other Non EC Category:	Non Leather Footwear manufacturing, Lace manufacturing unit and other allied products	95%

A brief description of the project activities under each category of Industries is given in Section 2.6.1 and 2.6.2. The detailed description on the technology adopted and manufacturing process for the 5(f) category industry is included in the EIA Report. The detailed description on the technology adopted for non EC Category industries will be provided by individual industries upon establishment while obtaining CTE from the Tamil Nadu Pollution Control Board.

2.6.1 Process Description – EC category Industry

The Synthetic Organic Chemicals Industry proposed is an industry involved in the manufacturing of Adhesive, Primer, Hardner and Cleaner. The products and its quantity are given in Table 2.6. The raw materials required in the manufacturing of the products are listed in Table 2.6 is given in Table 2.7.

Table 2.6: Product and its quantity

S.No	Product	Quantity in Tons/Annum
1	Adhesive	26,520
2	Primer	9,174
3	Hardner	1,020
4	Cleaner	1,260

Table 2.7: Raw Materials and its Specifications

S.No	Raw Materials	CAS No.	Physical State	Characteristic	Mode of Transportation	Mode of Storage
1.	Acetone	67-64-1	Liquid	Flammable	Tank car	Tank
2.	Methyl Ethyl Ketone	79-93-3	Liquid	Flammable	Tank car	Tank
3.	Cyclohexane	110-82-7	Liquid	Flammable	Tank car	Tank
4.	Solvent naphtha	8030-30-6	Liquid	Flammable	Tank car	Tank
5.	Dimethyl Carbonate	616-38-6	Liquid	Flammable	Tank car	Tank
6.	Methyl Acetate	79-20-9	Liquid	Flammable	Tank car	Tank
7.	Ethyl Acetate	141-78-6	Liquid	Flammable	Tank car	Tank
8.	Toluene	108-88-3	Liquid	Flammable	Tank car	Drum
9.	Synthetic resin	Variable	Solid	Non- Hazardous	Container	Bag
10.	Polyisocyanates	Variable	Liquid	Irritant	Container	Drum
11.	Polyurethane aqueous dispersion	Variable	Liquid	Non- Hazardous	Container	Drum
12.	Polyester polyol	Variable	Solid	Non- Hazardous	Container	Drum
13.	Chloroprene Rubber	9010-98-4	Solid	Non- Hazardous	Container	Bag
14.	Natural latex	9006-04-06	Liquid	Non- Hazardous	Container	Drum
15.	Additive	Variable	Liquid	Non- Hazardous	Tank car	Bag/ Drum
16.	Purified Water	7732-18-5	Liquid	Non- Hazardous	Tanker/ Pipeline	Tank

2.6.1.1 Manufacturing Process

The manufacturing process of the Products namely Adhesive, Primer, Hardner and Cleaner is as below.

a) Adhesive:

Adhesives are bonding agents used to join different components of footwear such as soles, uppers, insoles, and trims.

Manufacturing Process:

- Initial Mixing: Solvents are charged into the mixing vessel along with solid raw materials followed by controlled stirring.
- Dissolution: The mixture is heated to around $60 \pm 5^{\circ}\text{C}$ to dissolve the solids completely.
- Secondary Solvent Addition: Additional solvents are added to achieve the required formulation.
- VOC Handling: Vapors released during heating and mixing are captured through a condenser system.
- Viscosity Adjustment: Final solvents are added to obtain the desired viscosity with generated vapors captured.

- Filtration: The adhesive solution is filtered to remove any solid impurities; filter residue is sent to an authorized recycler.
- Filling & Packaging: The finished product is filled into containers, with VOCs from filling operations also captured.
- Product Storage: Filled containers are transferred to the warehouse for storage and dispatch.
- VOC Treatment: All collected VOC streams are treated before safe release.
- The Adhesives manufactured are either Water Based or Flammable liquid and will be stored at temperature between 5~40°C away from fire, heat sources and oxidant in a cool, dry ventilated area in a dangerous goods warehouse.

The flow chart showing the manufacturing process of Adhesives are given in Figure 2.4

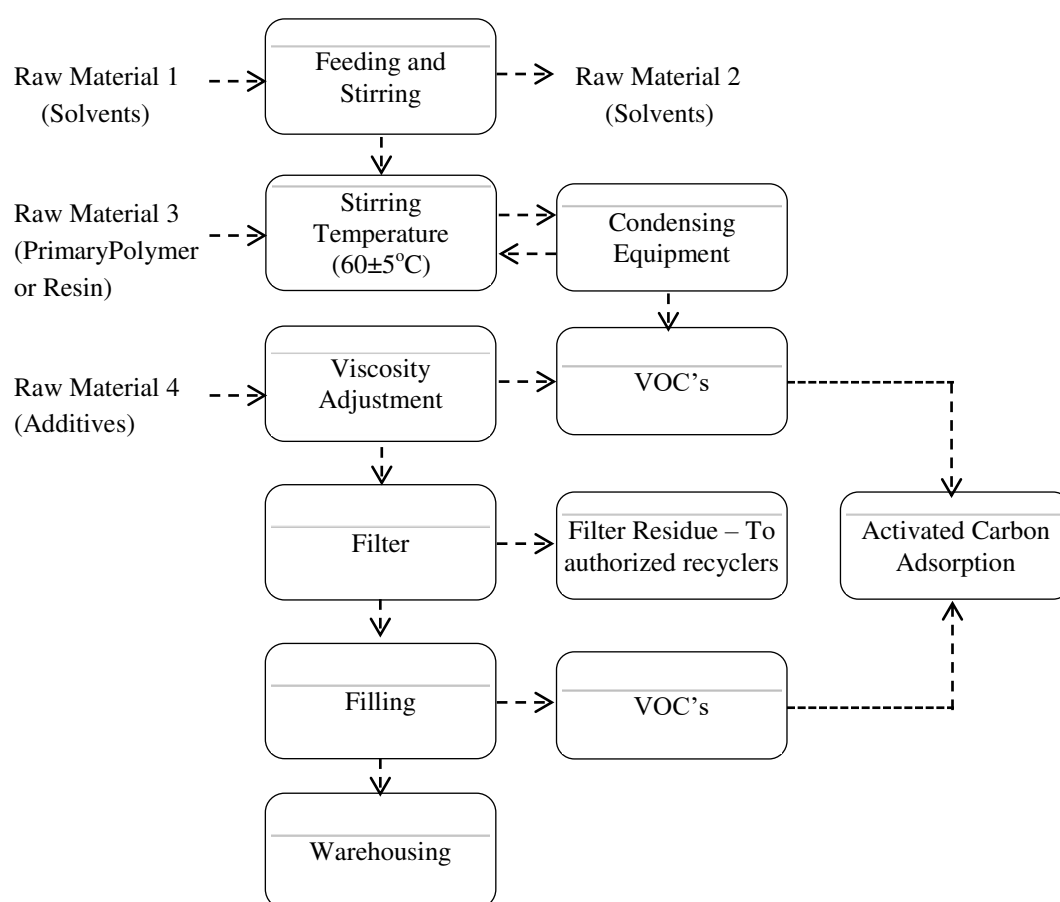


Figure 2.4: Flow Chart showing Manufacturing Process of Adhesives

b) Primer:

Primers are surface-preparation chemicals applied before adhesive application. They improve adhesion by cleaning, activating, or slightly etching the surface of materials such as EVA, PVC, PU soles and synthetic uppers. Primers ensure the adhesive bonds firmly and uniformly, especially on smooth or low-energy surfaces.

Manufacturing Process:

- Solvent and polyisocyanates are charged into the primary mixing vessel and stirred to begin dissolution/dispersion.
- Mixing is carried out under controlled conditions: 10–25°C temperature and $\leq 65\%$ relative humidity.
- VOCs generated during mixing are captured through Condensing Equipment.
- The mixed adhesive undergoes quality checks for consistency and performance.
- The product is passed through a Filter to remove particulate matter or undissolved residues.
- Filter residue is collected and handed over to an authorized recycler.
- The finished product is filled and store.
- Activated Carbon Adsorption is used to treat VOC's before safe release.
- The Primer manufactured will be flammable liquid and will be stored at temperature between 5~40°C away from fire, heat sources and oxidant in a cool, dry ventilated area in a dangerous goods warehouse.

The flow chart showing the manufacturing process of Primer is given in Figure 2.5

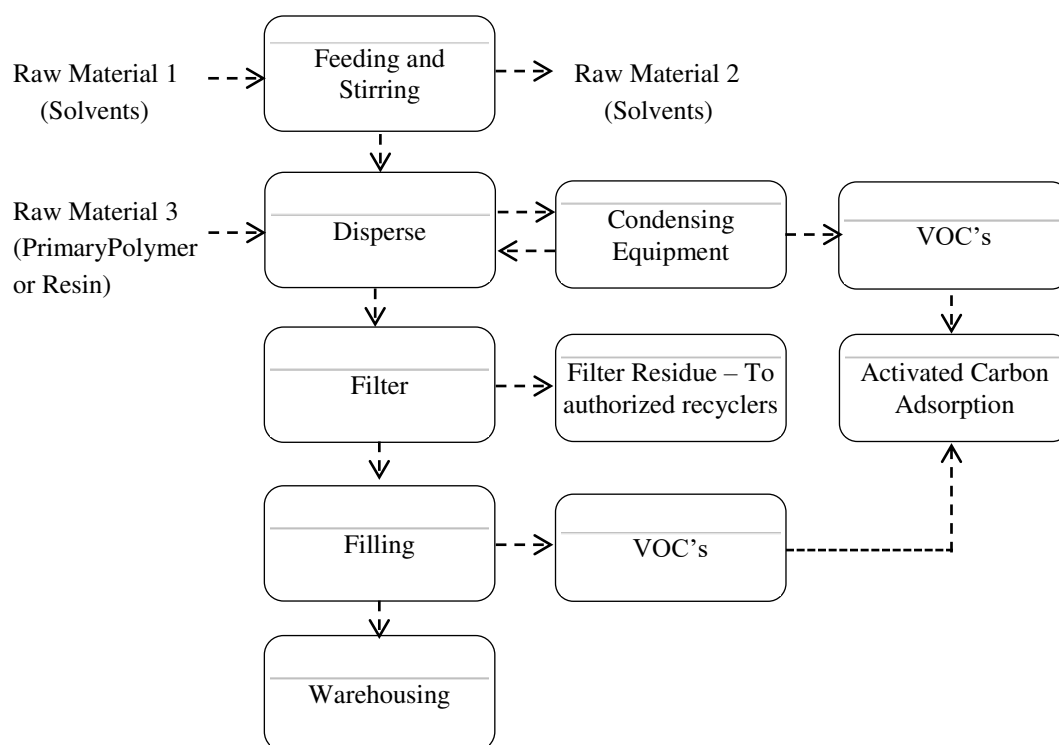


Figure 2.5: Flow Chart showing Manufacturing Process of Primer

c) Hardener:

Hardeners are curing agents added to certain adhesives (typically PU adhesives) to enhance their bonding strength and heat/moisture resistance. When mixed with the adhesive, hardeners trigger a chemical reaction that increases the final bond's durability.

Manufacturing Process:

- Solvent is retrieved from the Solvent Tank and Polyisocyanates are retrieved from the Raw Material Warehouse
- The Solvent and Polyisocyanates are combined and mixed in the main vessel.
- The mixing environment is strictly maintained for Temperature (18°C to 25°C) and Humidity: $\leq 45\%$
- VOCs generated during the controlled mixing are collected by Condensing Equipment.
- The product is checked for quality and then passed through a Filter
- The Filter residue is segregated and entrusted to an authorized party to recycle.
- The filtered product is packaged and moved to the Warehousing area.
- Activated Carbon Adsorption is used to treat VOC's before safe release.
- The hardener manufactured will be flammable liquid and will be stored at temperature between 5~40°C away from fire, heat sources and oxidant in a cool, dry ventilated area in a dangerous goods warehouse.

The flow chart showing the manufacturing process of Hardener is given in Figure 2.6

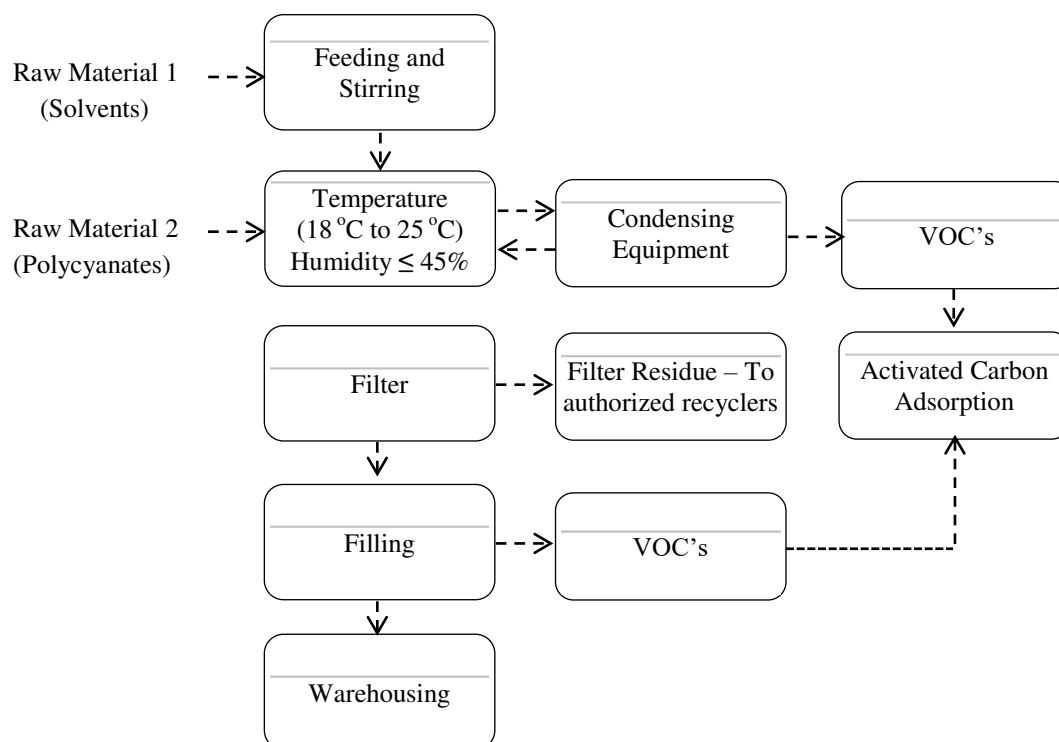


Figure 2.6: Flow Chart showing Manufacturing Process of Hardner

d) Cleaner:

Cleaners are solvents used to remove dust, oil, release agents or contaminants from soles and uppers before bonding. They ensure a clean surface for effective adhesion.

Manufacturing Process:

- The first group of solvents are fed into the main vessel and subjected to initial Stirring followed by second group of solvents.
- The entire mixture is subjected to the dispersion where intense mixing is performed to ensure all components are uniformly dissolved or suspended in the solvent base.
- Volatile Organic Compounds (VOCs) generated during the stirring and dispersion are captured by Condensing Equipment.
- The finished product is transferred into final containers.
- Activated Carbon Adsorption is used to treat VOC's before safe release.
- The Cleaner manufactured will be flammable liquid and will be stored at temperature between 5~40°C away from fire, heat sources and oxidant in a cool, dry ventilated area in a dangerous goods warehouse.

The flow chart showing the manufacturing process of Cleaner is given in Figure 2.7

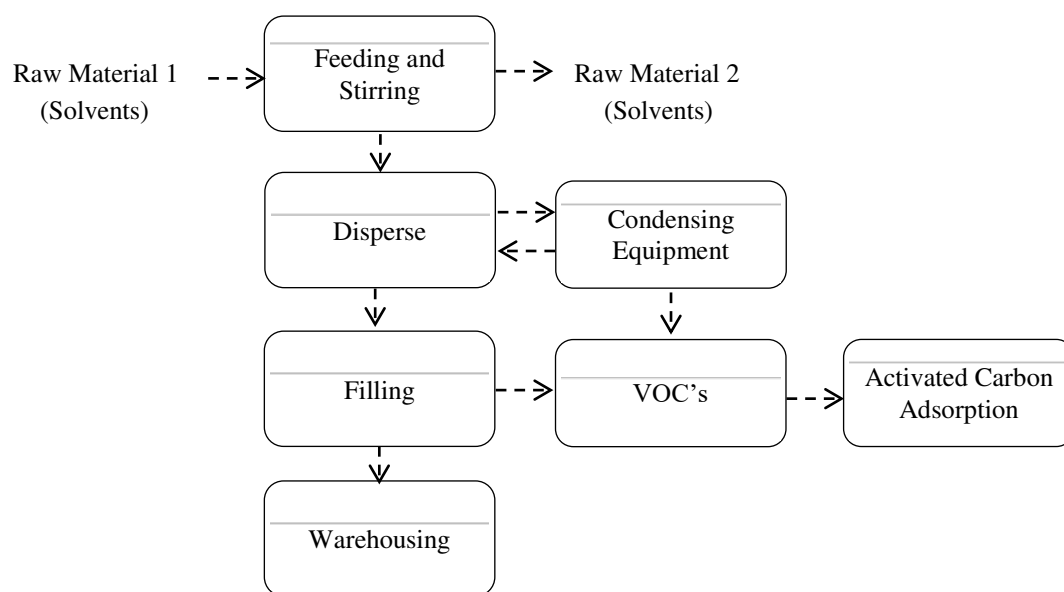
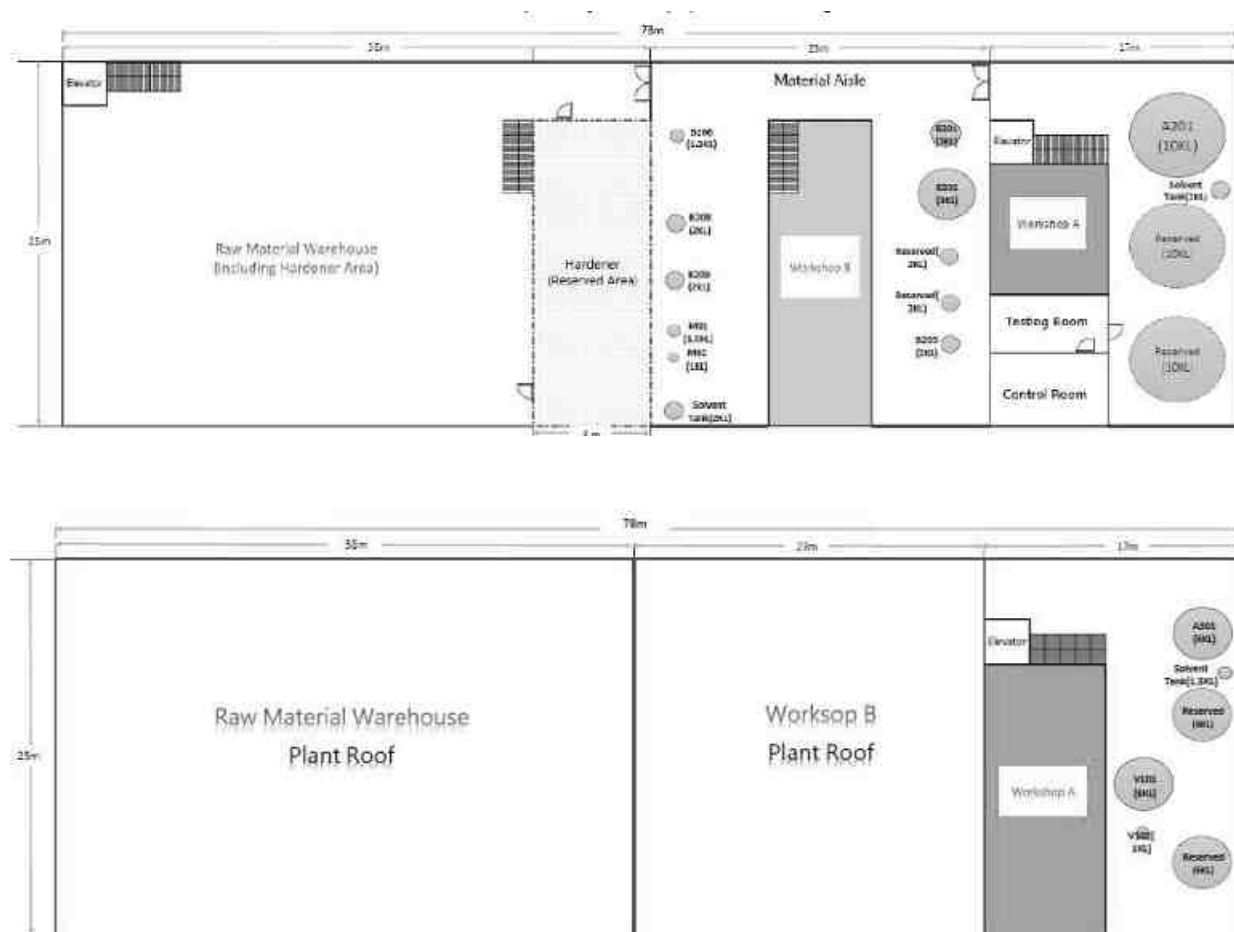


Figure 2.7: Flow Chart showing Manufacturing Process of Cleaner

The tentative list of the machinery/equipment proposed to be installed is listed in Table 2.8. The tentative machinery and equipment layout of the plant is given in Figure 2.8.

Table 2.8: List of Machinery/Equipment

Equipment Id	Equipment / Kettle Type	No. of Equipment	Volume of the Vessel/ Capacity
A201	Dispersion Kettle	1 no.	10 KL
A301	Polymerization Kettle	1 no.	6 KL
B201	Polymerization Kettle	1 no.	3 KL
B202	Polymerization Kettle	1 no.	6 KL
B205	Dispersion Kettle	1 no.	2 KL
B206	Dispersion Kettle	1 no.	1.5 KL
B208	Dispersion Kettle	1 no.	2 KL
B209	Dispersion Kettle	1 no.	2 KL
V101	Metering Tank	1 no.	6 KL
V102	Metering Tank	1 no.	1 KL
Solvent Tank	Metering Tank	2 nos.	2 KL
Solvent Tank	Metering Tank	2 nos.	1.5 KL
Reserved Tank	Dispersion Kettle	2 nos.	2 KL
Reserved Tank	Dispersion Kettle	2 nos.	10 KL
Reserved Tank	Dispersion Kettle	2 nos.	6 KL
Boiler 1	Boiler	1 no.	1 Ton/Hr

**Figure 2.8 Tentative Machinery Layouts at Level 1 and Level 2**

2.6.1.2 Water and Wastewater Management

a. Process water requirement

The manufacturing process is entirely solvent based and involves only mixing, dissolution, and filtration operations. However, Demineralised Water of 150 LPD will be used to adjust the viscosity of solvents used.

i) Adhesive: The adhesive formulation is completely solvent-based and all operations (mixing, heating, filtration) are carried out without the use of water.

ii) Primer: Primer manufacturing involves controlled solvent mixing and filtration only hence, water is not required in the process.

iii) Hardener: Hardener production uses solvents and polyisocyanates exclusively with no water involved in mixing or processing.

iv) Cleaner: Cleaner manufacturing is a purely solvent mixing and dispersion process, requiring no water for any operation.

It is evident that effluent generation is not envisaged, Hence no Effluent Treatment Plant is proposed.

b. Domestic water requirement

Manpower requirement of 220 is anticipated during the operation phase hence fresh water for domestic use and sewage generation is envisaged. The fresh water requirement

Table 2.9: Water and Wastewater Estimation – 5(f) Industry

Component	Occupancy	Water Consumption	
		Water Consumption Rate (LPCD)	Total Water Requirement (LPD)
Workers	250	45	11,250
Admin & Maintenance Staff	12	15	180
Green belt /Landscape Development: 5500 Sq.m *3.5 L/Sq.m			19,250
Total			30,680
			31 KLD

Total domestic water requirement is 11KLD wherein the sewage generation is 9.9 KLD after losses. The sewage generated will be treated in a STP of 10 KLD capacity. The treated sewage of 9.7 KLD will be utilized for grading requirements.

Water requirement for green belt is estimated to be 19 KLD wherein, 9.7 KLD will be treated water from STP and remaining 9.5 KLD will be fresh water supply.

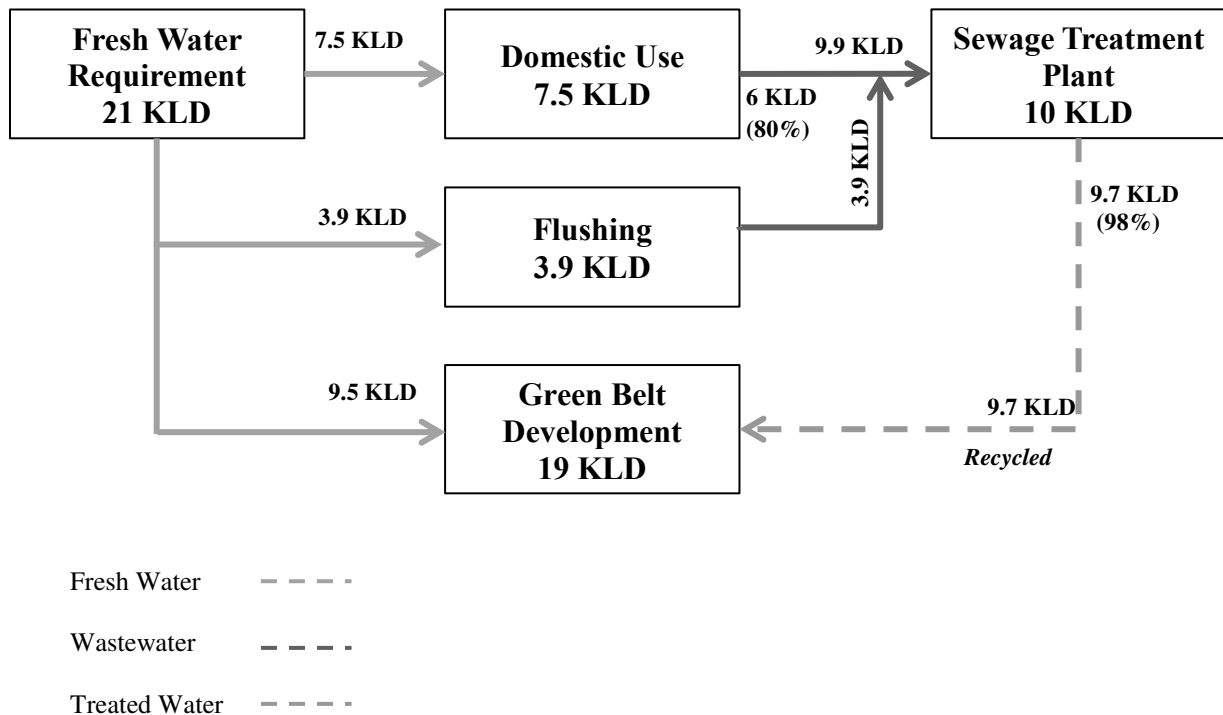


Figure 2.9: Water Balance Chart 5(f) Category

2.6.1.3 Air Pollution Control Measures

The sources of air pollution from the proposed plant are the DG set, process reactor stack and boiler. The details of the emission sources and the proposed air pollution control measures are provided in Table 2.10.

Stack height design calculation:

i) DG set – 400 kVA (1 no.)

where

$h = 5 \text{ m};$

$H = h + (0.2) (\text{kVA})$

$= 5 + (0.2) (400)^{0.5}$

$= 5 + 4$

$= 9.00 \text{ m}$

where, H = Total height of stack in meters from ground level

h = height of the building in meters

The stack height required as per CPCB norms is 9 m. The stack height of 9 m will be provided.

Table 2.10 Air Pollution Control Measures

S.No	Description/ Source	Capacity	Stack Height	Material of Construction	Mitigation Measures
1.	DG Set	400 kVA	10	Mild Steel	Stack height with acoustic enclosure
2.	Process Reactor	-	12	Stainless Steel	Collection Hood with Two stage activated carbon filter
3.	Boiler	1 Ton/hr	8	Stainless Steel	Stack

2.6.1.4 Solid Waste Generation and Management**a. Construction and Demolition Waste**

The construction waste generation in the project is estimated at the rate 40 – 60 kg/ Sq. m. of the construction area. (Source: Central Pollution Control Board, 2017 – Guidelines on Environmental Management of Construction & Demolition (C&D) Wastes, Section 2.2). The construction waste generated shall be used in the construction of internal driveways within the project site.

b. Municipal Solid Waste

The municipal solid waste from the proposed project activity will comprise of biodegradable waste and non-biodegradable waste and is estimated (Table 2.11) based on CPHEEO norms. The biodegradable waste and the STP Sludge will be treated in an organic waste convertor and will be converted to manure. The non-biodegradable waste will be handed over to Local Body daily waste collection system through Phoenix Kothari Private Limited.

Table 2.11: Estimation of Municipal Solid Waste from Occupants

S.No.	Component	Occupancy	Per Capita waste generation (kg/day)	Total waste generation (kg/day)	Biodegradable Waste	Non-Biodegradable waste
					@ 60% of total waste generation (kg/day)	@ 40% of total waste generation (kg/day)
1.	Workers	250	0.3	75	45	30
2.	Admin & Maintenance Staff	12	0.3	4	2	2
3.	STP Sludge			1	1	-
Total				79	47	32

c. Hazardous Waste Management

The details of hazardous waste to be generated from the project activity are listed in Table 2.12.

Table 2.12 Details of Hazardous Waste

S.No.	Description of Waste	Category as per HWM Rules 2016	Quantity T/Annum	Storage Method	Method of disposal
1.	Used oil	5.1	0.2	Hazardous waste generated will be stored inside a hazardous waste storage shed having impervious floor	Will be collected and disposed through TNPCB Authorized recycler/TSDF
2.	Contaminated cotton rags or other cleaning materials	33.2	0.1		
3.	Contaminated Barrels	33.1	7.5		
4.	Process Filter residue	36.1	17		
5.	Spent carbon	36.2	2		
6.	Spent solvents	20.2	6		

2.6.2 Process Description – Non EC category Industries

The Non-EC category comprises non-leather footwear manufacturing units and their allied industries. A brief overview of the technologies and processes likely to be adopted by these industries within the proposed industrial estate is provided below. Detailed manufacturing processes for each individual unit will be submitted by the individual industries at the time of obtaining Consent to Establish (CTE) and Consent to Operate (CTO) from the Board.

i) Non-Leather Footwear Manufacturing

The general manufacturing process in a non-leather footwear industry involves designing and selecting synthetic materials such as EVA, PU, PVC, fabric and rubber, followed by cutting and stitching or laminating the upper components. Simultaneously, soles are manufactured using injection or compression molding techniques. The upper and sole are then bonded using adhesives solvent-based, water-based or hot-melt through pressing and curing. The assembled footwear undergoes finishing steps such as trimming, cleaning, insole insertion and fastening attachment (like laces or Velcro). Finally, each unit will be inspected for quality and durability before being packed for dispatch.

ii) Other Allied Non Leather Footwear Products Manufacturing

The manufacturing process of other allied non-leather footwear products such as insoles, midsoles, outsoles, straps, footbeds, heel counters and laces involves material selection, shaping, treatment and finishing. Components like insoles and midsoles are typically made from EVA, PU or foam using compression or injection molding, while straps, footbeds and heel counters are cut or molded from synthetic materials and may be stitched, laminated or buffed for added durability and comfort. Laces are manufactured using synthetic yarns like polyester or nylon, which are braided or woven using automated lace braiding machines followed by tipping (adding aglets) and cutting to required lengths. Adhesives or ultrasonic welding are used for assembling certain components. All items undergo quality inspection and are packed for integration into footwear or supplied separately as accessories or replacement parts.

2.7 PROJECT DESCRIPTION

The project proponent M/s. Phoenix Kothari Footwear Limited will establish infrastructure development like water supply system, power transmission system, internal roads and driveways, common green belt area, solid waste management yard, rainwater management system etc. The remaining area is earmarked as industrial plots for individual industries coming up within the industrial estate. The total no. of the industrial plots and the area breakup are given in Table. 2.13.

Table 2.13 Land area break-up – Industrial Plots

S.No	Plot Description	Area in Acres	Area in Hectares
Industrial Plots			
1	Plot 1	29.09	11.77
2	Plot 2	19.44	7.87
3	Plot 3	51.71	20.93
4	Plot 4	36.45	14.75
5	Plot 5	8.78	3.55
Total		145.47	58.87

The infrastructure proposed in the Industrial Estate and their details is briefed below

2.7.1 Internal Roads

The development of Industrial Park will facilitate internal roads of 20m width covering 4.59 Hectares (11.34 acres) which will be the access to the individual industrial plots.

2.7.2 Solid Waste Management Yard

A common solid waste management yard is proposed in a land area of 0.08 Hectares (0.19 acres). Horticultutal waste from the common green belt area will be composted onsite and

converted into manure. The non-biodegradable wastes such as cartons, packaging material, paper and plastic wastes etc and e-wastes will be collected, segregated and disposed through TNPCB authorized recyclers. Other wastes such as biodegradable waste, horticulture wastes, hazardous wastes from individual industries will be handled by the individual industries.

2.7.3 Common Green Belt Area

A green belt of 15 m width is proposed along the periphery of the industrial plots and as common green belt area. The break-up is given in Table 2.14. The Green belt Layout of the project site is attached as Annexure VII.

Table 2.14 Green Belt area break-up

S.No	Plot Name	Plot Area in Acres	Green Belt Area in Acres	Green Belt Area in Hectares
1	Green belt area of individual plots (15%)	145.47	21.82	8.82
2	Common green belt area	-	21.21	8.58
Total green belt area provided			43.03	17.41

2.7.4 Manpower Requirement

About 250 labourers (100 – Temporary and 150 – Local) will be employed during peak construction period. The labor camps for the laborers will be arranged by the contractor engaged for the construction. During Operation phase around 20,000 employees will be benefitted through direct and indirect involvement.

2.7.5 Water and Wastewater Management

During Construction phase:

The water requirement during the construction phase for both construction and domestic requirements totals to 100 - 150 KLD and will be met through SIPCOT water supply scheme/Private Tankers.

During Operation phase:

Total water requirement during the operation phase will be 2,238 KLD of which daily fresh water requirement for domestic use, green belt and industrial use will be 831 KLD, which will be sourced through SIPCOT water supply scheme. Apart from fresh water requirement recycled water requirement for flushing, gardening, industrial use are

Toilet Flushing	:	300 KLD (STP treated water)
Gardening	:	553 KLD (STP treated water)
Industrial Use	:	553 KLD (ETP treated water)

The detailed water requirement and wastewater generation from the industrial estate is estimated in Table 2.15 and the water balance chart is shown in Figure 2.10

The sewage generated from the industrial plots of 870 KLD, which will be treated in individual STP proposed within each industry. The treated sewage from the STP will be utilized for Flushing and Gardening water requirements.

The effluent generation from the industrial plots will be treated in individual ETP's proposed within each industry. The treated effluent will recycled within the individual industries for manufacturing requirements.

Table 2.15: Estimation of Water Requirement

Description	Water Consumption Rate/ Criteria	Occupancy/ BUA/LA	Total Water Requirement	Fresh Water Requirement	Recycled Water Requirement
Industrial Process	5 KL/acre	145.47 acres	7,27,350	1,74,564	5,52,786
Domestic Industries	45 LPCD	20,000	9,00,000	6,00,000	3,00,000
				@ 30 LPCD	@ 15 LPCD
Maintenance Staff	45 LPCD	20	900	500	400
				@ 25 LPCD	@ 20 LPCD
Green Belt Development	3.5 L/Sq.m	1,74,124 Sq.m	6,09,433	56,376	5,53,057
Total			22,37,683	8,31,440	14,06,243
			2237 KLD	831 KLD	1,406 KLD

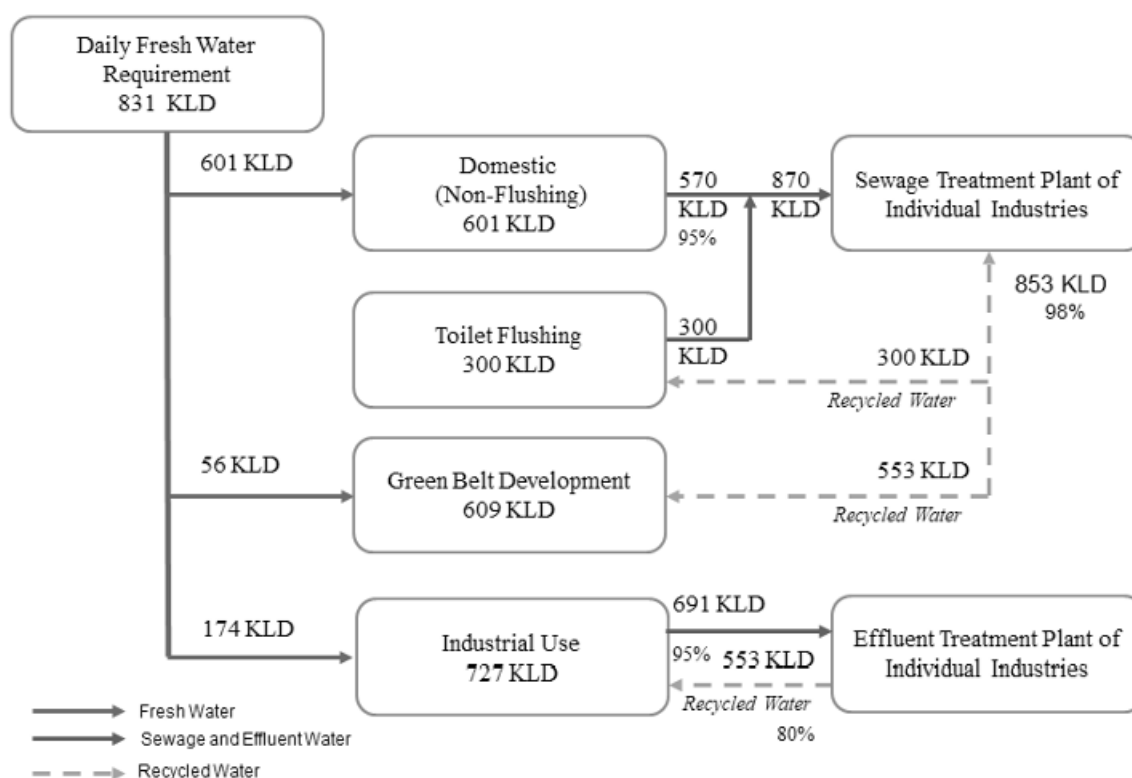


Figure 2.10: Water Balance Chart

2.7.6 Solid Waste Estimation and Management

Construction Phase: The solid waste generation from the project site during the construction phase will be from labour camps and construction and demolition waste. The C&D waste during construction of individual industries will be of 64.50 kg/day which will be used for backfilling and level rising within individual industrial plots. Any excess waste will be disposed in locations earmarked by the local body.

Operation Phase: The solid waste (i.e biodegradable and non-biodegradable) generation from the industrial estate during the operation phase is estimated as per CPHEEO norms as in Table 2.16. The disposal method of the solid wastes are summarized in Table 2.17

Table 2.16: Solid Waste Estimation

Project Component	Total Occupancy (Nos.)	Per capita generation (kg/c/day)	Total waste generation (kg/day)	Total Biodegradable waste generation (kg/day)	Total Non-biodegradable waste generation (kg/day)
Industries	20,000	0.3	6,000	3,600	2,400
Maintenance Staff	20	0.3	6	4	2
STP Sludge	10 % of Sewage generated		57	57	-
ETP Sludge	5% of Effluent generated		34	-	34
ETP Salt	15% of the reject generated		21	-	21
Total	20,020	-	6,118	3,661	2,457

Table 2.17: Solid Waste Disposal

Description	Generation (kg/day)	Disposal
Biodegradable waste	3,604	Treated in an Organic Waste Converter (OWC) within individual industries and used as manure for green belt
Non-biodegradable waste	2,402	Handed over to authorized recyclers.
STP Sludge	57	Dewatered and processed along with biodegradable waste in OWC and used as manure for green belt
ETP Sludge	34	Through authorized hazardous waste disposal facility
ETP Salt	21	As per TNPCB norms

The other non-biodegradable wastes from the manufacturing process of the individual wastes will be segregated onsite and disposed through authorized disposal facility by the individual

industries. The hazardous wastes such as ETP sludge, Spent Oil from DG sets etc. generated from the individual industries will be disposed through authorized hazardous waste disposal facility in accordance with the rules.

The E-Waste generated from the individual industries will be properly disposed through the TNPCB authorized vendor / dismantlers by the individual industries as per E-waste Management Rules 2022 and its amendments.

The industries generating any biomedical waste shall ensure proper segregation, collection, storage, transportation, treatment and disposal of such waste as per the provisions of the said rules and the guidelines issued by the CPCB and TNPCB. The individual industries will be instructed to comply with the Bio-Medical Waste Management Rules, 2016 (as amended)

2.7.7 Power requirement

The power requirement of the project will be about 3000 KVA and which will be sourced from the proposed substation. Additionally, DG sets as source of backup for the industries will be provided by the individual industries upon necessary permission from TNPCB. No DG sets proposed as source of power backup for the common amenities such as project office.

2.8 DESCRITPITON OF MITIGATION MEASURES INCORPORATED INTO THE PROPOSED PROJECT TO MEET THE ENVIRONMENTAL STANDARDS

2.8.1 Air Pollution Control Measures

The individual industries will install Air Pollution Control (APC) equipment as required in compliance with CPCB/TNPCB norms to contain emissions from their industrial activity and from Diesel Generator sets.

Vehicular emissions within the proposed Industrial Estate will be mitigated through the development of greenbelt and by restricting vehicles with valid Pollution under Control (PUC) certificate.

2.8.2 Wastewater Generation and Its Management

Construction Phase: The sewage generated from the construction phase will be treated in temporary mobile STP's or septic tank soak pit arrangement.

Operation Phase: The sewage generated from the individual industry will be treated in their own individual STP's and the treated sewage will be reused for greenbelt development and flushing prupose

The effluent generated from the individual industries will be treated in their own individual ETP's and the treated effluent will be reused for the industrial process.

2.8.3 Solid Waste Generation and Its Management

Construction Phase: The C&D waste will be reused within the sites for back filling or leveling or will be disposed in locations designated by the local body. Other wastes such as organic wastes and other non-biodegradable wastes will be segregated in earmarked location and will be disposed through the local body.

Operation Phase:

- **Municipal Solid Waste Management:**

Solid waste management during the operation phase will be carried out as listed in Section 2.7.6. A solid waste management yard has been earmarked in the industrial estate to manage non-biodegradable wastes. The horticultural waste from the common green belt area will be collected onsite and converted into manure for the green belt.

- **Hazardous Waste Generation and Its Management**

The hazardous wastes such as ETP sludge, Spent Oil from DG sets etc., generated from the individual industries will be disposed through authorized hazardous waste disposal facility in accordance with the TNPCB norms by the individual industries.

- **E-Waste Generation and Its Management**

The E-Waste generated from the individual industries will be segregated and disposed through TNPCB authorized vendor / dismantlers by the individual industries as per E-waste Management Rules 2022 and its amendments.

- **Biomedical Waste Management**

The industries generating any biomedical waste will individually ensure segregation, collection, storage, transportation, treatment and disposal as per the provisions of Bio-Medical Waste Management Rules, 2016 (as amended from time to time) and the guidelines issued by the Central Pollution Control Board (CPCB) and Tamil Nadu Pollution Control Board (TNPCB).

- **Plastic Waste Management**

The individual industries generating plastic wastes will ensure segregation, collection, storage, transportation, recycling and disposal in accordance with the Plastic Waste Management Rules, 2016 and its subsequent amendments.

2.9 STORM WATER MANAGEMENT AND RAIN WATER HARVESTING SYSTEM

Storm water drain will be constructed all along the periphery of the project site and the internal road area. Rain water harvesting pits will be provided along the storm water drain to facilitate ground water recharge. The excess storm water after recharge will be diverted into the external storm water drain available in the road abutting the project site. The storm water

drain design and the rain water harvesting system are designed as per Rain Water Harvesting and Conservation Manual, CPWD, GOI. The runoff estimation is given in Table 2.18

Estimation of Runoff:

Annual rainfall for Perambalur Region : 876.6 mm (CGWB)

Based on the annual rainfall, average daily rainfall : 14.6 mm/day

Table 2.18: Estimation of Runoff

S.No	Description	Area (Sq.m)	Runoff Coefficient	Rainfall Intensity	Runoff (Cum)
1	Rooftop Area (Assumption)	2,95,127	0.80	0.014	3,305
2	Pavement, Parking, Road & Utility Area	45,893	0.80	0.014	514
3	Greenbelt Area & Open Area	3,80,196	0.30	0.014	1,597
Total					5,416 Cu.m

The recharge system is proposed in compliance with Rain Water Harvesting and Conservation Manual by CPWD, GOI. On considering the soil profile and ground water table at below 2.5 m from the Existing Ground Level, the following recharge system with rain water harvesting pits is considered.

Design of recharge pits

No. of recharge pits required : total built-up area / 5,000 = assuming 4,41,538/5,000
= 88 nos.

(@ 1 no. of recharge pit per every 5,000 Sq.m of built-up area in compliance with MoEFandCC Norms)

No. of recharge pits proposed : 104 Nos.

Internal Storm Water Drain

100 % of total quantum of rainfall in catchment area is considered for calculation of drainage system to avoid flooding within the project site. (Ref. Appendix A 3.1, Computation of Storm Runoff and Design of Storm Sewer)

Estimated runoff from project site : 5,615 Cu.m/d = 0.065 Cu.m/sec

Cross section of Drainage System : 1.2 Sq.m (1.2 m wide x 1.0 m depth)

Carrying capacity of the open flow channel is based on Manning's equation as follows:

$$Q = A * V,$$

where, Q = Discharge in Cu.m/sec
 A = Area in Sq.m
 V = Velocity in m/sec

$$V = 1/n \times R^{2/3} \times S^{1/2}$$

where, n = Manning's Coefficient (For concrete finished surface = 0.016)
 R = Hydraulic Radius in m ($R = A/P$, where P = Wetted Perimeter in m)
 S = Channel slope in m/m

For the Industrial development,

$n = 0.016$
 $A = 1.2 \text{ Sq.m (1.2 m wide x 1.0 m depth)}$
 $P = 2 * (1.2 + 1.0) = 4.4 \text{ m}$
 $R = A/P = 1.2/4.4 = 0.27 \text{ m}$
 $S = 1/100 = 0.01$
 $V = 2.64 \text{ m/sec}$
 $Q = A \times V = 1.2 \times 2.64 = 3.16 \text{ Cu.m/sec}$

The storm water layout of the Industrial Estate is attached as Annexure IX.

2.10 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

The proposed Industrial Estate will accommodate only non-leather footwear manufacturing units and their allied industries. M/s. Phoenix Kothari Footwear Limited will ensure that only proponents with proven technological processes and a demonstrated record of accomplishment of successful operations elsewhere are allotted plots within the estate. The likelihood of technological failures arising from the use of new or untested systems is expected to be negligible. In the event that any individual industry intends to adopt a new technology, it will be first validated through pilot-scale trials and comprehensive risk assessment and management studies will be undertaken by the respective industry prior to onsite implementation.

2.11 ESTIMATION OF PROJECT COST

The estimated project cost towards establishment of the Industrial Estate is Rs. 116.99 Crores. The project cost certificate obtained from the Chartered Accountant is enclosed as Annexure III.

CHAPTER 3

DESCRIPTION OF THE ENVIRONMENT

Baseline studies were carried out to provide a detailed description of the existing environment in the project site and its study area. The study area encompasses different radii from the project site depending on the project component. For Ecology and Biodiversity, Socioeconomics and Land Use studies, the radius was 10 km, for Air quality and Noise level assessment and for Water and Soil quality analyses it was 5 km radius from the project site.

The baseline study was conducted from March 2025 to May 2025. Monitoring locations were fixed following a reconnaissance survey of the site and its study area. The study involved the collection of both primary and secondary data pertinent to the project.

3.1 METHODOLOGY – BASELINE ENVIRONMENTAL MONITORING

The references for the baseline study includes

- MoEF&CC Technical Guidance Manual for Industrial Estates
- ToR issued by SEIAA-TN for the project
- Sector and functional area regulations and directives

The baseline study was conducted with the following considerations

Primary attributes such as ambient air quality, micrometeorological data, noise levels, ground water and surface water quality, soil quality, land use pattern, biodiversity and socio-economic aspects were assessed through field studies.

Secondary attributes includes Meteorological data from IMD, Trichirapalli, land use data, geology and hydrogeological conditions, flora and fauna of the study area and sensitive areas such as forests, sanctuaries etc. and the socio-economic condition were evaluated using published literature and government publications and was validated against ground conditions.

3.2 LAND ENVIRONMENT

3.2.1 Objectives of the Study

- To assess the existing land use patterns within the core and buffer zones of the study area.
- To analyze the potential impacts of land use changes resulting from the proposed project activities.
- To identify critically vulnerable zones and recommend appropriate long-term management and mitigation measures along with an implementation timeline.

3.2.2 Methodology of the Study

The following steps were undertaken to analyze the land use pattern of the project site, with the assessment based on image characteristics such as color, texture, tone, and other visual attributes.

- **Data Collection and Preparation:** Source data including Survey of India (SOI) topo sheets and IRS P-6 LISS IV satellite imagery were collected. The satellite images were geometrically corrected using the Principal Component Analysis (PCA) method and resampled with the nearest neighbour technique.
- **Image Enhancement and Geo-referencing:** The LISS IV images were enhanced through spatial, radiometric, and temporal tools using ERDAS Imagine software. The images were then geo-referenced using control points from SOI topo sheets to align with the UTM coordinate system.
- **Area of Interest (AOI) Definition:** A 10 km buffer zone was created around the project site to define the area of interest for land use analysis.
- **Image Fusion and Sub setting:** The LISS IV images were fused and blended using the Layer Stack option to improve visualization. A subset of the image was extracted based on the defined AOI for focused analysis.
- **Classification and Interpretation:** Unsupervised classification was initially performed using maximum iterations. A signature file was created by selecting representative samples within the AOI. This was followed by supervised classification supported with visual interpretation based on image characteristics like tone, texture, shape, and pattern.
- **Digitization and Data Integration:** The interpreted maps were digitized and spatial features such as contours and drainage lines were edited, labelled, mosaiced and integrated into a GIS environment.
- **Validation and Finalization:** All data and maps underwent Quality Control/Quality Assurance (QC/QA) process. Necessary corrections were incorporated to ensure accuracy and land use areas were quantified in hectares for final analysis.

The flow chart showing methodology adopted for land use mapping is shown in Figure 3.1.

3.2.3 Topography

The Topography maps of the study area prepared using Survey of India (SOI) topo sheets (C44B3 and C44A15) shows the project site along with surrounding canals, lakes, drains and other water bodies. (*Source: Survey of India (SOI). (n.d.). Topographical Sheets – C44B3 and C44A15. Department of Science & Technology, Government of India.*) The maps also illustrate the hydrological connectivity of these features to major water bodies in the study area such as the Vellar river, Chinar river, Koneri Ar and Elumuru Ar. The Topo Maps of the project and its study area is attached as Annexure IV.

- The site is well-connected by an existing road.
- The terrain in the project area consists of red and brown soil with black cotton texture, characterized by no undulations.
- A natural drainage network exists around the site and due to the topographical features and with effective drainage the risk of flooding is minimal.
- No eco sensitive sites such as Wildlife Sanctuaries and National Parks exist within the 10 km radius of the project site.
- The project site is primarily an open land with no undulations.

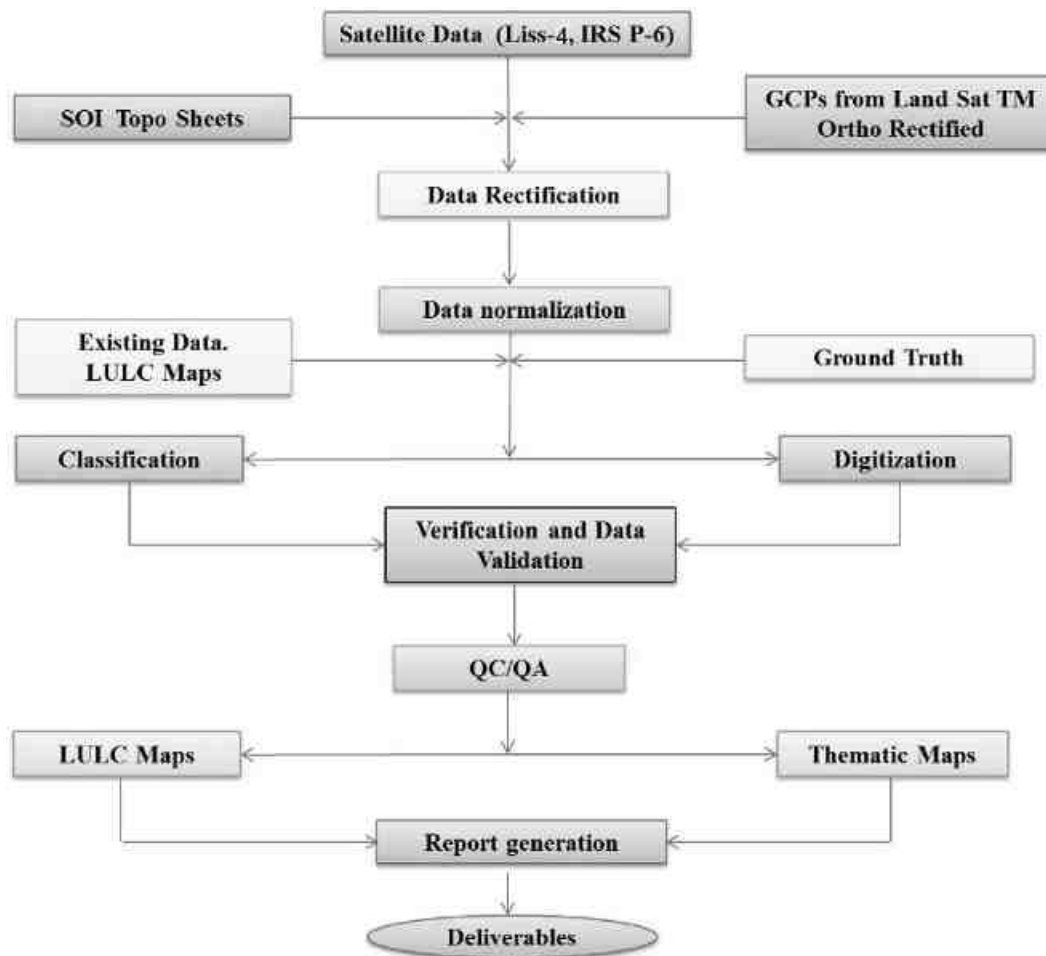


Figure 3.1: Flow Chart Showing Methodology of Land Use Mapping

3.2.4 Contour Map and Elevation of Study Area

The contour lines from the Survey of India (SOI) topo sheet were digitized within a GIS environment and assigned elevation values in meters, referenced to Mean Sea Level (MSL). To enhance accuracy, these values were verified using elevation data from the Shuttle Radar Topography Mission (SRTM). (Source: United States Geological Survey (USGS). (2000), Shuttle Radar Topography Mission (SRTM) Global Elevation Data. NASA and NGA.) The

contour map (Figure 3.2) was prepared by integrating both the topo sheet and SRTM data, with a contour interval of 10 meters.

The elevation at the project site ranges from 120 m to 132 m above MSL, while the study area exhibits elevation variations from 60 m to 160 m above MSL. Higher contour levels were noticed towards the east of the project site whereas lower elevations in the west. The remaining areas exhibited gradual variations in elevation across the site. The Contour Plan of the project site is attached as Annexure VI.

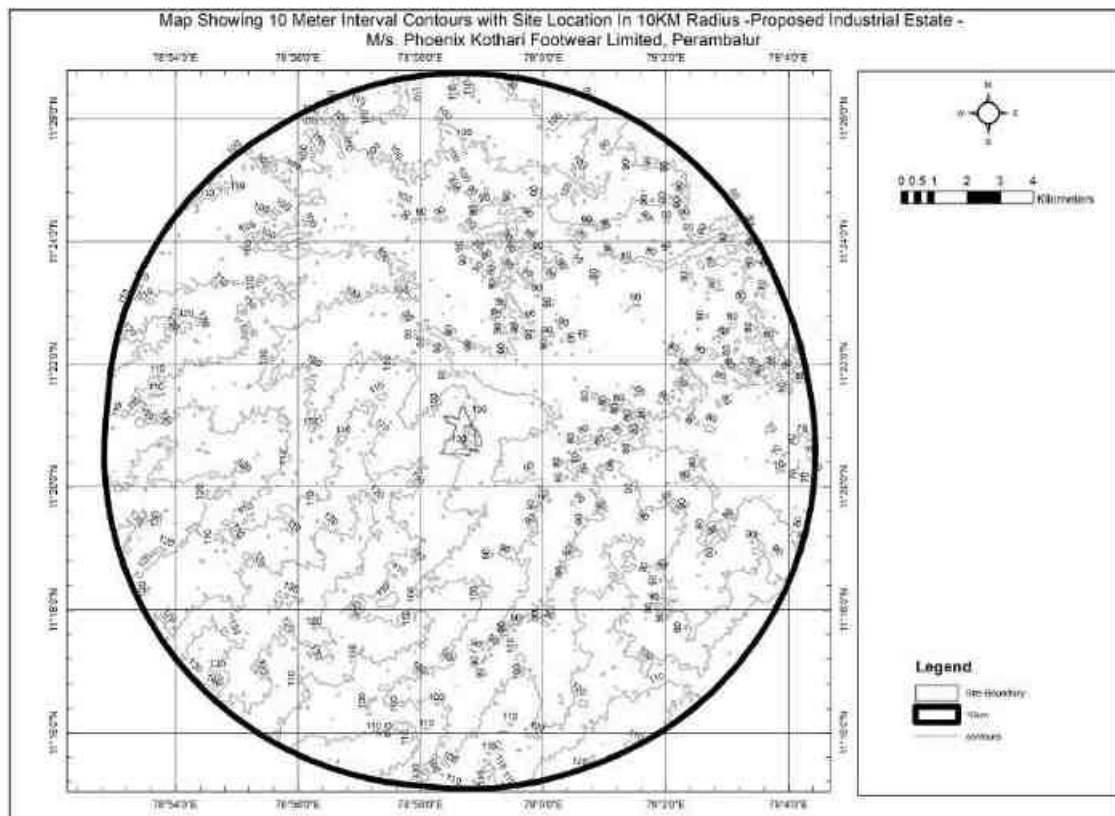


Figure 3.2: Contour Profile of the Study Area

3.2.5 Drainage

The Vellar River and its tributaries primarily drain the study area. In the northern part of the study area, the Vellar River flows from west to east, while its tributaries the Chinnar River and the Elumur River drain the central and southern part of the study area. The study area displays the intricate network of drainage system with dendritic pattern. Some of the tributaries like Chinnar and Elumuru Rivers displays the same flow pattern with semi parallelism and direction which is an indication of presence of structural pattern of lineaments in the area. The drainage and presence of water bodies is presented in Figure 3.3.

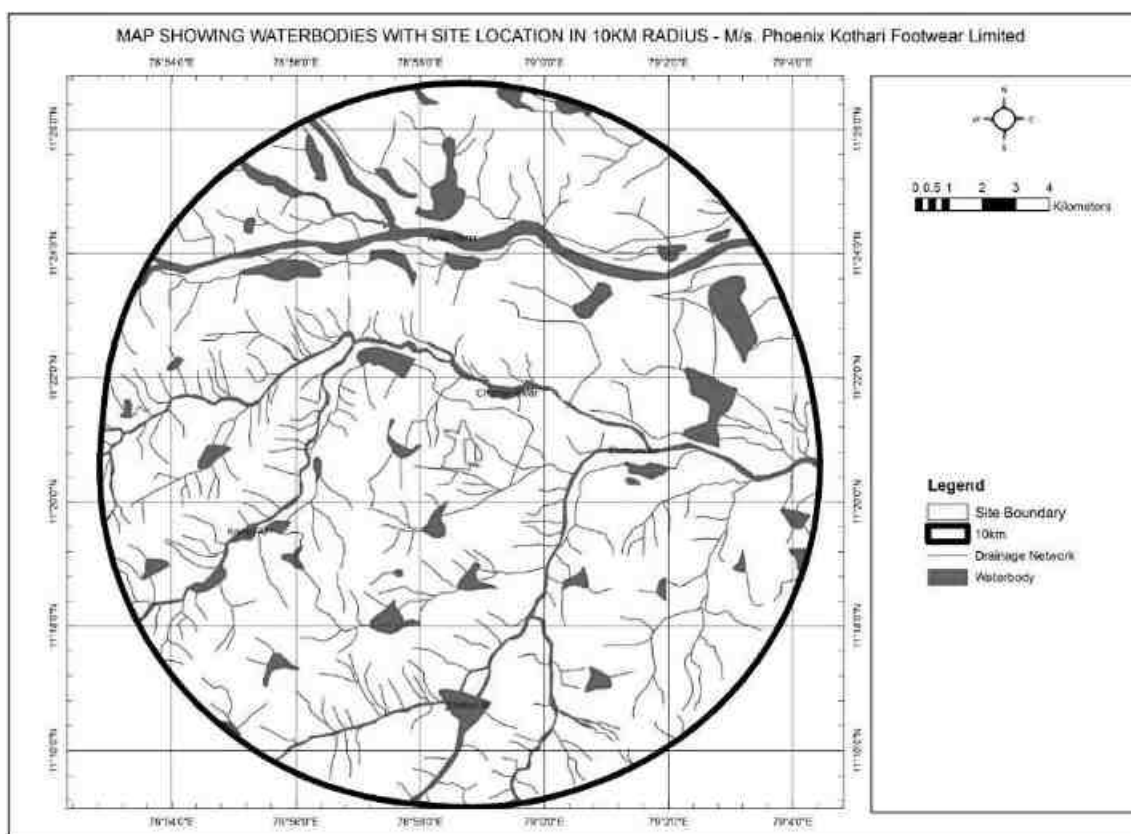


Figure 3.3: Drainage Pattern of the Study Area

3.2.6 Soil

Major parts of the study area around 90% is comprised of red loam soil, and remaining areas are covered by black soils and alluvial soils along the major streams

3.2.7 Land Use Pattern

The present study envisaged different Land Use and Land Cover (LU and LC) around the project site and its study area. The methodology adopted is summarized below.

The Satellite IRS - R2A L4FX images were obtained. (Source: National Remote Sensing Centre (NRSC). (n.d.). IRS - R2A L4FX Satellite Imagery, Indian Space Research Organisation (ISRO), Hyderabad.) The co-ordinate of the site is at the Latitude of 11°20'47.05"N and Longitude of 78°58'39.24"E. The satellite image of the site is shown in Figure 3.4.

The study area is predominantly characterized by agricultural fallow land, which accounts for about 25% of the total area. These lands are cultivated but temporarily left uncropped for one or more seasons typically for at least a year and therefore constitute the total cultivable area. Open scrub covers around 11%, while roads and transportation networks occupy approximately 7% of the area. Settlements (built-up areas) are located along the edges of the agricultural fields and cover about 10%. These built-up areas represent zones of human

habitation developed for non-agricultural purposes and include buildings, transportation and communication facilities, utilities, and associated vegetation and open spaces. Forest areas account for about 6% of the study area.

The proposed project site lies on plain land adjacent to forested areas and is not expected to create significant impacts on the nearby villages or settlements. Water bodies, including the Vellar River, Chinnar River, Elumuru Ar, Koneri Ar and others comprise about 21% of the area and are distinctly visible in satellite imagery due to their prominent dark and light blue signatures. The detailed land use classes of the study area are provided in Table 3.1, and their spatial distribution is illustrated in Figure 3.5.

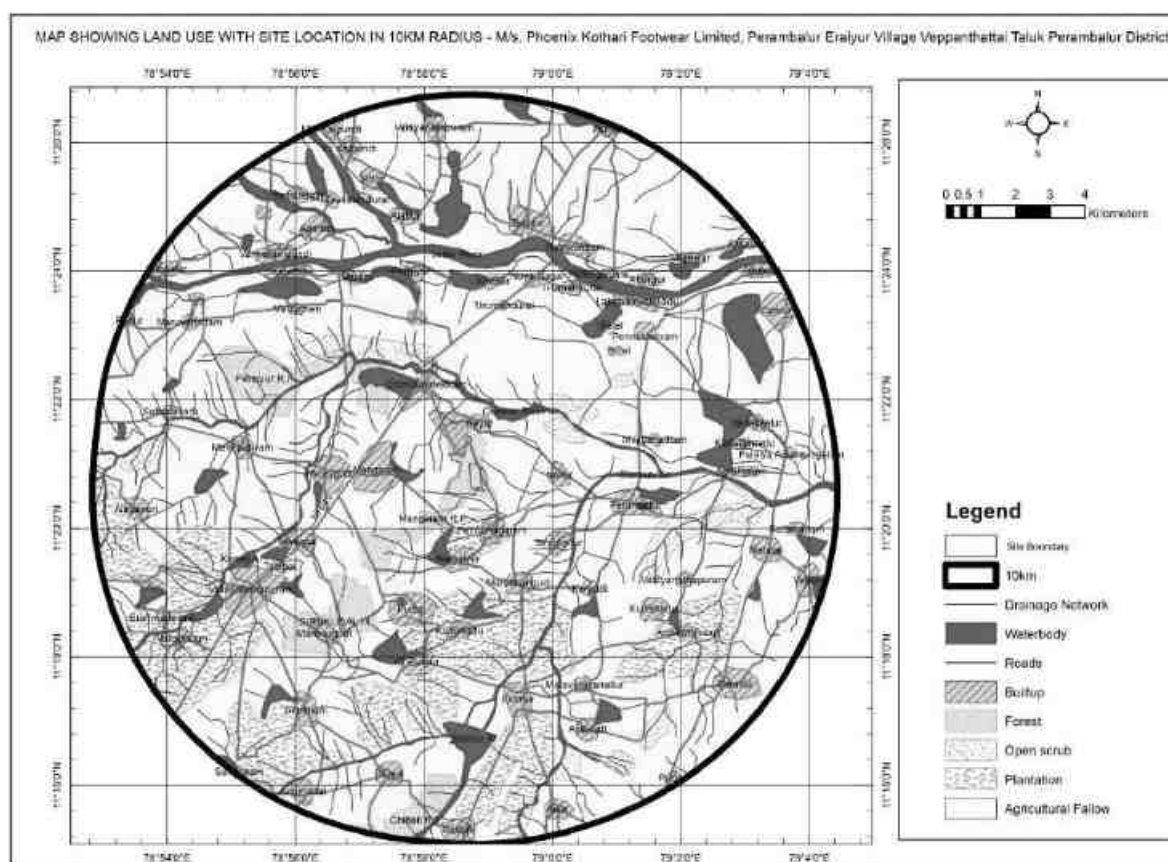


Figure 3.4: Satellite image showing Land Use of the Study Area

To ensure the reliability of the satellite-based interpretation, ground-truthing and field verification were done at key locations across various land use classes. Observations confirmed the accuracy of classification with visual characteristics of settlements, roads, water bodies and industrial areas aligning well with on-ground conditions. Corrections and adjustments where necessary were incorporated into the final LULC map during the Quality Control/Quality Assurance (QC/QA) stage.

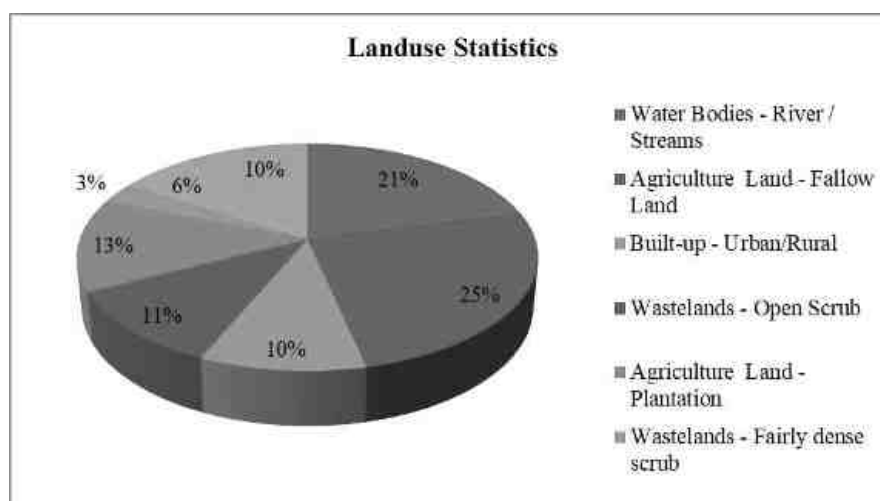


Figure 3.5: Graphical representation of the Land Use statistics of the Study Area

Table 3.1: Land Use and Land Cover Statistics of the Study Area

S. No.	LULC Class 1	LULC Class 2	Area (Ha)	Area (%)
1	Water Bodies	River / Streams	6468.31	21%
2	Agriculture Land	Fallow Land	7810.44	25%
3	Built-up	Urban/Rural	3166.75	10%
4	Wastelands	Open Scrub	3412.00	11%
5	Agriculture Land	Plantation	4102.00	13%
6	Wastelands	Fairly dense scrub	1021.00	3%
7	Forest	Reserve Forest	2015.00	6%
8	Built-up	Roads/Railways	3110.00	10%
Total			31105.50	100%

3.2.8 Summary on the Land Use of the Study Area

Land Use/Land Cover (LULC) analysis of the 10 km radius study area indicates that the region is predominantly agricultural lands (fallow and plantation) accounting for the largest share of the landscape at 38%. This reflects the dependence on agriculture and associated activities in the region. Water bodies, primarily rivers and streams, occupy 21%, suggesting the presence of significant surface water networks that contribute to local hydrology and support irrigation and ecological functions.

Built-up areas, including rural/urban settlements and transport infrastructure, together constitute 20% of the study area, highlighting moderate levels of human habitation and connectivity. Wastelands, comprising open scrub and fairly dense scrub, together account for 14%, indicating the presence of degraded or underutilized land with limited vegetation cover. Forest areas represent 6%, predominantly reserve forests, signifying patches of natural vegetation that contribute to local biodiversity and ecological balance.

Overall, the LULC pattern reflects a mixed rural landscape with a agricultural base, moderate settlement, notable water resources and limited forest cover. The distribution suggests that while development activities are present, significant ecological features such as water bodies and forest patches remain integral components of the study area.

3.3 GEOLOGY AND HYDROGEOLOGY

3.3.1 Objectives of the Study

- To evaluate the geological and hydrogeological characteristics of the project site and its surrounding area including rock types, soil profile, aquifer systems and groundwater conditions.
- To assess the potential impacts of the proposed project on geological stability and groundwater resources, including changes in recharge, withdrawal and contamination risks.
- To recommend appropriate mitigation and management measures for conserving groundwater and ensuring geotechnical stability.

3.3.2 Methodology of the Study

The following methodology was adopted for the assessment of geomorphology, geology, and hydrogeology of the study area:

- Collection of Secondary Data: Relevant data on geomorphology, geology, and hydrogeology were obtained from various State and Central agencies, including the Central Ground Water Authority (CGWA), District Handbooks, and the Indian Meteorological Department (IMD).
- Assessment of Terrain Characteristics: The physiography, slope, terrain and geomorphic features of the buffer zone were analyzed to understand their influence on groundwater conditions.
- Field Investigation:
 - a. Rock types and aquifer characteristics were identified
 - b. Existing open wells, bore wells and tube wells were monitored for water levels and conditions.
- Data Correlation: Field observations were collated and compared with secondary data to validate and enhance the understanding of site-specific conditions.
- Interpretation: Geomorphological, geological and hydrogeological characteristics were interpreted in the context of the study area.
- Impact Assessment and Mitigation: Potential project-related impacts on geological and groundwater conditions were identified, and appropriate mitigation measures were proposed.
- Environmental Management Recommendations: Site-specific environmental management strategies were suggested, particularly focusing on the utilization of available rainwater potential.

3.3.3 Geomorphology

The study area is a part of the Perambalur District and is characterized by an undulating topography, characterized by low mounds and broad valleys. Hill ranges belonging to Pachaimalai Hills occupy the northwestern part of the district, where the terrain is rugged. The ground elevation ranges from 100 to 1015 m amsl. The region slope is towards east. Denudational, structural and fluvial processes mainly control the geomorphic evolution of the area. Mainly the varying resistance of geological formations to those processes has governed the evolution of various landforms. The land forms occurring in the area such as structural hills, erosional plains, residual hills rolling uplands and pediments of different facies belonging to the denudational and structural land forms. Fluvial landforms caused by the activity of Cauvery, Marudayar and Vellar river systems include younger flood plains, older flood plains and buried pediments.

3.3.4 Geology

Geologically, the district is largely underlain by Basal Crystalline formations. The western one-third consists predominantly of Archean-age Charnockites, Granites and Gneisses while the eastern two-thirds comprise Cretaceous formations such as white sandy limestones and sandstones with fossil content, along with Tertiary formations including Cuddalore Sandstone, mottled ferruginous clays and pebble beds. Charnockites, Granites and Gneisses, intersected by Quartz and Pegmatite veins, specifically underlie the study area. (Source: Geological Survey of India (GSI). (n.d.). Geological and Mineral Maps of Tamil Nadu, Ministry of Mines, Government of India.)

3.3.5 Seismic Zones

As per the seismic zone map of India, Perambalur falls under Zone II, indicating a least seismic active zone/low damage risk zone. (Source: Bureau of Indian Standards (BIS). (2002). IS 1893 (Part 1): 2002 – Criteria for Earthquake Resistant Design of Structures – Part 1: General Provisions and Buildings (Fifth Revision), Seismic Zones of India, Pg 5. New Delhi: Bureau of Indian Standards). The development on hard Charnockite and Granites and Gneisses of Archean Age are generally more stable under seismic conditions. (Reference: Srinivasan, R. (2001). Geology of the Southern Granulite Terrain. Geological Society of India.)

3.3.6 Hydrogeology

The study area is underlain by the hard rock aquifer system include Charnockites, Granites and Gneisses traversed by Quartz and Pegmatite veins which are otherwise called hard rock aquifers. Ground water occurs under water table conditions in weathered mantle and semi-confined conditions in fractured zones depend on the joints, fracture and its development. The Depth to Water Level during pre-monsoon ranges from 5.0 to 10.0 m bgl m bgl, whereas post-monsoon period, water level ranges from 2.0 to 5.0 m bgl. The ground water development in the area is through dug wells and bore wells feasible in weathered and fracture zones. The yields of the wells are relatively low in water divide area with less than

50 m³/day and more in the river valley area with yield ranging between 50 m³/day to 200 m³/day.

3.3.7 Ground Water Resource

As per Ground Water Estimation Committee Methodology (GEC- 2015), for the year 2024, the Annual Recharge in Vallikandapuram Firka in which the study area falls is 3396.59 Ham and the Net Annual Extractable Ground Water availability is 3056.93Ham, whereas Extraction of ground water for irrigation, industry and domestic use is 3171.53Ham. Net Ground water availability for future use is (-)116.75 Ham (means availability for future use is nil). Stage of Ground Water Extraction is 103.75% indicating that the Villikandapuram Firka as a whole is classified as “Over Exploited Category”. The annual ground water resources of Perambalur District and Vallikandapuram firka in which present study area falls are given in Table 3.2.

Table 3.2: Annual ground water resources of Perambalur district and the Study Area

S.No	Details	Perambalur District	Vallikandapuram Firka
1	Total Ground Water Recharge (Ham)	28883.8	3396.59
2	Extractable Ground water Resources (Ham)	25995.4	3056.93
3	Total Ground Water Extraction from Irrigation, Domestic and Industrious (Ham)	27517.06	3171.53
4	Ground Water Availability for Future Use (Ham)	(-) 1521.66	(-) 116.6
5	Stage of Ground Water Extraction (%)	105.85	103.75
6	Category	Over Exploited	Over Exploited

Ref: Ground Water Estimation Committee (GEC- 2015)

The total ground water recharge of Perambalur district is 28883.8 Ham, whereas the extractable ground water resources are 25995.4 Ham. The total ground water extraction for all uses in the district is 27517.06 Ham. The ground water availability for future use is (- 1521.66) Nil Ham. The stage of ground water extraction of the district is 105.85% falling in Over Exploited category. As such there is no scope to extract ground water for large scale withdrawals for industries.

Any extraction of ground water has to be viewed critically and necessary recharge measured to be taken as per the stipulation of Regulatory Authority, in general around the area, specifically in the project premises to comply with.

3.3.8 Summary on the Geology and Hydrogeology

Geological Stability:

The study area forms part of an undulating terrain shaped by denudational, structural and fluvial processes featuring hills, plains, uplands and pediments. Geologically, it is underlain by Archean Charnockites, Granites and Gneisses, traversed by Quartz and Pegmatite veins.

Hydrogeological Conditions:

The study area is underlain by hard rock aquifers (Charnockites, Granites and Gneisses), where groundwater occurs in weathered and fractured zones with shallow water levels ranging from 2–10 m bgl. Well yields are low in upland areas and higher in river valleys, with groundwater development mainly through dug wells and bore wells.

3.4 AIR ENVIRONMENT

Air quality is influenced by both micrometeorological conditions and the presence of pollutants from natural and anthropogenic sources. The meteorological data for the study has been obtained from Indian Meteorological Department (IMD) station at Trichirapalli, while a micrometeorological study has been conducted at the project site to capture site-specific atmospheric conditions.

3.4.1 Meteorological Characteristics

The meteorological data from NASA's Prediction of Worldwide Energy Resources (POWER) Data Access Viewer (DAV) was processed for the nearest IMD station located at Trichirapalli International Airport (VOTR), Trichirapalli. The data for the past ten years (2014-2024) were collected and compiled for the study area as shown in Table 3.3. The important parameters considered are temperature, humidity, wind speed, wind direction and rainfall.

**Table 3.3: Meteorological Data – Station: IMD, Trichirapalli
(2014-2024)**

Month	Temperature °C		R.H %	Predominant Wind Direction	Wind Speed	Rainfall (mm)
	Max	Min	Max		Max	Max
January	32.8	15.8	76.2	ENE	9.0	26.7
February	36.8	16.5	67.3	ENE	9.3	6.7
March	40.5	19.1	58.5	ESE	9.7	9.9
April	41.7	23.1	56.3	SE	9.6	27.4
May	40.3	23.9	64.0	SSW	10.1	92.0
June	38.4	23.3	64.8	W	12.6	58.0
July	37.9	23.1	64.4	W	13.7	67.1
August	37.5	22.7	67.8	W	12.6	100.4

September	37.0	22.2	71.2	W	10.9	105.4
October	35.0	21.2	78.6	S	8.4	149.4
November	31.9	19.1	84.6	NE	9.9	178.5
December	31.1	17.0	83.7	NW	10.2	87.3

(Source: NASA Prediction of Worldwide Energy Resources (Power) Data Access Viewer (DAV), IMD Station – Tiruchirapalli -2014 -2024)

3.4.2 Site specific Micro Meteorological Characteristics

The micro-meteorological station was installed at the site and the details on the monitoring parameters, equipment, its detection limit and the monitoring frequency are given in Table 3.4

Table 3.4: Details on Micro Meteorological parameters monitored

S.No	Parameters Monitored	Sampling collection		Monitoring period	Monitoring Frequency	Methodology
		Equipment	Sensitivity/ Detection Limit			
1	Wind Speed	Anemometer cup counter (0 to 65 m/s)	0.25 m/s	One season (March – May 2025)	Hourly	As per Manufacture's manual (IS 8892-1978)
2	Wind Direction	Wind vane (0 ⁰ to 357 ⁰)	1 ⁰			
3	Temperature	Thermometer (-40 ⁰ C to 60 ⁰ C)	0.1 ⁰ C			
4	Humidity	Relative Humidity meter (0-99%)	3%			
5	Rain fall	Rain gauge	0.5 mm		-	-
6	Cloud cover	-	-		4 Hourly	Visual Inspection by the observer

3.4.3 Micro metrological Study – Results & Interpretation

The micro meteorological data were processed to obtain average values of Temperature, Wind Speed, Wind direction, Cloud Cover, Rainfall and Relative Humidity and is presented in Table 3.5. The combined wind rose diagram for the season March to May 2025 is given in Figure 3.6

Table 3.5: Mean Meteorological Data for the Season March to May 2025

Time (Hrs)	Temp. ⁰ C		R.H (%)	W.S (km/h)	Wind Direction	Cloud cover (Tenths)	Rainfall (mm)
	Max	Min					
0	27.4	24.8	58	12	NE	0	Trace
1	26.6	24.6	60	9.0	ENE	0	000.0

Time (Hrs)	Temp. °C		R.H (%)	W.S (km/h)	Wind Direction	Cloud cover (Tenths)	Rainfall (mm)
	Max	Min					
2	26.4	23.8	63	11	NE	0	000.0
3	26.2	22.6	62	11	NE	0	000.0
4	24.8	20.0	61	13	NNE	0	Trace
5	25.2	21.8	63	12	NNE	0	000.0
6	27.1	22.6	60	10	NE	0	000.0
7	28.4	23.1	67	8	NE	0	004.9
8	32.9	24.2	68	13	ENE	0	002.4
9	34.2	24.4	65	15	ENE	0	009.4
10	34.5	24.2	65	14	ENE	0	000.6
11	34.7	25.8	64	14	ENE	0	000.0
12	34.8	26.6	69	13	E	0	000.0
13	41.3	28.4	68	13	ENE	0	000.0
14	38.8	26.6	65	13	NE	0	000.0
15	37.7	26.2	62	12	NE	0	000.0
16	35.6	25.4	60	12	ENE	0	000.0
17	34.1	25.8	64	13	ESE	0	000.0
18	32.7	25.2	65	12	ENE	0	000.0
19	30.2	24.6	61	12	NNE	0	Trace
20	29.9	25.3	61	14	ENE	0	000.0
21	29.5	24.9	61	11	E	0	000.0
22	28.9	24.5	62	12	NE	0	000.0
23	28.5	24.4	60	10	E	0	000.0

Inference from the study:

- Site specific meteorological data shows that wind speed in the season of the year 2025 is minimum 8 kmph and maximum of 14 kmph.
- Wind rose diagram prepared for the same is shown as Figure 3.6.
- Average temperature recorded for the season was 29.9°C with maximum temperature of 41.3°C and minimum of 20.0°C which is a characteristic of the study area.
- Average relative humidity recorded for the season was 62% with maximum humidity of 98% and minimum of 71% which is a characteristic of this study area.

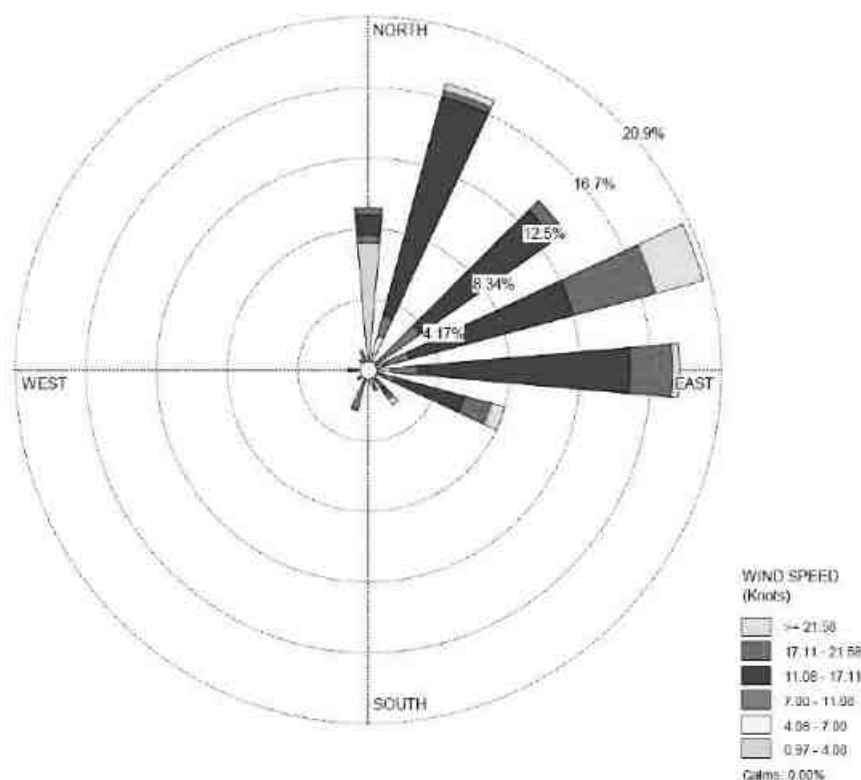


Figure 3.6: Combined Wind Rose diagram for the period March to May 2025

3.4.4 Ambient Air Quality Monitoring

Sampling locations were finalized in accordance with IS 5182 (P-14) 2000 and the norms prescribed by the Central Pollution Control Board (CPCB) considering factors such as regional climatology, predominant wind direction (NE to SW), ease of site accessibility and availability of essential infrastructure such as adequate power supply.

Accordingly, eight sampling stations were established at the project site (Core zone), and in Pennankonam, Perumathur, Athipattu Pudhunagar, Keelapuliur, Mettupalayam, Chinnar and Peraiyur (Buffer zone) as presented in Figure 3.7 and Table 3.6. At each station, PM₁₀, PM_{2.5}, SO₂, and NO₂ were measured over a 24-hour period at uniform intervals and CO concentration was measured every 1 hour twice every week for a period of 3 months. The photographs taken during ambient air quality monitoring are given in Figure 3.8.

3.4.5 Ambient Air Quality Monitoring - Sampling Procedure

Respirable Dust Samplers and Fine Particulate Samplers were used to collect samples for PM₁₀ and PM_{2.5} in ambient air at a flow rate of 1.2 m³/min and 17.6 LPM, respectively. The ambient air was sucked through the cyclone and filter paper by a blower. Samples of gases were drawn at a flow rate of 0.5 litres per minute and were analysed in the laboratory. Measurements were made in respect of the following parameters:

- Particulate Matter (PM₁₀)
- Particulate Matter (PM_{2.5})

- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen (NO₂)
- Carbon Monoxide (CO)



Figure 3.7: Ambient Air Quality monitoring stations

Imagery source: Google Earth (2025)

[Online] Available at: <http://www.google.com/earth/index.html>

[Accessed February 2025]

Table 3.6: Details of Ambient Air quality monitoring stations

Location code	Name of the Location	Direction and Distance from Project Site	Area/ Sources	Environmental Significance	Latitude and Longitude	Justification or Selection of station
AAQ1	Project Site (Core Zone)	Base	Core Zone	Existing ambient air quality at core zone	11.346631°N 78.977402°E	Selected as Base Station
AAQ2	Pennankonam	NW (5.5 Km)	Residential	Existing air quality at Buffer Zone	11.380948°N 79.021959°E	1 st Crosswind direction area with rural habitation and agriculture area.
AAQ3	Perumathur	SE (4.5 Km)	Residential		11.320144°N 79.011600°E	Upwind direction
AAQ4	Athipattu Pudhunagar	S (7.0 Km)	Residential		11.287012°N 78.991951°E	Upwind direction

Location code	Name of the Location	Direction and Distance from Project Site	Area/ Sources	Environmental Significance	Latitude and Longitude	Justification or Selection of station
AAQ5	Keelapuliur	SW (5.7 Km)	Residential		11.306024°N 78.942174°E	2 nd Crosswind direction area with rural habitation and agriculture area.
AAQ6	Mettupalayam	NNW (6.9 Km)	Residential		11.353680°N 78.919536°E	3 rd Downwind direction area with rural habitation and agriculture area.
AAQ7	Chinnar	NW (2.3 Km)	Residential		11.365603°N 78.967830°E	1 st Downwind direction area with rural habitation and agriculture area.
AAQ8	Peraiyur	N (5.9 Km)	Residential		11.400769°N 78.963769°E	2 nd Downwind direction area with rural habitation and agriculture area.



Figure 3.8. Photographs of Ambient Air Quality sampling

The methodology adopted for the analysis is given in Table 3.7

Table 3.7: Method of analysis of Ambient Air Quality parameters

Sampling Parameters	Sampling Equipment	Analytical Equipment	Sensitivity/Detection Limit	Methodology
PM ₁₀	Respirable dust sampler with cyclone and flow measurement – APM 460	Electronic Balance	5 µg/m ³	Gravimetric IS:5182 (Part 23) 2006
PM _{2.5}	Fine particulate sampler – APM 550 mini	Electronic Balance	8 µg/m ³	ESIPL/SOP/C-AA/03 Refer CPCB Guidelines
SO ₂	Gaseous flow (Impinger with TCM) with RDS	Spectrophotometer	4.5 µg/m ³	Colorimetric IS:5182 (Part 2) 2001
NO ₂	Gaseous Flow (Impinger with Sodium Hydroxide (0.1N)) with RDS	Spectrophotometer	6 µg/m ³	Colorimetric IS:5182 (Part 6) 2006
CO	CO Sensor	CO Analyser	1.14 mg/m ³	Sensor/GC Method

- Particulate Matter (PM_{2.5}): (NAAQS Monitoring & Analysis Guidelines Volume-I: Particulate Matter (PM_{2.5}) was analyzed by Gravimetric Method. Particulate matter was collected on the 37 mm dia glass microfiber Filter Paper. PM_{2.5} value was determined from the values of volume of air passed through Ambient Fine Dust Sampler.
- Particulate Matter (PM₁₀) (IS: 5182 Part 23:2006): Particulate Matter (PM₁₀) was carried out by Respirable Dust sampler as per IS: 5182(Part 23):2006. Particulate

matter was collected on the GF/A Filter Paper. Particles with aerodynamics diameter less than the cut-point of the inlet were collected by the filter. The mass of these particles was determined by the difference in filter paper weight prior to and after sampling.

- Sulphur dioxide (SO₂) (IS: 5182; Part – 2 – 2001): Sulphur dioxide was absorbed by aspirating a measured air sample through a solution of Potassium or sodium tetrachloromercurate, TCM. This procedure results in the formation of a dichloro sulphite mercurate complex. The Sulphite ion produced during sampling reacts with sulphamic acid, formaldehyde and pararosaniline to form an azo dye which was determined colorimetrically.
- Nitrogen Oxides (IS: 5182; Part – 6 – 2006): Nitrogen dioxide was collected by bubbling air through a sodium hydroxide- sodium arsenite solution to form a stable solution of sodium Nitrite. The Nitrite ion produced during sampling reacts with hydrogen peroxide, Sulphanilamide and NEDA to form an azodye which was determined colorimetrically.
- Carbon monoxide (CO) (IS:5182; Part -10-1999): Samples containing Carbon monoxide in the range of 0 to 100 mg/m³ were analysed using an Electro chemical sensor.

3.4.6 Ambient Air Quality Monitoring – Results

At each station, ambient air quality parameters i.e. PM₁₀, PM_{2.5}, SO₂, NO₂ & CO were monitored twice a week for 3 months (March 2025 – May 2025) 24 hourly at uniform intervals. The results are presented in Table 3.8 and Figures 3.9, 3.10, 3.11 and 3.12.

Table 3.8: Ambient Air Quality in the study area

Location Code	Name of the Location	Range	Results				
			(µg/m ³)				CO (mg/m ³)
			PM ₁₀	PM _{2.5}	SO ₂	NO _x	
AAQ1	Project Site (Core)	Min	57	20.0	3.1	14	BDL (DL:1.14)
		Max	65	28.0	4.8	23	BDL (DL:1.14)
		Avg	61.1	24.8	3.8	19.3	BDL (DL:1.14)
		98%	65.0	27.7	4.7	22.7	BDL (DL:1.14)
AAQ2	Pennankonam	Min	54	17.0	3.1	15	BDL (DL:1.14)
		Max	63	29.0	5.7	25	BDL (DL:1.14)
		Avg	58.8	23.6	4.5	19.5	BDL (DL:1.14)

Location Code	Name of the Location	Range	Results				
			(µg/m ³)				CO (mg/m ³)
			PM ₁₀	PM _{2.5}	SO ₂	NO _x	
		98%	63.0	28.4	5.6	24.4	BDL (DL:1.14)
AAQ3	Perumathur	Min	50	17.0	3.5	15	BDL (DL:1.14)
		Max	66	31.0	5.3	26	BDL (DL:1.14)
		Avg	58.9	23.5	4.2	19.8	BDL (DL:1.14)
		98%	65.7	30.7	5.3	25.4	BDL (DL:1.14)
AAQ4	Ezhumor	Min	43	15.0	3.1	13	BDL (DL:1.14)
		Max	56	25.0	5.2	20	BDL (DL:1.14)
		Avg	50.6	19.8	4.0	16.7	BDL (DL:1.14)
		98%	55.7	24.7	5.0	19.7	BDL (DL:1.14)
AAQ5	Keelapuliyur	Min	45	16.0	3.1	14	BDL (DL:1.14)
		Max	57	27.0	4.6	23	BDL (DL:1.14)
		Avg	51.8	20.6	3.8	18.2	BDL (DL:1.14)
		98%	57.0	26.4	4.5	22.7	BDL (DL:1.14)
AAQ6	Mettupalayam	Min	46	15.0	3.1	14	BDL (DL:1.14)
		Max	62	29.0	5.2	22	BDL (DL:1.14)
		Avg	54.8	22.6	3.8	17.5	BDL (DL:1.14)
		98%	61.4	28.4	5.0	22.0	BDL (DL:1.14)
AAQ7	Chinnar	Min	54	20.0	3.9	14	BDL (DL:1.14)
		Max	63	30.0	5.2	24	BDL (DL:1.14)
		Avg	58.3	25.2	4.5	18.8	BDL (DL:1.14)
		98%	62.7	29.7	5.2	23.7	BDL (DL:1.14)
AAQ8	Peraiyur	Min	40	15.0	3.4	10	BDL (DL:1.14)

Location Code	Name of the Location	Range	Results				
			$(\mu\text{g}/\text{m}^3)$				CO (mg/m^3)
			PM ₁₀	PM _{2.5}	SO ₂	NO _x	
		Max	53	22.0	4.8	20	BDL (DL:1.14)
		Avg	45.6	18.4	4.2	15.2	BDL (DL:1.14)
		98%	52.1	22.0	4.8	19.7	BDL (DL:1.14)
CPCB –NAAQ Standards			100	60	80	80	2.0

Note: BDL - Below Detection Limit, DL - Detection Limit.

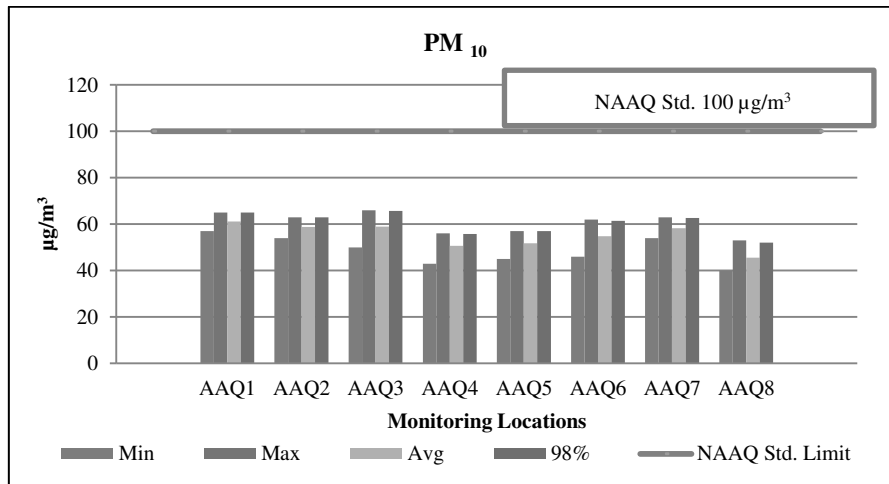


Figure 3.9: Distribution of PM₁₀ concentration in the study area

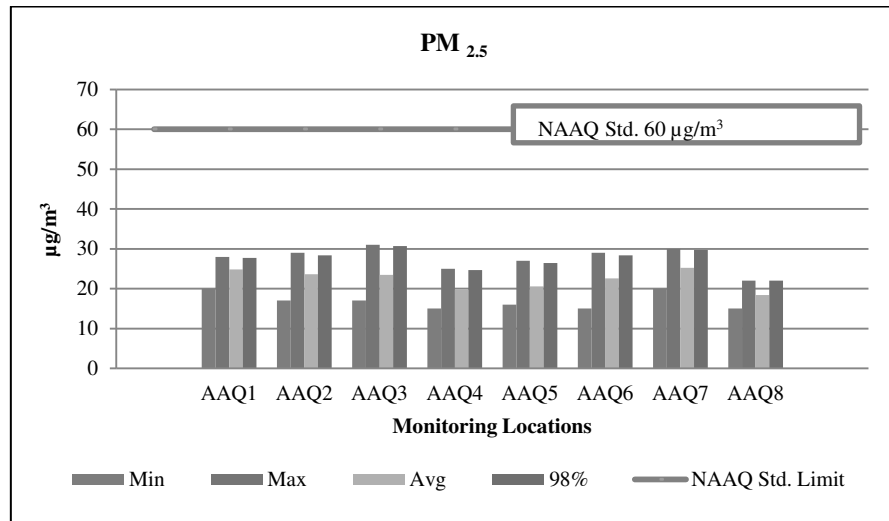


Figure 3.10: Distribution of PM_{2.5} concentration in the study area

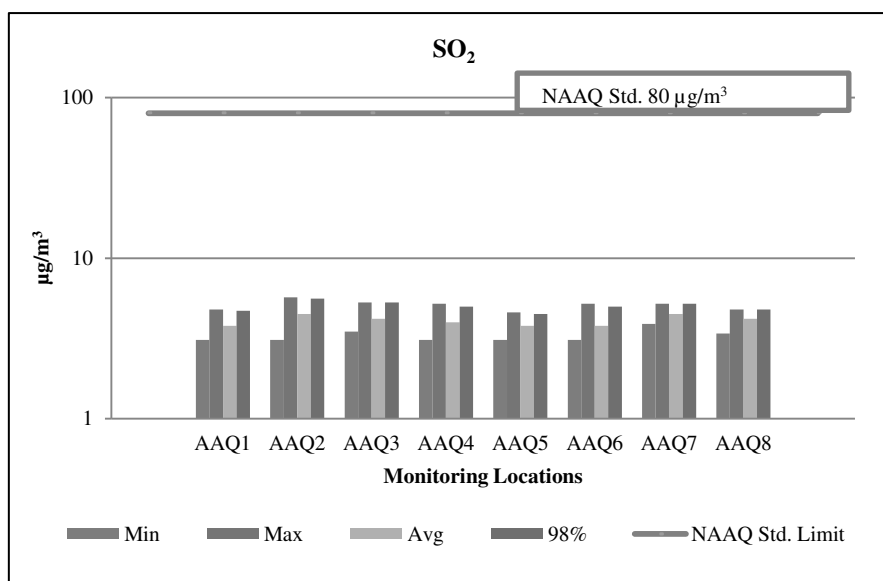


Figure 3.11: Distribution of SO₂ concentration in the study area

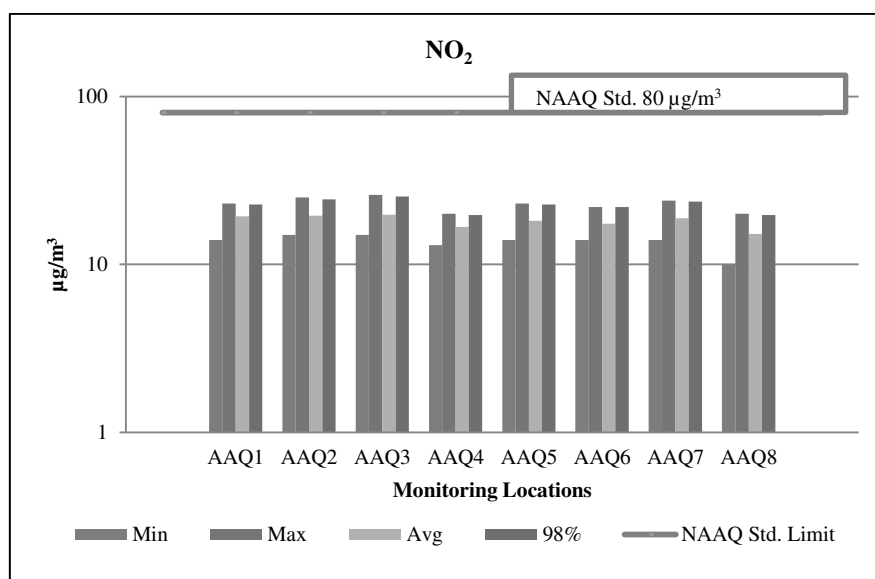


Figure 3.12: Distribution of NO₂ concentration in the study area

3.4.7 Air Quality Index

The AQI for the site area and its surrounding was calculated (Table 3.9) following AQI category by CPCB as shown in Table 3.10.

Table 3.9: Calculated AQI data

Location Code	Locations	AQI Value	AQI Range
AAQ1	Project Site (Core)	61.1	Satisfactory
AAQ2	Pennankonam	58.8	Satisfactory
AAQ3	Perumathur	58.9	Satisfactory
AAQ4	Ezhumor	50.6	Satisfactory

AAQ5	Keelapuliyur	51.8	Satisfactory
AAQ6	Mettupalayam	54.8	Satisfactory
AAQ7	Chinnar	58.3	Satisfactory
AAQ8	Peraiyur	45.6	Satisfactory

(Reference: National Air Quality Index, Control of Urban Pollution Series (CUPS/87/2014-15) by CPCB, Overall AQI System, Page 19)

Table 3.10: AQI Category by CPCB

AQI RANGE	AQI CATEGORY	AQI RANGE	AQI CATEGORY
Good (0–50)	Minimal Impact	Poor (201–300)	Breathing discomfort to people on prolonged exposure
Satisfactory (51–100)	Minor breathing discomfort to sensitive people	Very Poor (301–400)	Respiratory illness to the people on prolonged exposure
Moderate (101–200)	Breathing discomfort to the people with lung, heart disease, children and older adults	Severe (>401)	Respiratory effects even on healthy people

3.4.8 Data Interpretation

The Core zone:

AAQ1 (Onsite): the 98th percentile concentrations of air pollutants were recorded as follows: PM₁₀ - 65 µg/m³, PM_{2.5} - 27.7 µg/m³, SO₂ - 4.7 µg/m³, NO₂ - 22.7 µg/m³ and CO - below the detection limit (Detection Limit: 1.14 mg/m³). All measured values are within the limits prescribed by the National Ambient Air Quality Standards (Refer Figures 3.9, 3.10, 3.11 and 3.12).

The Buffer zone:

The air quality monitoring results for the buffer zone (locations AAQ2 to AAQ8) are presented in Figures 3.9, 3.10, 3.11 and 3.12.

- PM₁₀: Concentrations ranged from a minimum of 52.1 µg/m³ at AAQ8 - Peraiyur to a maximum of 65.7 µg/m³ at AAQ3 - Perumathur.
- PM_{2.5}: The lowest concentration of 22 µg/m³ was recorded at AAQ8 - Peraiyur, while the highest concentration of 30.7 µg/m³ was observed at AAQ3 - Perumathur.
- Sulphur Dioxide (SO₂): Levels varied from 4.5 µg/m³ at multiple locations to a maximum of 5.6 µg/m³ at AAQ2 - Pennankonam.
- Nitrogen Dioxide (NO₂): Concentrations ranged from a minimum of 19.7 µg/m³ at AAQ8 - Peraiyur and AAQ4 - Ezhumor, to a maximum of 25.4 µg/m³ at AAQ3 - Perumathur.

PM₁₀ and PM_{2.5} concentrations across all monitoring locations were well within the limits prescribed by the Central Pollution Control Board (CPCB) under the National Ambient Air Quality Standards (NAAQS). The highest average PM₁₀ concentration of 65.7 µg/m³ was recorded at Perumathur village (AAQ3), which is well below the NAAQS limit of 100 µg/m³. PM_{2.5} concentrations were also significantly lower than the permissible limit of 60 µg/m³, with all values remaining below 50% of the standard indicating effective control of fine particulate matter. Gaseous pollutant levels were consistently low and within the prescribed limits, suggesting a minimal contribution to overall air pollution. The Air Quality Index (AQI) at all ambient air quality monitoring locations fell within the "Satisfactory" category (51-100), indicating minimal health impacts with only minor breathing discomfort possible for sensitive individuals.

3.5 NOISE LEVEL

Noise level monitoring evaluates existing ambient noise conditions in and around the project site. This helps assess potential noise impacts from the proposed activities and aids in the formulation of mitigation measures.

3.5.1 Ambient Noise Level Monitoring Stations

Monitoring stations (Figure 3.13 and Table 3.6) were fixed based on the Land use pattern (e.g. silent, commercial, industrial and residential zone) that lies within the core and buffer areas and their proximity to noise sources and sensitive receptors.

3.5.2 Ambient Noise Level – Monitoring Method

At each station the noise level was measured during both day and night times:

1. Day time - 6.00 a.m. to 10.00 p.m.
2. Night time - 10.00 p.m. to 6.00 a.m.

For each measurement, dB (A) readings were taken every 15 minutes for 24 hours to get Leq values following the method given in Table 3.12.



Figure 3.13: Ambient Noise Level monitoring stations

Imagery source: Google Earth (2025)

[Online] Available at: <http://www.google.com/earth/index.html>

[Accessed February 2025]

Table 3.11: Details of Ambient Noise Level Monitoring Stations

Location code	Name of the Location	Direction from Project Site	Category	Distance from Project Site (km)	Latitude; Longitude	Sampling type and parameter
ANL 1	Project Site (Core zone)	-	Industrial Area	-	11.349989°N 78.980434°E	Noise Values (Leq in dB(A))
ANL 2	Nehru-Primary. School - Eraiyur	NW	Silent Zone	1.7 km	11.365113°N 78.967930°E	
ANL 3	Govt. Primary. School - Nallur	E	Silent Zone	2.6 km	11.348757°N 79.001835°E	
ANL 4	Near Health and Wellness Centre -	S	Silent Zone	2.5 km	11.326808°N 78.973732°E	

	Namaiyur					
ANL 5	Near Ankanvadi Maiyam - Keelapuliyur	SW	Residential – Silence Zone	6.0 km	11.306042°N 78.943977°E	
ANL 6	Near Mariyamman Temple – Mettupalayam	W	Residential – Sensitive Zone	5.8 km	11.353631°N 78.921154°E	
ANL 7	Near Mariyamman Temple – Pennakonam	NE	Residential – Sensitive Zone	5.7 km	11.380105°N 79.020598°E	
ANL 8	R.C.ST. John's High School – Perumathur	SE	Silent Zone	5.2 km	11.319534°N 79.012889°E	

Table 3.12: Ambient Noise Level Monitoring Method

Environmental Component	Method	Sample collection		Sampling Parameter
		Equipment	Detection Limit	
Ambient Noise Level	IS 9989	Baseline Technologies AO-313-1372	0.1 dB (A)	Decibels - dB (A)

The photographs taken during the measurement of noise are in Figure 3.14.

**Figure 3.14. Photographs of Ambient Noise Level Monitoring**

3.5.3 Ambient Noise Level – Results

The Ambient Noise Levels are given in Table 3.13. Table 3.14 presents the noise level standards according to the Noise Pollution (Regulation and Control) Rules, 2000. Figure 3.15 shows the graphical representation of the existing noise levels.

Table 3.13: Ambient Noise Levels

Location Code	Name of the Location	Noise levels in dB(A)	
		Day Time Leq	Night Time Leq
ANL 1	Project Site (Core zone)	47.4	40.6
ANL 2	Nehru-Primary. School - Eraiur	48.3	37.2
ANL 3	Govt. Primary. School - Nallur	49.3	38.5
ANL 4	Near Health and Wellness Centre - Namaiyur	48.4	37.6
ANL 5	Near Ankanvadi Maiyam - Keelapuliur	49.6	38.0
ANL 6	Near Mariyamman Temple – Mettupalayam	52.8	40.9
ANL 7	Near Mariyamman Temple – Pennakonam	50.6	39.1
ANL 8	R.C.ST. John's High School – Perumathur	47.6	37.7

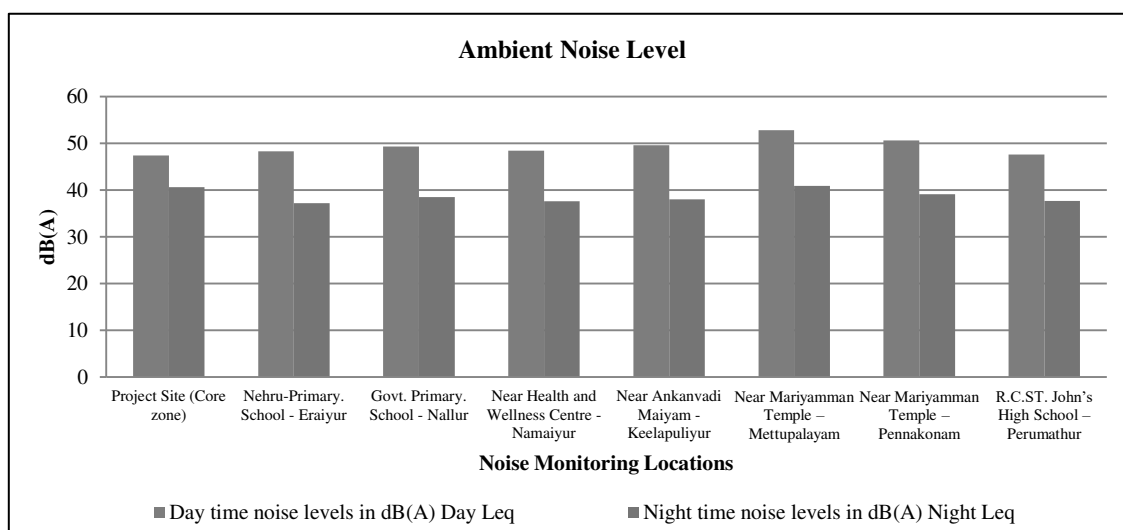


Figure 3.15: Ambient Noise Level in the study area

Table 3.14: Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
A	Industrial Area	75	70

B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Area	50	40

Note:-

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night time shall mean from 10.00 p.m. to 6.00 a.m.

(Source: Standards for Noise Pollution (Regulation & control) Rules by CPCB, 2010)

3.5.4 Interpretation of Results

Ambient Noise level at ANL1 (Project Site), situated in proximity to National Highway NH 38 (Ulundurpet – Perambalur Road), recorded noise levels 47.4 dB(A) during the daytime and 40.6 dB(A) at night.

Several other monitoring points fall under designated Silent Zones, including:

- ANL2 - Nehru Primary School, Eraiyur
- ANL3 - Government Primary School, Nallur
- ANL4 - Near Health and Wellness Centre, Namaiyur
- ANL8 - R.C. St. John's High School, Perumathur

In these silent zones, noise levels were observed to be well within the ambient noise standards prescribed by the Central Pollution Control Board (CPCB). During the daytime, values ranged from a minimum of 48.3 dB(A) at ANL2 to a maximum of 49.3 dB(A) at ANL3. At night, the levels ranged between 37.2 dB(A) at ANL2 and 38.5 dB(A) at ANL3.

Monitoring locations categorized as Residential Areas—namely:

- ANL5 - Near Ankanvadi Maiyam, Keelapuliyur
- ANL6 - Near Mariyamman Temple, Mettupalayam
- ANL7 - Near Mariyamman Temple, Pennakonam are located approximately 2 to 5 kilometers from the project site.

Across all zones - Industrial, Residential, and Silent, the noise levels recorded were found to be within the permissible limits defined by the CPCB for ambient noise.

3.6 WATER ENVIRONMENT

The assessment of the water environment involves the evaluation of surface water and groundwater resources in the study area. It includes the identification of existing water bodies, drainage patterns, water quality status and usage. The objective of the study is to establish a baseline quality of water resources, assess potential impacts of the proposed project and recommend appropriate mitigation and management measures to ensure the protection and sustainable use of water resources.

3.6.1 Water Quality – Monitoring Locations

Water samples were collected from ten locations (Surface Water – 5 nos. and Groundwater – 5 nos.) in the study area to assess its characteristics. Sampling was carried out at the locations shown in Figure 3.16 and listed in Table 3.15 and Table 3.16. The sampling locations were finalized following a preliminary visit of the project site and a desktop assessment of the study area.



Figure 3.16: Surface and Groundwater Quality Monitoring Locations

Imagery source: Google Earth (2025)

[Online] Available at: <http://www.google.com/earth/index.html>

[Accessed February 2025]

Table 3.15: Details of Surface Water quality monitoring locations

Location Code	Name of the Location	Source of Water	Distance from Project Site (km)	Direction from Project Site	Latitude and Longitude
SW1	Mettuchery Lake	Lake Water	6.8	NW	11.395788°N 78.933433°E
SW2	Eraiyr lake	Lake Water	2.6	NW	11.371848°N 78.961155°E
SW3	Ogalur Lake	Lake Water	8.9	NE	11.385368°N 79.048886°E

SW4	Perumathur lake	Lake Water	5.6	SE	11.342203°N 79.025330°E
SW5	Elumur Lake	Lake Water	7.6	S	11.280828°N 78.981364°E

Table 3.16: Details of Groundwater quality monitoring locations

Location Code	Name of the Location	Source of Water	Distance from Project Site (km)	Direction from Project Site	Latitude and Longitude
GW1	Project Site	Open well	--	--	11.350769°N 78.979374°E
GW2	Karugudi	Open well	4.1	SE	11.319566°N 79.009099°E
GW3	Keelapuliyur	Bore well	5.2	SW	11.312020°N 78.938139°E
GW4	Mettupalayam North	Bore well	6.6	W	11.352744°N 78.918946°E
GW5	Murukkangudi	Open well	2.8	NW	11.367835°N 78.967154°E

Water samples were collected in accordance with the Standard Methods (IS 3025: Part 1 and APHA, 24th Edition 2023) and the CPCB Guidelines for Water Quality Monitoring (MINARS/27/2007-08). Necessary precautions for sample preservation were followed as per IS 3025: Part 3 “Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater”.

The physical parameters pH, Temperature, Dissolved Oxygen and Conductivity were measured at the site using a portable water analyser. Photographs taken during the work are in Figure 3.17.

**Figure 3.17. Photographs of Water Quality Monitoring**

3.6.2 Water Quality Monitoring – Method of Analysis

The samples were kept under controlled conditions on reaching the laboratory according to the sample storage requirements. The parameters were analyzed as per the IS/APHA Standards and SOPs developed by our in-house laboratory as shown in the Table 3.17

Table 3.17: Analytical Methods - Water quality

S.No	Parameter Tested	Standard method or Technique Used
1.	Colour	IS 3025: Part 4 (Platinum Cobalt Method)
2.	Temperature	IS 3025 : Part 9
3.	Turbidity	IS 3025 : Part 10 Nephelometric Method
4.	pH @ 25°C	IS 3025 : Part 11 (Electrometric Method)
5.	Conductivity @ 25°C	IS 3025 : Part 14
6.	Total Dissolved Solids	IS 3025 : Part 16
7.	Total Suspended Solids	IS 3025 Part 17
8.	Alkalinity as CaCO ₃	IS 3025 : Part 23
9.	Total Hardness as CaCO ₃	IS 3025 : Part 21 (EDTA- METHOD)
10.	Calcium as Ca	IS 3025 : Part 40 (EDTA-Titrimetric Method)
11.	Magnesium as Mg	IS 3025: Part 46 (Volumetric Method using EDTA)
12.	Sodium as Na	IS 3025 : Part 45 (Flame Photometry Method)
13.	Potassium as K	IS 3025 : Part 45 (Flame Photometry Method)
14.	Chloride as Cl ⁻	IS 3025 : Part 32 (Argentometric Method)
15.	Sulphate as SO ₄	IS 3025 : Part 24 (Turbidity Method)
16.	Nitrate Nitrogen as NO ₃	IS 3025: Part 34 (Devarda's alloy reduction method)
17.	Ammonia as NH ₃ -N	IS 3025 : Part 34
18.	Total Kjeldal Nitrogen	IS 3025 : Part 34
19.	Phosphate PO ₄	IS 3025 : Part 31(Stannous Chloride Method)
20.	Dissolved Oxygen O ₂	IS 3025 : Part 38 (Titrimetric Method)
21.	BOD @ 27°C for 3 days	IS 3025:Part 44
22.	Chemical oxygen Demand	IS 3025 : Part 58
23.	Oil & Grease	IS 3025 Part 39
24.	Anionic Surfactant as MBAS	IS 13428 Annex-K
25.	Free Residual Chlorine	IS 3025 Part 26
26.	Fluoride as F ⁻	IS 3025 : Part 60
27.	Chromium as Cr ⁶⁺	IS 3025: Part 52 (Diphenylcarbazide Method)
28.	Copper as Cu	IS 3025 : Part 42 (Neocuproine Method)
29.	Iron as Fe	IS 3025:Part 53 (1,10Phenanthroline Method)
30.	Manganese as Mn	IS 3025 Part 59
31.	Nickel as Ni	IS 3025:Part 54 (Dimethylglyoxime Method)
32.	Boron as B	APHA24 th Edn. 4500B-B

S.No	Parameter Tested	Standard method or Technique Used
33.	Phenols as C ₆ H ₅ OH	IS 3025: Part 43/Sec-I
34.	Lead as Pb	IS 3025 Part 2
35.	Arsenic as As	IS 3025 Part 2
36.	Cadmium as Cd	IS 3025 Part 2
37.	Zinc as Zn	IS 3025 Part 2
38.	Mercury as Hg	IS 3025 Part 2
39.	Chromium as Cr	IS 3025 Part 2
40.	Total coliform in MPN/100 mL	IS 1622
41.	Faecal coliform in MPN/100 mL	IS 1622
42.	E.Coli in MPN/100 mL	IS 1622

3.6.3 Surface Water Quality

The surface water quality data are presented in Table 3.18. The designated best use for surface water quality criteria as prescribed by CPCB is given in Table 3.19.

Table 3.18: Surface Water Quality Monitoring Results

S.No	Parameters	Unit	SW1	SW2	SW3	SW4	SW5
1	Temperature	°C	1.5	1.6	2.2	1.5	1.0
2	pH	--	7.05	7.49	7.39	7.56	9.06
3	Electrical Conductivity	µmhos/cm	740	1215	1150	1045	796
4	Total Suspended Solids	mg/L	2.2	3.6	4.8	2.8	3.4
5	Total Dissolved Solids	mg/L	440	674	640	576	440
6	Salinity	ppt	0.19	0.37	0.29	0.18	0.17
7	Alkalinity	mg/L	197	212	268	258	182
8	Total Hardness	mg/L	237	348	247	202	126
9	Sodium	mg/L	83	130	160	153	120
10	Potassium	mg/L	4.3	6.8	8.5	4.5	1.8
11	Calcium as Ca	mg/L	36	57	43	32	16
12	Magnesium as Mg	mg/L	35	50	34	29	21
13	Total phosphorus	mg/L	BDL (DL:0.01)	0.16	0.09	0.08	0.02
14	Iron	mg/L	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)
15	Manganese as Mn	mg/L	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
16	Chloride as Cl	mg/L	103	206	161	98	96
17	Sulphate as SO ₄	mg/L	41	73	40	75	47
18	Silica as SiO ₂	mg/L	12	12	13.5	15.4	17.6
19	Ammoniacal	mg/L	1.3	2.1	4.2	2.8	2.4

S.No	Parameters	Unit	SW1	SW2	SW3	SW4	SW5
	Nitrogen						
20	Nitrate as NO ₃	mg/L	4.3	6.8	14	9.2	7.9
21	Copper	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
22	Fluorides as F	mg/L	0.16	0.42	0.43	0.43	0.76
23	Boron as B	mg/L	2.5	3.4	4.2	3.0	2.8
24	Nickel	mg/L	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
25	TKN	mg/L	BDL (DL:1.0)	1.8	1.8	1.4	1.4
26	Hexavalent Chromium	mg/L	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
27	Free Residual Chlorine	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
28	Dissolved Oxygen	mg/L	6.2	5.9	5.8	6	5.9
29	COD	mg/L	4.0	16	20	8.0	12
30	BOD	mg/L	BDL (DL:1.0)	3.0	4.0	BDL (DL:1.0)	2.0
31	Oil & Grease	mg/L	BDL (DL:1.0)	3.0	4.4	2.8	3.4
32	Phenols as C ₆ H ₅ OH	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
33	Anionic Surfactant as MBAS	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
34	Lead as Pb	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
35	Arsenic as As	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
36	Cadmium as Cd	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
37	Selenium as Se	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
38	Zinc as Zn	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
39	Mercury as Hg	mg/L	BDL (DL:0.0001)	BDL (DL:0.0001)	BDL (DL:0.0001)	BDL (DL:0.0001)	BDL (DL:0.0001)
40	Total Coliform	MPN/ 100ML	21	26	32	38	27
41	Faecal Coliform	MPN/ 100ML	4.0	5.6	6.0	6.1	5.5
42	E.Coli	MPN/ 100ML	1.8	2.0	2.0	3.5	2.0

Note: BDL - Below Detection Limit, DL - Detection Limit.

Table 3.19: CPCB Designated best use Surface water criteria

Designated Best Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100mL shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/L or more Biochemical Oxygen Demand 5 days 20°C 2mg/L or less
Outdoor bathing (Organised)	B	Total Coliforms Organism MPN/100mL shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/L or more Biochemical Oxygen Demand 5 days 20°C 3mg/L or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100mL shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4mg/L or more Biochemical Oxygen Demand 5 days 20°C 3mg/L or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/L or more Free Ammonia (as N) 1.2 mg/L or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/L
	Below-E	Not Meeting A, B, C, D and E Criteria

(Source: CPCB: Water Quality Standards, <https://cpcb.nic.in/wqstandards/>.)

3.6.4 Results and Interpretation

The graphical representation of the surface water quality parameters pH, Dissolved Oxygen, BOD and Total Coliforms at locations SW1 to SW5 is shown in Figure 3.18.

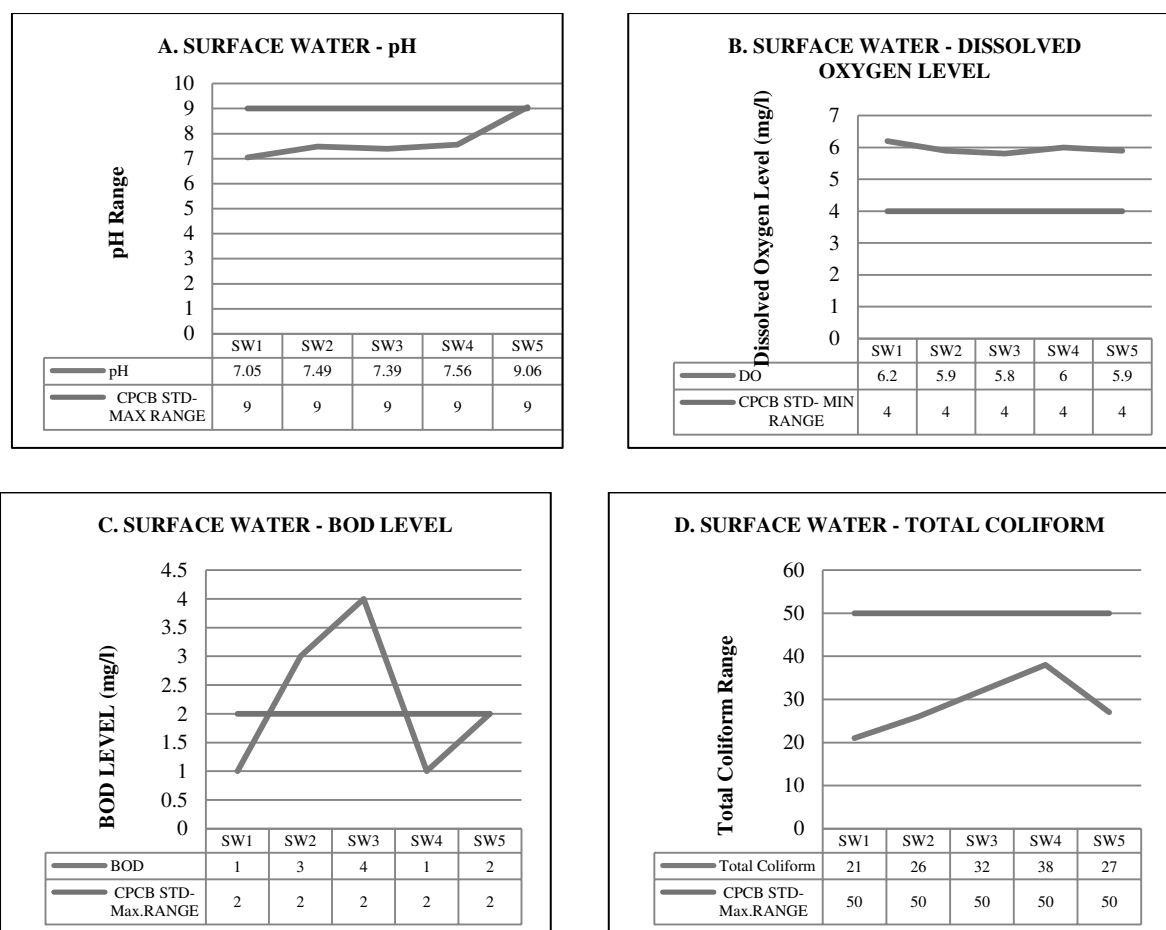


Figure 3.18: Graphical Representation of (a) pH, (b) Dissolved Oxygen, (c) BOD, (d) Total Coliform at Surface Water Quality Monitoring Locations

The pH range in the surface water bodies was from 7.05 (SW1) to 9.06 (SW5). SW1 - SW4 fall within the neutral to slightly alkaline range, which is generally acceptable. However, SW5 shows a high pH value (9.06), which indicate alkaline pollution, possibly from industrial or chemical discharge.

Electrical Conductivity (EC) and Total Dissolved Solids (TDS) are elevated in SW2 and SW3, suggesting higher ionic content, likely due to urban runoff, sewage, or industrial effluents. Total Suspended Solids (TSS) values are within acceptable limits at all locations; however, the slightly elevated TSS at SW3 may indicate surface runoff or minor erosion.

Salinity is higher in SW2, suggesting some saline water intrusion or mixing with wastewater. The analysis of major ions and nutrients indicates hard water conditions in SW2 and SW3, commonly due to the presence of calcium (Ca^{2+}) and magnesium (Mg^{2+}), which may affect domestic and industrial water usage. Sodium and potassium levels are also slightly elevated at SW2, suggesting the influence of domestic wastewater or agricultural return flow.

Regarding nitrification, ammoniacal nitrogen is highest at SW3 (4.2 mg/L), while nitrate concentration is also highest at SW3 (14 mg/L). These elevated nutrient levels, particularly in

SW2 and SW3, point to sources such as sewage discharge, agricultural runoff or decaying organic matter, potentially leading to eutrophication.

In terms of microbiological quality, all sites show the presence of coliforms, indicating fecal contamination. SW4 is the most microbiologically contaminated and may pose a public health risk if used for recreational or drinking purposes.

Biochemical Oxygen Demand (BOD) is highest in SW3 (4.0 mg/L), suggesting moderate organic pollution, possibly from wastewater discharge. Fluoride levels are within safe limits. However, a high level of boron at SW3 should be monitored due to its potential impact on crops if the water is used for irrigation.

Regular microbial testing should be conducted at SW2–SW4, especially where the water is used for recreational or drinking purpose. Public health advisories or water treatment measures should be considered before use.

3.6.5 Groundwater Quality

The Groundwater quality data are presented in Table 3.20. The graphical representation of the ground water quality parameters are shown in Figures 3.19, 3.20, 3.21, 3.22, 3.23 and 3.24.

Table 3.20: Groundwater Quality Monitoring Results

S.No	Parameters	Unit	GW1	GW2	GW3	GW4	GW5	Drinking Water Specification (IS 10500:2012)	
								Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
1	Turbidity	NTU	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	1.0	5.0
2	pH	--	7.12	7.15	6.82	7.05	7.10	6.5 -8.5	No relaxation
3	Electrical Conductivity	µmhos/cm	650	804	1190	1550	998	--	--
4	Total Dissolved Solids	mg/L	383	480	716	924	596	500	2000
5	Salinity	ppt	0.07	0.16	0.2	0.45	0.2	--	--
6	Alkalinity	mg/L	237	268	354	273	323	200	600
7	Total Hardness	mg/L	313	459	620	716	454	200	600
8	Sodium	mg/L	20	22	62	114	44	--	--
9	Potassium	mg/L	1.2	1.3	4.1	4.6	3.5	--	--
10	Calcium as Ca	mg/L	79	111	113	225	138	75	200
11	Magnesium as Mg	mg/L	28	44	82	38	25	30	100

S.No	Parameters	Unit	GW1	GW2	GW3	GW4	GW5	Drinking Water Specification (IS 10500:2012)	
								Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
12	Total phosphorus	mg/L	BDL (DL:0.01)	BDL (DL:0.01)	0.04	0.02	0.03	--	--
13	Iron	mg/L	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	1.0	No relaxation
14	Manganese as Mn	mg/L	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	0.1	0.3
15	Chloride as Cl	mg/L	40	88	113	249	118	250	1000
16	Sulphate as SO ₄	mg/L	36	23	97	94	38	200	400
17	Free Residual Chlorine	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.2	1.0
18	Phenols as C ₆ H ₅ OH	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	0.001	0.002
19	Boron as B	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.5	2.4
20	BOD	mg/L	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	---	--
21	COD	mg/L	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	--	--
22	Silica as SiO ₂	mg/L	24	18.4	20.2	21.4	22.8	--	--
23	Nitrate as NO ₃	mg/L	2.2	3.6	4.2	4.0	2.8	45	No relaxation
24	Copper	mg/L	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.05	1.5
25	Fluorides as F	mg/L	0.43	0.18	0.26	0.30	0.13	1.0	1.5
26	Nickel	mg/L	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	0.02	No relaxation
27	TKN	mg/L	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	--	--
28	Hexavalent Chromium	mg/L	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	0.05	No relaxation
29	Lead as Pb	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	0.01	No relaxation
30	Arsenic as As	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	0.01	No relaxation
31	Cadmium as Cd	mg/L	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	0.003	No relaxation

S.No	Parameters	Unit	GW1	GW2	GW3	GW4	GW5	Drinking Water Specification (IS 10500:2012)	
								Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
									ion
32	Zinc as Zn	mg/L	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	5	15
33	Mercury as Hg	mg/L	BDL(DL:0.0001)	BDL(DL:0.0001)	BDL(DL:0.0001)	BDL(DL:0.0001)	BDL(DL:0.0001)	0.001	No relaxation
34	Total Coliform	MPN/100ML	Absent	Absent	Absent	Absent	Absent	Absent	Absent
35	Faecal Coliform	MPN/100ML	Absent	Absent	Absent	Absent	Absent	--	--
36	E.Coli	MPN/100ML	Absent	Absent	Absent	Absent	Absent	Absent	Absent

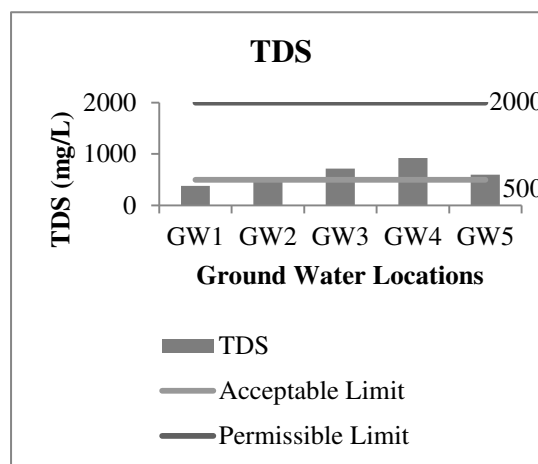
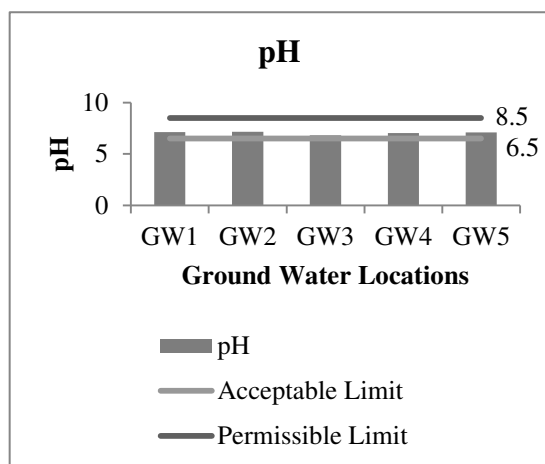


Figure 3.19: Graphical representation of pH and TDS in Ground water samples

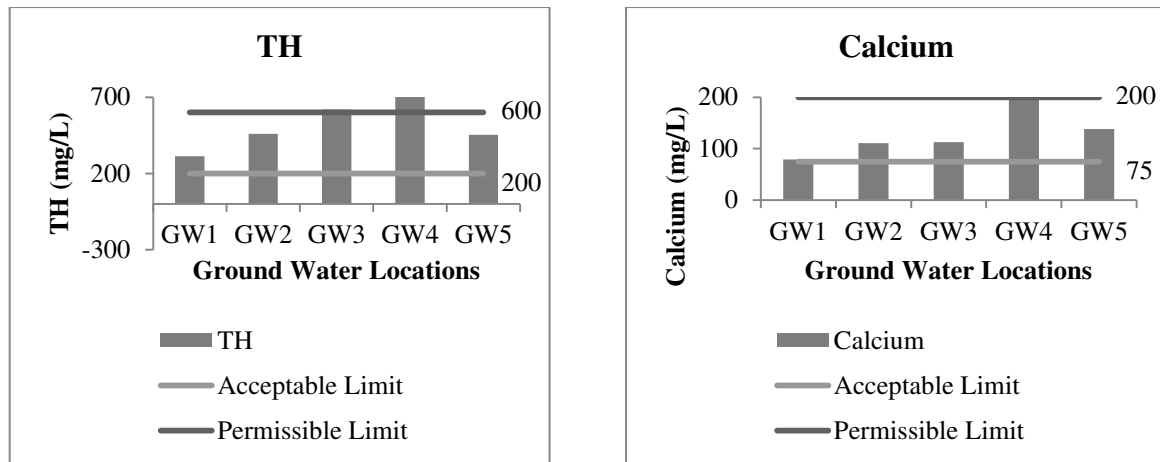


Figure 3.20: Graphical representation of Total Hardness and Calcium in Ground water samples

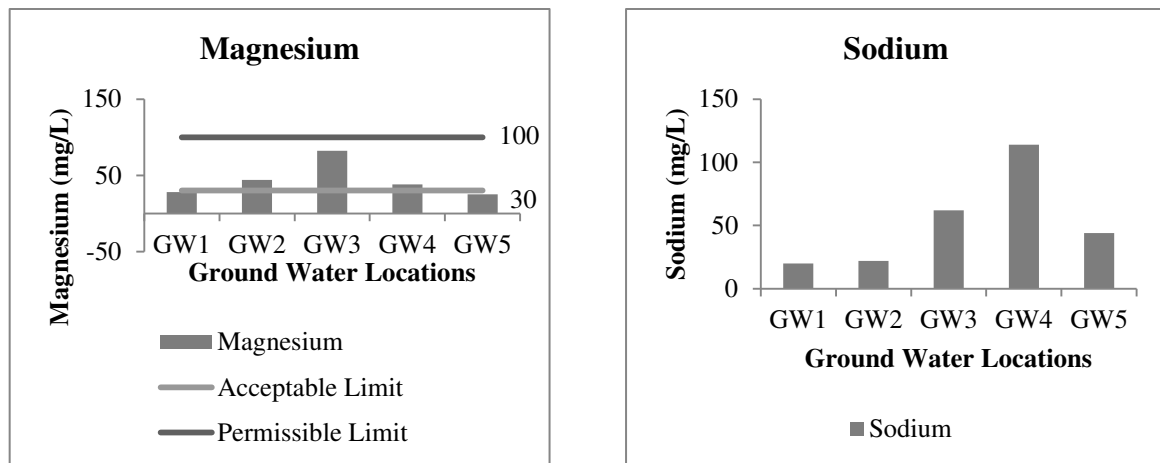


Figure 3.21: Graphical representation of Magnesium and Sodium in Ground water samples

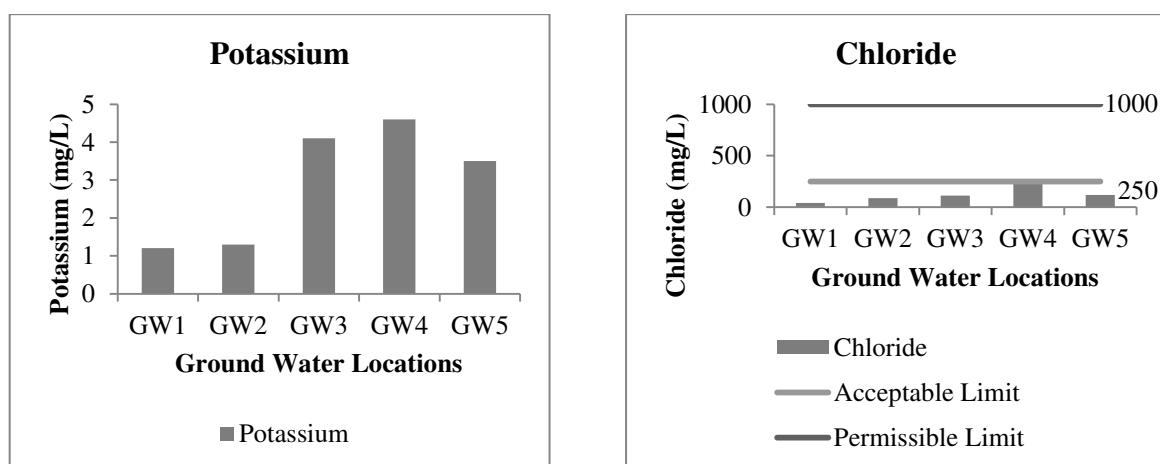


Figure 3.22: Graphical representation of Potassium and Chloride of Ground water samples

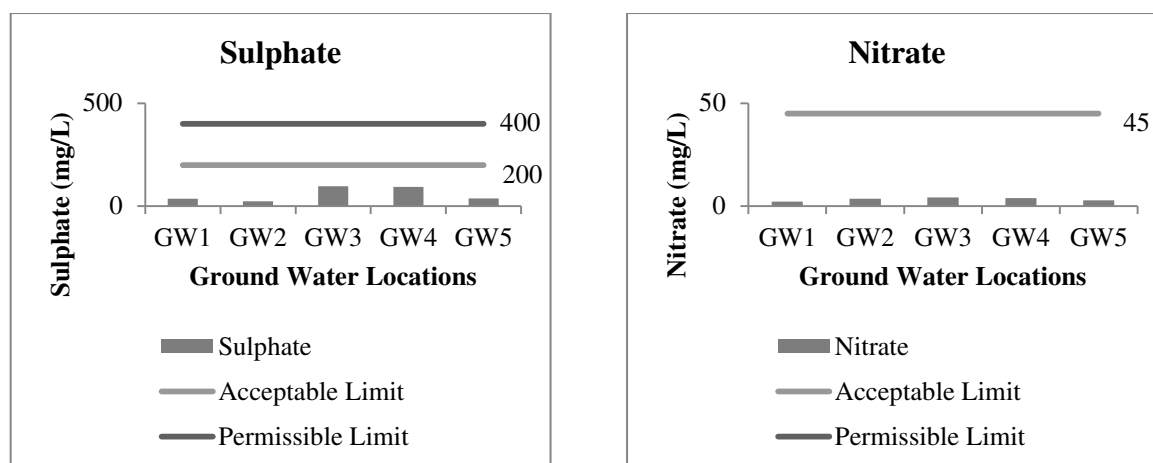


Figure 3.23: Graphical representation of Sulphate and Nitrate in Ground water samples

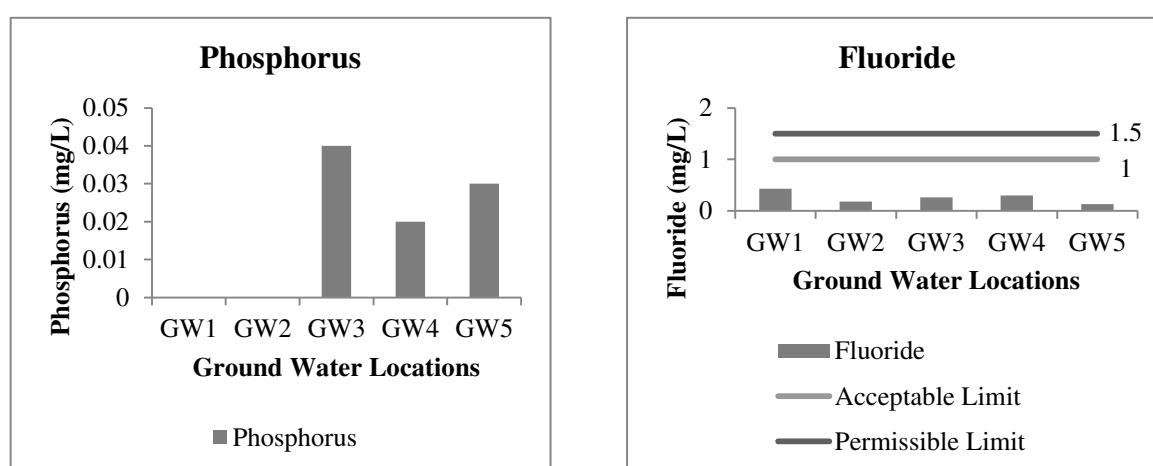


Figure 3.24: Graphical representation of Phosphorus and Fluoride of Ground water samples

3.6.6 Results and Interpretation

The pH in the study area ranges from 6.82 (GW3) to 7.15 (GW2). All samples fall within the acceptable range of 6.5–8.5 as per IS 10500:2012 standards. Turbidity is below detection limits (BDL) in all samples, indicating clear water, and remains well within the acceptable limit of 1 NTU.

Electrical Conductivity (EC) is highest in GW4 (1550 μ mhos/cm), suggesting a higher ionic concentration, which could result from mineral dissolution or pollution sources.

Total Dissolved Solids (TDS) exceed the acceptable limit of 500 mg/L in GW3 (716 mg/L), GW4 (924 mg/L), and GW5 (596 mg/L), with GW2 (480 mg/L) approaching the limit. However, all values remain below the permissible limit of 2000 mg/L. Salinity is low across all sites, with the highest level in GW4 (0.45 ppt). Although no standard for salinity is specified in drinking water guidelines, elevated values can impact taste and long-term usability.

Total Hardness is high in all samples. Particularly, GW3 (620 mg/L) and GW4 (716 mg/L) exceed the permissible limit of 600 mg/L, classifying the water as very hard, which may affect domestic use, particularly in appliances and for bathing. For calcium and magnesium, GW4 has the highest calcium concentration (225 mg/L), exceeding the permissible limit of 200 mg/L. Magnesium is elevated in GW3 (82 mg/L) but remains within permissible limits.

Sodium and potassium levels are highest in GW4 (Sodium: 114 mg/L, Potassium: 4.6 mg/L). While these elements are not regulated under drinking water standards, elevated concentrations could indicate domestic or urban contamination sources. Chloride levels are within acceptable limits, though GW4 (249 mg/L) is close to the limit of 250 mg/L. Sulphate concentrations are well below both acceptable and permissible limits across all locations.

Heavy metals including Iron, Manganese, Copper, Nickel, Lead, Chromium, Arsenic, Cadmium, Zinc, and Mercury were below detection limits in all samples. This indicates no significant heavy metal contamination in the groundwater.

Total coliforms, fecal coliforms, and E.coli were absent in all samples, indicating excellent microbiological quality and no fecal contamination, making the groundwater safe for drinking from a microbiological standpoint.

Organic Pollutants: Phenols, Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) were all below detection limits, indicating minimal to no organic pollution in the groundwater.

3.7 SOIL QUALITY

The study of the soil environment aims to assess the physico-chemical characteristics of the soil within the project site and surrounding study area. This includes the evaluation of soil texture, fertility status, organic content, nutrient levels and potential contamination. The objective of the baseline study is to determine the suitability of the soil for construction, landscaping and vegetation and to assess the potential impact of the project activities on soil quality.

3.7.1 Soil Quality – Monitoring Locations

Representative soil samples were collected from five locations from different land use patterns including the project site. The sampling locations are indicated in Figure 3.25 and the geographical coordinates are provided in Table 3.21.



Figure 3.25: Soil Sampling Locations

Imagery source: Google Earth (2025)

[Online] Available at: <http://www.google.com/earth/index.html>

[Accessed February 2025]

Table 3.21: Details of Soil Quality Monitoring Locations

Location Code	Name of the Location	Direction from Project Site	Distance from Project Site (km)	Latitude; Longitude
SQ 1	Project Site	-	-	11.346162° N 78.976527°E
SQ 2	Pennankonam	NE	5.6	11.376784° N 78.019152°E
SQ 3	Karugudi	SE	4.1	11.325157° N 79.010612°E
SQ 4	Ezhumor	S	6.3	11.286805° N 78.985412°E
SQ 5	Keelapulliyur	SW	5.0	11.310887° N 78.945626°E
SQ 6	Mettupalayam	W	6.1	11.349732° N 78.921068°E
SQ 7	Chinnaru Eraiyur	N	2.7	11.369833° N 78.969785°E
SQ 8	Peraiyur	NW	6.6	11.402646°N 78.960317°E

3.7.2 Sampling Procedure and Analysis

Augur method was used to collect samples at a depth of 15 cm after removing the surface litter. After mixing each spot-sample, about 1 kg of soil was retained after the process of quartering. This sample was air dried at room temperature and stored in a polythene bag with a label. Photographs taken during the soil sampling are presented in Figure 3.26. Samples were analyzed as per the analytical methods listed in Table 3.22.



Figure 3.26. Photographs of Soil Quality Monitoring

Table 3.22: Analytical Methods for Soil Parameters

S.No.	Parameter Tested	Standard method or Technique Used	Range of Testing
1.	Soil Texture (particle size analysis)	ESIPL/SOP/C-S/04	Sand- 1- 80% Silt - 1- 80% Clay -1- 80%
2.	Permeability	ESIPL/SOP/C-S/18	0.2 – 5.0 cm/hr
3.	pH@ 25 ⁰ C	IS 2720:Part 26	2-12
4.	Electrical Conductivity	IS 14767	1-10000 μ mhos/cm
5.	Cation Exchange Capacity (CEC)	ESIPL/SOP/C-S/10	2-100 meq/100 g
6.	Water Soluble Sodium	ESIPL/SOP/C-S/07	10 -1000 mg/kg
7.	Phosphorous as P (Available)	ESIPL/SOP/C-S/11	1-100 μ g/g
8.	Potassium as K (Soluble)	FAO method	1-250 mg/kg
9.	Calcium as Ca	FAO method	0.1 meq/100g – 200 meq/100g
10.	Magnesium as Mn	FAO method	0.1 meq/100g – 150 meq/100g
11.	Organic Nitrogen	IS 14684	2 mg/kg – 5000 mg/kg
12.	Organic Carbon	IS 2720 : Part 22	0.01% - 10%
13.	Bulk Density	FAO method	0.5g/cm ³ – 2g/cm ³
14.	Porosity	FAO method	Qualitative
15.	SAR	ESIPL/SOP/C-S/01	Qualitative

3.7.3 Soil Quality - Results

The physical and chemical properties of soil are given in Table 3.23.

Table 3.23: Soil Quality in different locations of the study area

S.No.	Parameter		Unit	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5	SQ-6	SQ-7	SQ-8	ICAR Standard
1	Soil Texture		-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	5.0 – 8.0
2	Soil Particle Size	Clay	%	5.8	2.2	4.6	14.4	13.8	18.4	6.4	5.9	--
		Silt	%	21.8	19.4	19.8	25.2	26.8	27.8	23.2	22.2	--
		Sand	%	72.4	78.4	75.6	60.4	59.4	53.8	70.4	71.9	--
3	Moisture Content		%	1.40	0.56	0.48	0.64	0.38	0.76	1.24	0.88	--
4	pH		-	6.68	7.87	7.86	8.04	7.78	6.69	8.04	7.8	5.0 – 8.0
5	Electrical conductivity		dS/Cm	0.199	0.458	0.140	0.191	0.206	0.076	0.141	2.161	<4.0
6	Available phosphorus as P		mg/kg	96	160	124	110	154	118	120	240	10 – 30
	Phosphorous as P ₂ O ₅		mg/kg	220	367	284	252	353	270	275	550	--
7	Sodium as Na (Soluble)		meq/100g	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	1.7	200 – 500
8	Potassium as K(Soluble)		meq/100g	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.63	150 – 250
9	Calcium as Ca (Soluble)		meq/100g	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.12	0.13	BDL (DL:0.1)	0.11	0.63	1000 – 2000
10	Magnesium as Mg (Soluble)		meq/100g	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.24	100 – 300
11	Organic Nitrogen		%	0.035	0.068	0.046	0.039	0.055	0.042	0.049	0.075	--
12	Total Kjeldahl Nitrogen as N		mg/kg	421	990	602	488	763	535	649	1104	1500 – 2500
13	Organic Carbon		%	0.14	0.63	0.3	0.2	0.43	0.24	0.34	0.73	0.5 – 0.75
14	Organic Matter		%	0.24	1.09	0.51	0.34	0.75	0.41	0.58	1.26	--
15	Cation Exchange Capacity (CEC)		meq/100g	0.26	0.32	0.34	0.41	0.42	0.3	0.41	3.2	--
16	Sulphate		mg/kg	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.19	0.21	BDL (DL:0.1)	0.18	2.79	--
17	Sodium Adsorption Ratio (SAR)		meL/Kg	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.3	0.29	BDL (DL:0.1)	0.31	0.48	--
18	Bulk Density		gm/cm ³	1.13	1.05	1.11	1.21	1.18	1.27	1.16	1.13	--
19	Permeability		cm/hr	1.64	1.73	1.67	1.56	1.59	1.50	1.62	1.64	--
20	Porosity		%	57	60	58	54	55	52	56	57	--

Reference: ICAR - Indian Institute of Soil Science - Assessment of Soil Health and Preparation of Soil Health Card

3.7.4 Results and Interpretation

Soil Texture: All samples are Sandy Loam, which is generally good for agriculture as it balances drainage and nutrient retention.

As per ICAR Standard (5.0-8.0) is likely for pH. All samples fall within the acceptable pH range. SQ-1 and SQ-6 are slightly acidic (6.68 and 6.69), while the rest trend towards neutral-alkaline (up to 8.04). No immediate pH concerns.

Electrical Conductivity (EC) <4.0 dS/m, All the locations within safe limits. However, SQ-8 (2.161) is higher than others but still well below the 4.0 dS/m threshold for salinity issues.

Available Phosphorus ICAR Standard: 10 - 30 mg/kg. All samples exceed the standard significantly (96–240 mg/kg) Indicates excess phosphorus, especially SQ-8 (240 mg/kg). Could lead to nutrient imbalance or environmental runoff issues.

Soluble Cations (Na, K, Ca, Mg). Most samples are BDL (Below Detection Limit) for Na, K, Ca, and Mg, except SQ-8. SQ-8 has measurable quantities, but still well below ICAR thresholds, indicating no toxicity. No harmful salt accumulation overall.

Total Kjeldahl Nitrogen (TKN) – Ideal: 1500-2500 mg/kg. All samples fall below the recommended level, from 421 to 1104 mg/kg. Indicates low nitrogen availability, affecting plant growth. Suggests the need for N-based fertilization.

Organic Carbon (OC) ideal range: 0.5 - 0.75%. Only SQ-8 (0.73%) and SQ-2 (0.63%) meet the standard. Others fall below the recommended threshold, down to 0.14%. Suggests poor organic matter content in most samples. Organic Matter (OM), Derived from Organic Carbon (approx. $OC \times 1.724$). Ranges from 0.24% to 1.26% – higher OM in SQ-2 and SQ-8.

Cation Exchange Capacity (CEC), Ranges from 0.26 to 3.2 meq/100g. Generally low CEC, indicating poor nutrient holding capacity. SQ-8 is an outlier with 3.2, significantly higher. Sandy soils often have low CEC - not unexpected, but confirm low fertility.

Sodium Adsorption Ratio (SAR), Detected only in some samples (0.29-0.48), still very low. Indicates no sodium hazard.

Bulk Density, Ranges from 1.05 to 1.27 gm/cm³ – acceptable for sandy loam. Good physical condition for root penetration and aeration.

Permeability, Ranges from 1.50 to 1.73 cm/hr – indicates moderate to good permeability. Suitable for most crops.

Porosity, 52% to 60% – normal for sandy loam. Supports healthy root and water movement.

Overall, the soil is physically suitable for agriculture, but low nitrogen and organic matter content are major concerns. Phosphorus levels are excessive, which may require management to prevent environmental issues.

3.8 BIOLOGICAL ENVIRONMENT

The biodiversity assessment of the study area aims to evaluate the variety of species and their ecological roles, highlighting the importance of conservation.

3.8.1 Objective

- To carry out a systematic baseline survey of Flora and Fauna around 10 km radius of the study area.
- To list the plants and animals present in the study area as per the classifications of MoEF&CC.
- To identify the impacts of the project activities on the plants and animals,
- To evaluate the impacts of the project, and to propose Environmental Management Plan.
- Assessment of potential impacts on biodiversity and suggestion of suitable mitigation and conservation measures.

3.8.2 Methodology Used for Flora and Fauna Assessment

Desktop study of the study area was carried to select the sampling locations in the Core and Buffer Zone. Secondary data were collected for all seasons. Stratified random sampling was carried out for 3 days in the month of April 2025, which is premonsoon period (summer) to ensure coverage across the study area. Data on flora and fauna were collected using transect walks, quadrat sampling for vegetation, while visual encounter surveys and point count methods were employed for faunal groups, including birds, mammals and reptiles. Field data sheets were used to record the species richness, abundance and habitat preference. Informal interviews with residents and forest users and visual documentation of plant and animal species helped to record species in the study area. Faunal identification was based on authoritative field guides and cross-referenced with the IUCN Red List and the Wildlife Protection Act (WLPA), 1972. The data were then analyzed to determine species diversity indices, conservation status and potential anthropogenic impacts.

The photographs taken during the field survey is shown in Figure 3.27.



Figure 3.27: Photographs taken during the Field Survey

3.8.3 Description of the study area (Core Zone and Buffer Zone)

Core Zone: The quantitative and qualitative assessment was carried out through systematic field surveys in the Project Site and within a defined 500-meter radius around the proposed Industrial Estate, which is the Core Zone.

Buffer Zone: The buffer zone includes the study area beyond the core zone and within 10 km radius surrounding the project site. The buffer zone includes sensitive habitats such as agricultural fields, scrublands, water bodies and forest patches like the Chittāl Reserve Forest, Peraiyur Reserve Forest and Sirukudal Reserve Forest.

3.8.4 Assessment of Flora

a. Core Zone

A total of 67 plant species were recorded in the proposed SIPCOT area of Eraiyur, Perambalur district, representing a wide range of life forms, including trees, shrubs, herbs, climbers and grasses. These species belong to diverse families such as Fabaceae, Euphorbiaceae, Lamiaceae, Boraginaceae and Moraceae indicating a typical dry deciduous and scrubland vegetation of the region. The list of species identified in the core zone during the primary survey is listed in Table 3.24.

Table 3.24: List of Species identified in the core zone during the Primary Survey

S.No	Species	Vernacular Name	Family Name	Habit	IUCN status
1	<i>Acacia leucophloea</i> (Roxb.) Willd.	Velvelam	Fabaceae	Tree	NE
2	<i>Acacia nilotica</i> (L.) Delile	Karuvelam	Fabaceae	Tree	LC
3	<i>Acalypha indica</i> L.	Kuppaimeni	Euphorbiaceae	Herb	NE
4	<i>Aerva lanata</i> (L.) Juss. Ex Schult.	Poolai Poo	Amaranthaceae	Herb	NE
5	<i>Anisomeles malabarica</i> (L.) R.Br. ex Sims	Peyimarutti	Lamiaceae	Shrub	NE
6	<i>Aristida purpurea</i> Nutt.	Not Recorded	Poaceae	Grass	NE
7	<i>Aristolochia 89racteolata</i> Lam.	Ishvara-muli	Aristolochiaceae	Herb	NE
8	<i>Azadirachta indica</i> Juss	Vembu	Meliaceae	Tree	LC
9	<i>Borassus flabellifer</i> L.	Panai maram	Arecaceae	Tree	LC
10	<i>Calotropis gigantea</i> (L.) W.T.Aiton	Yerukku	Apocynaceae	Shrub	LC
11	<i>Cardiospermum halicacabum</i> L.	Mudakathan Keerai	Sapindaceae	Climber	NE
12	<i>Carissa carandas</i> L.	Kalakkaai	Apocynaceae	Shrub	DD
13	<i>Cassia auriculata</i> L.	Aavaram	Leptosphaeriaceae	Shrub	NE
14	<i>Cassia fistula</i> L.	Sarakonnai	Fabaceae	Tree	LC
15	<i>Cassia tora</i> L.	Tagarai	Fabaceae	Shrub	NE
16	<i>Borassus flabellifer</i> L.	Nallavelai	Cleomaceae	Tree	NE
17	<i>Cleome viscosa</i> L.	Kattu katuku	Cleomaceae	Herb	NE

S.No	Species	Vernacular Name	Family Name	Habit	IUCN status
18	<i>Coldenia procumbens</i> L.	Seruppada	Boraginaceae	Herb	NE
19	<i>Corbichonia decumbens</i> (Forssk.) Exell	Not Recorded	Lophiocarpaceae	Herb	NE
20	<i>Corchorus trilocularis</i> L.	Not Recorded	Malvaceae	Herb	NE
21	<i>Croton bonplandianus</i> Baill.	Railpondu,	Euphorbiaceae	Herb	NE
22	<i>Cucumis melo</i> L	Muluvellari	Cucurbitaceae	Climber	NE
23	<i>Dalbergia sissoo</i> Sensu Miq.	Thothakatti	Fabaceae	Tree	LC
24	<i>Datura metel</i> L.	Oomatthai	Solanaceae	Herb	NE
25	<i>Dichrostachys cinerea</i> Sensu R.Vig.	Varittula	Fabaceae	Tree	LC
26	<i>Euphorbia hirta</i> L	Amman Pacharisi	Euphorbiaceae	Herb	NE
27	<i>Evolvulus alsinoides</i> L.	Vishnukarandi	Convolvulaceae	Herb	NE
28	<i>Ficus benghalensis</i> L	Aalamaram	Moraceae	Tree	LC
29	<i>Ficus religiosa</i> L.	Arasamaram	Moraceae	Tree	LC
30	<i>Flueggea leucopyrus</i> Willd.	Pullathi	Phyllanthaceae	Shrub	LC
31	<i>Glinus oppositifolius</i> (L.) Aug.DC.	Bitter cumin	Molluginaceae	Herb	NE
32	<i>Heliotropium indicum</i> L.	Thel kodukku	Boraginaceae	Herb	NE
33	<i>Heliotropium ovalifolium</i> Forssk.	Not Recorded	Boraginaceae	Herb	LC
34	<i>Hemidesmus indicus</i> (L.) R.Br	Nannari	Apocynaceae	Climber	NE
35	<i>Hyptis suaveolens</i> (L.) Poit.	Neer thulsi	Lamiaceae	Shrub	NE
36	<i>Jatropha glandulifera</i> Roxb.	Adalai	Euphorbiaceae	Shrub	NE
37	<i>Jatropha gossypifolia</i> L.	Siria Amanakku	Euphorbiaceae	Shrub	NE
38	<i>Leucas aspera</i> (Willd.) Link	Thumbai	Lamiaceae	Herb	LC
39	<i>Merremia emarginata</i> (Burm. Fil.) Hall. Fil.	Musakaparni	Convolvulaceae	Herb	LC
40	<i>Morinda pubescens</i> Sm.	Nuna,Manchanari	Rubiaceae	Tree	LC
41	<i>Ocimum americanum</i> L.	Nai Thulasi	Lamiaceae	Herb	NE
42	<i>Opuntia stricta</i> (Haw.) Haw.	Chappathi kalli	Cactaceae	Shrub	LC
43	<i>Parthenium hysterophorus</i> L.	Carrot pundu	Asteraceae	Shrub	NE
44	<i>Passiflora foetida</i> L.	Mosukkattan	Passifloraceae	Climber	NE
45	<i>Pergularia daemia</i> (Forsskal) Chiov.	Uttamani	Apocynaceae	Climber	NE
46	<i>Phyllanthus amarus</i> Schumach. & Thonn.	Kizhaanelli	Phyllanthaceae	Herb	NE
47	<i>Phyllanthus maderaspatensis</i> L.	Nila-nelli	Phyllanthaceae	Herb	LC
48	<i>Phyllanthus virgatus</i> G.Forst.	Not Recorded	Phyllanthaceae	Herb	NE
49	<i>Physalis minima</i> L.	Sodakku thakkali	Solanaceae	Herb	LC
50	<i>Ricinus communis</i> L.	Amanakku	Euphorbiaceae	Shrub	NE
51	<i>Rivea hypocrateriformis</i> (Desr.) Choisy	Musuttai Kodi	Convolvulaceae	Climber	LC
52	<i>Santalum album</i> L.	Sandhanam	Santalaceae	Tree	VU

S.No	Species	Vernacular Name	Family Name	Habit	IUCN status
53	<i>Sauropus bacciformis</i> (L.) Airy Shaw	Not Recorded	Phyllanthaceae	Herb	NE
54	<i>Senna alexandrina</i> Mill.	Not Recorded	Fabaceae	Shrub	LC
55	<i>Senna uniflora</i> (Mill.) H.S. Irwin & Barneby	Not Recorded	Fabaceae	Herb	NE
56	<i>Solanum virginianum</i> L.	Kantankattari	Solanaceae	Herb	NE
57	<i>Stemodia viscosa</i> Roxb.	Not Recorded	Plantaginaceae	Herb	NE
58	<i>Tephrosia purpurea</i> (L.) Pers.	Kattukozhinji	Fabaceae	Herb	LC
59	<i>Tragia plukenetii</i> Radcl.-Sm.	Siru punnaikasan	Euphorbiaceae	Shrub	NE
60	<i>Trichodesma indicum</i> (L.) R. Br.	Kaasi Thumbai	Boraginaceae	Herb	LC
61	<i>Urena lobata</i> L.	Ottatthi	Malvaceae	Shrub	LC
62	<i>Vicoa indica</i> (L.) DC.	Not Recorded	Brassicaceae	Herb	NE
63	<i>Vitex negundo</i> L.	Nocchi	Lamiaceae	Shrub	LC
64	<i>Xanthium strumarium</i> L.	Ottarachedi	Asteraceae	Shrub	LC
65	<i>Ziziphus mauritiana</i> Lam.	Pallavaparunichedi	Rhamnaceae	Tree	LC
66	<i>Ziziphus oenoplia</i> (L.) Miller	Chooraimullu	Rhamnaceae	Tree	LC
67	<i>Ziziphus xylopyrus</i> (Retz.) Willd.	Kattu illanthai	Rhamnaceae	Shrub	LC

Note: NE – Not Evaluated, LC – Least Concerned, DD – Data Deficient, VU – Vulnerable

The area is dominated by commonly occurring native species like *Acacia leucophloea* (Velvelam), *Azadirachta indica* (Neem), *Borassus flabellifer* (Palmyra palm), *Ficus benghalensis* (Banyan) and *Ficus religiosa* (Peepal) which are ecologically significant for providing shade, fodder and habitat for birds and insects. Herbs such as *Acalypha indica*, *Euphorbia hirta*, *Leucas aspera* and medicinal plants like *Hemidesmus indicus* and *Ocimum americanum* are also well represented, highlighting the area's potential for traditional uses. Most species fall under the "Least Concern (LC)" or "Not Evaluated (NE)" categories according to the IUCN Red List, with *Santalum album* (Indian Sandalwood) being the only species listed as "Vulnerable (VU)", signifying its conservation importance. Overall, the floral composition reflects a mixture of native dryland vegetation, medicinal plants and hardy tree species adapted to the semi-arid climate. The species (38 Nos.) identified in the project site are listed in Table 3.25. Among these eight trees falling in the building in the footprint of the individual trees will be felled. Other trees along the periphery will be retained.

Table 3.25: List of species identified in the project site during the Primary Survey

S.No	Species	No of Species	Average age of the Species	Vernacular Name	Family	Habit	IUCN
1.	<i>Azadirachta indica</i> Juss	03	15	Vembu	Meliaceae	Tree	LC
2.	<i>Borassus flabellifer</i> L.	13	25	Nallavelai	Cleomaceae	Tree	NE
3.	<i>Acacia leucophloea</i> (Roxb.) Willd.	22	10	Velvelam	Fabaceae	Tree	NE

Note: NE – Not Evaluated, LC – Least Concerned

b. Buffer Zone

A total of 99 plant species were recorded belonging to various families including Fabaceae, Moraceae, Poaceae, Malvaceae, Rubiaceae and Apocynaceae. These species represent a mix of trees, shrubs, herbs, grasses and climbers reflecting the semi-arid and dry deciduous vegetation typical of the Perambalur region. The list of species identified in the buffer zone during the primary survey is listed in Table 3.26.

Table 3.26: List of species identified in the buffer zone during the Primary Survey

S.No	Species	Vernacular Name	Family	Habit	IUCN
4.	<i>Abutilon indicum</i> (L.) Sweet	Thutti	Malvaceae	Shrub	NE
5.	<i>Aegle marmelos</i> (L.) Correa	Vilvam	Rutaceae	Tree	NT
6.	<i>Alangium salviifolium</i> (L.f.) Wangerin	Azhingal	Cornaceae	Tree	LC
7.	<i>Albizia amara</i> (Roxb.) B. Boivin	Usilai	Fabaceae	Tree	LC
8.	<i>Albizia lebbek</i> (L.) Benth.	Vaagai	Fabaceae	Tree	LC
9.	<i>Alternanthera ficoidea</i> (L.) P. Beauv.	Semmai Ponnanganni	Amaranthaceae	Herb	NE
10.	<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	Ponnangani	Amaranthaceae	Herb	LC
11.	<i>Annona muricata</i> L.	Mullu-sitha-pazham	Annonaceae	Tree	LC
12.	<i>Annona squamosa</i> L.	Seetha pazham	Annonaceae	Tree	LC
13.	<i>Arachis hypogaea</i> L.	verkkadalai	Fabaceae	Herb	NE
14.	<i>Argemone mexicana</i> L.	Piramathandu	Papaveraceae	Herb	NE
15.	<i>Aristolochia indica</i> L.	Perumarunthukodi	Aristolochiaceae	Climber	NE
16.	<i>Artocarpus heterophyllus</i> Lam.	Palaamaram	Moraceae	Tree	NE
17.	<i>Azima tetracantha</i> Lam.	Echanka	Salvadoraceae	Shrub	LC
18.	<i>Bambusa vulgaris</i> Schrad.	Moongil	Poaceae	Grass	NE
19.	<i>Bauhinia purpurea</i> L.	Purple orchid tree	Fabaceae	Tree	LC
20.	<i>Bauhinia racemosa</i> Lam.	Mandharai	Fabaceae	Tree	LC
21.	<i>Benkara malabarica</i> (Lam.) Tirveng.	Sirukarai	Rubiaceae	Tree	NE
22.	<i>Calotropis procera</i> (Aiton) W.T.Aiton	Vellei erukku	Apocynaceae	Shrub	NE
23.	<i>Canavalia gladiata</i> Sensus Robyns, p.p.	Segapputampattai	Fabaceae	Shrub	NE
24.	<i>Carica papaya</i> L.	Pappali	Caricaceae	Tree	DD
25.	<i>Caryota urens</i> L.	Kondal Panei	Arecaceae	Tree	LC
26.	<i>Cassia roxburghii</i> DC.	Not Recorded	Fabaceae	Tree	NE
27.	<i>Catunaregam spinosa</i> (Thunb.) Tirveng.	Matukkarai	Rubiaceae	Shrub	NE
28.	<i>Cereus jamacaru</i> DC.	Not Recorded	Cactaceae	Herb	LC
29.	<i>Chrysanthemum x grandiflorum</i>	Not Recorded	Asteraceae	Herb	NE

S.No	Species	Vernacular Name	Family	Habit	IUCN
30.	<i>Clitoria ternatea</i> L.	Kakkanam	Fabaceae	Climber	NE
31.	<i>Coccinia grandia</i> (L.) Voigt	Kovakai	Cucurbitaceae	Climber	NE
32.	<i>Cocos nucifera</i> L.	Thenna Maram	Arecaceae	Tree	NE
33.	<i>Cordia obliqua</i> Willd.	Narruvizhi	Nyctaginaceae	Tree	NE
34.	<i>Corypha umbraculifera</i> L.	Talippanai	Arecaceae	Tree	DD
35.	<i>Crateva adansonii</i> DC.	Maa vilinga	Capparaceae	Tree	NE
36.	<i>Cucurbita maxima</i> Duchesne	Parankikay	Cucurbitaceae	Climber	NE
37.	<i>Cyanotis axillaris</i> (L.) D.Don ex Sweet	Vazhukai Pul	Commelinaceae	Herb	NE
38.	<i>Cymbopogon citratus</i> (DC.) Stapf	Karppurappul	Poaceae	Herb	NE
39.	<i>Delonix regia</i> (Hook.) Raf.	Neruppu Kondrai	Fabaceae	Tree	LC
40.	<i>Duranta erecta</i> L.	Not Recorded	Verbenaceae	Shrub	NE
41.	<i>Eucalyptus tereticornis</i> Sm.	Thaila maram	Myrtaceae	Tree	LC
42.	<i>Euphorbia pulcherrima</i> Willd. ex Klotzsch	Poin Chettiya	Euphorbiaceae	Shrub	LC
43.	<i>Ficus benghalensis</i> L.	Aalamaram	Moraceae	Tree	LC
44.	<i>Ficus benjamina</i> L.	Nintamaravakai	Moraceae	Tree	LC
45.	<i>Ficus hispida</i> L. f.	Pei-atthi	Moraceae	Tree	LC
46.	<i>Ficus microcarpa</i> L. f.	Kalichi, Pon-ichchi	Moraceae	Tree	LC
47.	<i>Ficus racemosa</i> L.	Atthi	Moraceae	Tree	LC
48.	<i>Gmelina asiatica</i> L.	Sirukumalaan	Lamiaceae	Shrub	LC
49.	<i>Hardwickia binata</i> Roxb	Anjan	Fabaceae	Tree	NE
50.	<i>Heliotropium indicum</i> L.	Thel kodukku	Boraginaceae	Herb	NE
51.	<i>Hibiscus rosa-sinensis</i> L.	Cembarutti	Malvaceae	Shrub	NE
52.	<i>Indigofera tinctoria</i> L.	Avuri	Fabaceae	Herb	NE
53.	<i>Indigofera trita</i> L.f.	Punalmurunkai	Fabaceae	Herb	NE
54.	<i>Ipomoea carnea</i> Jacq	Neyveli kaatamanakku	Convolvulaceae	Shrub	NE
55.	<i>Jasminum sambac</i> (L.) Aiton	Gundu Malli	Oleaceae	Shrub	NE
56.	<i>Justicia adhatoda</i> L.	Not Recorded	Acanthaceae	Shrub	LC
57.	<i>Lantana camara</i> L.	Arasimala	Verbenaceae	Shrub	LC
58.	<i>Lawsonia inermis</i> L.	Marudani	Lythraceae	Shrub	NE
59.	<i>Leucaena leucocephala</i> (Lam.) de Wit	Nattucavundal	Fabaceae	Tree	NE
60.	<i>Madhuca longifolia</i> (J.Koenig ex L.) J.F.Macbr.	Illupai	Sapotaceae	Tree	LC
61.	<i>Mangifera indica</i> L.	Maamaram	Anacardiaceae	Tree	DD
62.	<i>Manilkara zapota</i> (L.) P.Royen	Sapota	Sapotaceae	Tree	LC
63.	<i>Melia azedarach</i> L.	Kattu Vembhu	Meliaceae	Tree	NE
64.	<i>Melia dubia</i> Cav.	Not Recorded	Orchidaceae	Tree	NE
65.	<i>Mnesithea granularis</i> (L.) de Koning & Sosef	Not Recorded	Poaceae	Grass	NE
66.	<i>Moringa oleifera</i> Lam.	Murungamaram	Moringaceae	Tree	LC

S.No	Species	Vernacular Name	Family	Habit	IUCN
67.	<i>Mukia maderaspatana</i> (L.) M. Roem.	Mosumosukkai	Cucurbitaceae	Climber	LC
68.	<i>Musa paradisiaca</i> L.	Valaimaram	Musaceae	Tree	NE
69.	<i>Neolamarkia cadamba</i> (Roxb.) Bosser	Vella Cadamabu	Rubiaceae	Tree	NE
70.	<i>Nerium oleander</i> L.	Chevarali	Apocynaceae	Shrub	LC
71.	<i>Ocimum sanctum</i> L.	Tulasi	Lamiaceae	Shrub	NE
72.	<i>Oryza sativa</i> L.	Arishi, Nellu	Poaceae	Grass	LC
73.	<i>Pamburus missionis</i> Swingle	Not Recorded	Rutaceae	Tree	NE
74.	<i>Pedaliium murex</i> L.	Anai-Nerunci, Peru-Nerunci.	Pedaliaceae	Herb	LC
75.	<i>Pennisetum typhoides</i> (Burm.f.) Stapf et C.E.Hubb.	Not Recorded	Poaceae	Grass	NE
76.	<i>Pentatropis capensis</i> (L. fil.) Bullock	Uppili	Apocynaceae	Climber	LC
77.	<i>Phoenix sylvestris</i> (L.) Roxb.	Inthupaanai	Arecaceae	Tree	LC
78.	<i>Phyllanthus acidus</i> (L.) Skeels	Aranelli	Phyllanthaceae	Tree	NE
79.	<i>Phyllanthus debilis</i> J.G.Klein ex Willd.	Not Recorded	Phyllanthaceae	Herb	NE
80.	<i>Phyllanthus emblica</i> L	Kattu-nelli	Phyllanthaceae	Tree	LC
81.	<i>Pithecellobium dulce</i> (Roxb.)Benth.	Kodukkapuli	Fabaceae	Tree	LC
82.	<i>Plumeria obtusa</i> L.	Nela Sampangi	Apocynaceae	Tree	LC
83.	<i>Plumeria rubra</i> L.	Not Recorded	Apocynaceae	Tree	LC
84.	<i>Pongamia pinnata</i> (L.)Pierre	Ponga Maram	Fabaceae	Tree	LC
85.	<i>Psidium guajava</i> L.	koyyaa	Myrtaceae	Tree	LC
86.	<i>Psydrax dicoccos</i> Gaertn	Naluvai	Rubiaceae	Tree	LC
87.	<i>Quisqualis indica</i> L.	Irangun Malli	Combretaceae	Shrub	LC
88.	<i>Saccharum officinarum</i> L.	Karumbu	Poaceae	Grass	NE
89.	<i>Samanea saman</i> (Jacq.)Merr.	Thoongumoonji maram	Fabaceae	Tree	NE
90.	<i>Scoparia dulcis</i> L.	Sakarai vaambu	Plantaginaceae	Herb	LC
91.	<i>Senna occidentalis</i> (L.) Link	Nattam takarai, Payaverai	Fabaceae	Shrub	NE
92.	<i>Senna siamea</i> (Lam.)	Chelumalarkkonari	Fabaceae	Tree	NE
93.	<i>Sesamum indicum</i> L.	Ellu	Pedaliaceae	Herb	NE
94.	<i>Sesbania sesban</i> (L.)Merr.	Egyptian riverhemp	Fabaceae	Shrub	NE
95.	<i>Sida acuta</i> Burm. f.	Karuncaranai	Malvaceae	Herb	NE
96.	<i>Sida cordifolia</i> L.	Chittamuttie	Malvaceae	Herb	NE
97.	<i>Syzygium cumini</i> (L.) Skeels	Naval	Myrtaceae	Tree	NE
98.	<i>Tecoma stans</i> (L.) Juss. ex Kunth	Manjarali	Bignoniaceae	Shrub	LC
99.	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn	Marudha Maram	Combretaceae	Tree	NE
100.	<i>Tinospora cordifolia</i> (Willd.)	Seenthil	Menispermaceae	Climber	NE

S.No	Species	Vernacular Name	Family	Habit	IUCN
	Miers				
101.	<i>Wrightia tinctoria</i> R. Br	Veppalai	Apocynaceae	Tree	LC
102.	<i>Zea mays</i> L.	Makka cholam	Poaceae	Grass	NE
Note: NE – Not Evaluated, LC – Least Concerned, DD – Data Deficient, VU – Vulnerable, NT- Nearly Threatened					

Commonly found trees include *Albizia amara*, *Albizia lebbeck*, *Ficus benghalensis*, *Moringa oleifera*, *Pongamia pinnata*, *Terminalia arjuna* and *Syzygium cumini* which contribute to shade, soil fertility, and local biodiversity. Fruit-bearing trees like *Mangifera indica*, *Manilkara zapota*, *Psidium guajava*, *Phoenix sylvestris*, and *Carica papaya* are also prevalent, supporting both wildlife and human use. Several herbaceous and medicinal species, including *Abutilon indicum*, *Lawsonia inermis*, *Pedaliu murex*, *Ocimum sanctum*, and *Tinospora cordifolia*, are traditionally used in local healthcare practices. The IUCN status indicates that most species are categorized as Least Concern (LC) or Not Evaluated (NE), with a few listed as Near Threatened (NT) (e.g., *Aegle marmelos*) or Data Deficient (DD) (e.g., *Carica papaya*, *Corypha umbraculifera*, *Mangifera indica*). Overall, the area hosts a rich diversity of native and cultivated plant species that support ecological functions, provide medicinal and economic value and maintain habitat connectivity in the buffer zone.

3.8.5 Assessment of Fauna

The study area supports a variety of fauna adapted to its dry deciduous and scrubland habitats, as well as nearby waterbodies and agricultural fields. Commonly observed species include wild boar, jackals, mongooses, and small civets, along with reptiles such as Indian cobra, Russell's viper, and monitor lizards. Birdlife is abundant, with frequent sightings of Indian Spot-billed Ducks, Northern Pintails, Painted Storks, egrets, kingfishers, and raptors like the Short-toed Snake-Eagle, especially around local lakes and wetlands. Insects and butterflies, including species such as the Common Rose and Southern Birdwing, are widespread in flowering patches and farmlands. Seasonal migratory birds visit the region during winter months, while the surrounding terrain also hosts small mammals and amphibians that thrive in the semi-arid landscape.

Table 3.27: List of fauna in the Study Area

S.No	Scientific Name	Vernacular Name	Common Name	WLPA Schedule	IUCN Status
Mammals					
1.	<i>Sus scrofa</i>	Kaattu Pandri	Wild Boar	Schedule III	LC
2.	<i>Canis aureus</i>	Nari	Jackal	Schedule II	LC
3.	<i>Herpestes edwardsii</i> *	Keeripillai	Indian Grey Mongoose	Schedule IV	LC
4.	<i>Viverricula indica</i>	Siriya Civet	Small Indian Civet	Schedule II	LC
Reptiles					
5.	<i>Naja naja</i>	Nagam	Indian Cobra	Schedule II	LC
6.	<i>Daboia russelii</i>	Kannaadi Viriyan	Russell's Viper	Schedule II	LC

7.	Varanus bengalensis	Udumbu	Bengal Monitor Lizard	Schedule II	LC
Birds					
8.	Anas poecilorhyncha	Kuttai Vaathu	Indian Spot-billed Duck	Schedule IV	LC
9.	Anas acuta	Neela Vaal Vaathu	Northern Pintail	Schedule IV	LC
10.	Mycteria leucocephala	Oviya Kokku	Painted Stork	Schedule IV	NT
11.	Egretta garzetta *	Siriya Kokku	Little Egret	Schedule IV	LC
12.	Alcedo atthis *	Meenkoththi	Common Kingfisher	Schedule IV	LC
13.	Circus gallicus	Pambari Kalugu	Short-toed Snake-Eagle	Schedule I	LC
Butterflies					
14.	Pachliopta aristolochiae	Roja Vannathi	Common Rose	Not Listed	LC
15.	Troides minos	Ponnalagan	Southern Birdwing	Schedule I	LC
* Species identified during field survey					
Source:					
1. IUCN Status: https://www.iucnredlist.org/species					
2. WPA Schedule: Appendix of Wildlife (Protection) Amendment Act 2022 and Rules 2024					
Note: LC – Least Concern, NT – Nearly Threatened					

The study area supports a stable fauna typical of dry deciduous and scrub habitats, including common Mammals, Reptiles in suitable microhabitats across the landscape. Bird diversity is high due to the presence of local tanks attracting species. Most species fall under the Least Concern (LC) category, with a few Schedule I species indicating the ecological value of the region. No endangered or highly sensitive wildlife habitats were recorded in the study area.

3.8.6 Ecologically Sensitive Areas and Critical Habitats

The area is mainly rural, with farming being the primary livelihood. Although there are no wildlife reserves nearby, the Karaivetti Bird Sanctuary, about 39.34 km south, provides a refuge for many resident and migratory bird species. This sanctuary, centered on a large irrigation tank and wetlands, supports diverse bird populations such as pelicans, storks, ibises, and ducks, helping maintain the ecological balance of the region. The impacts of the project on the Bird Sanctuary are insignificant.

3.8.7 Protected Areas

Reserve Forests in the region include Sirukudal Reserve Forest, Peraiyur Reserve Forest and the Chittāl Reserve Forest. The Forests lie within a semi-arid landscape characterized by scrub and dry deciduous vegetation typical of the region. The Forest Department maintains monoculture plantations of *Hardwickia binata* while smaller forest patches host native vegetation. Although not a large wilderness area, its protected status helps conserve local flora and fauna and prevents the land from being converted for agriculture or development. While these reserves support local biodiversity, there are no major national parks or wildlife sanctuaries near the proposed project site.

3.8.8 Biodiversity of the Study Area

- The Core Zone (300 m radius) comprises dry deciduous and scrub vegetation, with 67 plant species identified mostly of Least Concern except *Santalum album*, listed as Vulnerable.
- The Buffer Zone (10 km radius) recorded 99 plant species including native trees, fruit-bearing plants, medicinal herbs and crops typical of the semi-arid region. Most species are of Least Concern or Not Evaluated, with a few Nearly Threatened or Data Deficient species.
- The study area supports a variety of fauna, including mammals, reptiles and a rich diversity of birds particularly near local water bodies. Most faunal species fall under the Least Concern category, with a few listed under Schedule I of the Wildlife Protection Act, indicating notable ecological value but no critical or endangered habitats.
- No ecologically sensitive or protected areas lie in the 10 km study area of the site. Overall, the region hosts diverse biodiversity typical of semi-arid landscapes with no major ecological constraints to development, provided proper environmental management measures are followed.

3.9 SOCIO-ECONOMIC ENVIRONMENT

Developmental projects such as Industrial Estates can influence socioeconomic conditions both directly and indirectly, including the level of public acceptance for the proposed development. A detailed assessment of the existing socioeconomic and cultural conditions of the Eriayur region was carried out. This evaluation helps in identifying, predicting, and assessing the potential impacts of the project on local communities, their livelihoods and overall human welfare.

3.9.1 Objectives of the Socio-Economic Study

- To assess the existing socioeconomic and cultural profile of the study area.
- To understand the demographic characteristics, livelihood patterns and quality of life of the local population.
- To evaluate public perception and acceptance of the proposed project.
- To identify vulnerable groups and assess potential project-related impacts on their welfare.
- To predict and analyse the likely socioeconomic changes due to project implementation.
- To provide a basis for developing measures to enhance positive impacts and mitigate adverse effects.

3.9.2 Methodology of the Study

- Identification of the study area around the project site.
- Assessment of the socio-economic profile using secondary data (literature review)
- Collection of Primary data through socio-economic survey conducted with the stakeholders (household, local body, focused group etc.)
- Validation of secondary data with primary findings.

- Interpretation of the socio-economic data.
- Identification of potential socio-economic impacts of the proposed project.
- Suggestion of appropriate mitigation measures for the identified impacts.

3.9.3 Description of the Study area

The study area for the project covers a radial distance of 10 km from the project site, with a total area of approximately 360.36 sq. km. Within this radius, 53 villages are included. For the field survey, the study area has been classified into three segments: the Primary Zone (0–2 km), Secondary Zone (2–5 km), and Tertiary Zone (5–10 km). The villages and municipalities located within the project site is presented in Figure 3.28.

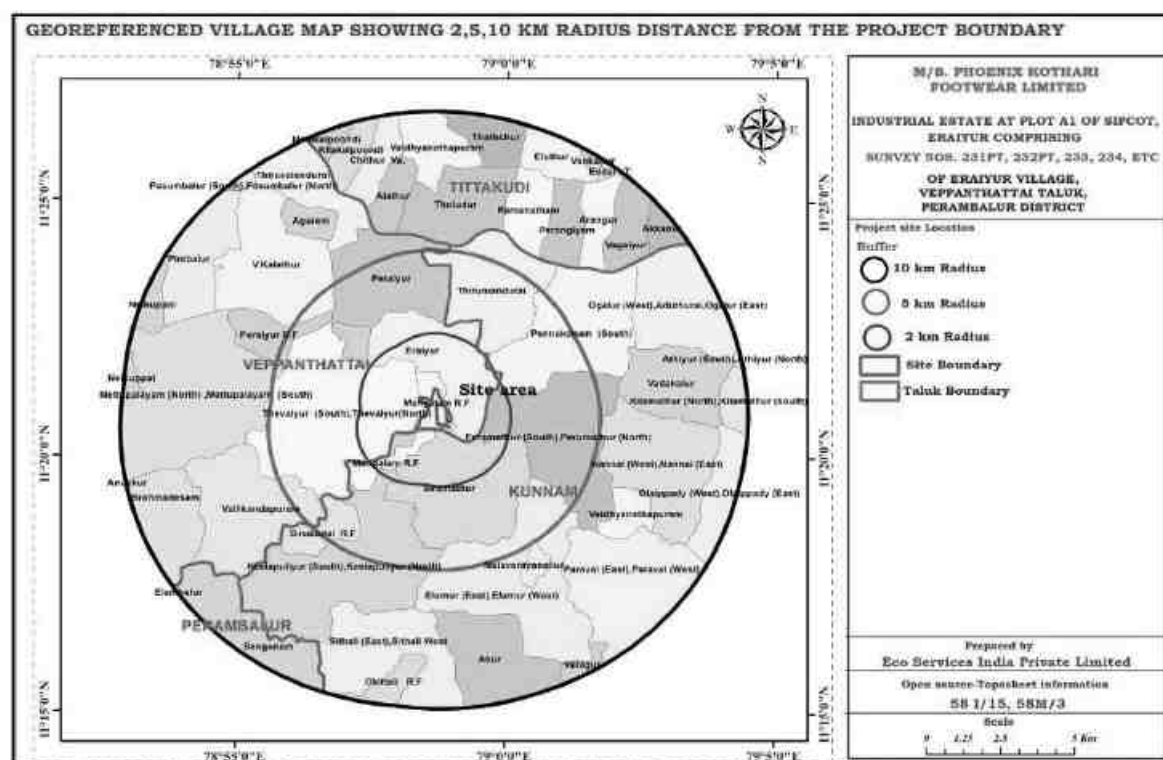


Figure 3.28: Map showing the villages in the Primary Zone, Secondary Zone, and Tertiary Zone of the Study Area

3.9.4 Demographic Structure of the Study Area

Demographic structure of the study area was compiled for selected parameters such as households, population, sex ratio, scheduled caste, scheduled tribes, literacy from census of India 2011. The summary of demographic data based on district census, Perambalur 2011 is presented in Table. 3.28

The significant demographic features areas are:

- ❖ Total population of the region as per 2011 census is 1,61,708 out of which 80,955 are male and 80,753 are female.
- ❖ Total number of households in the region is about 41,695.

- ❖ Gender ratio (number of male per thousand female) in the region is 998 this shows that male population is higher in the region as compared to the female population.
- ❖ Out of the total population, Scheduled Caste and Scheduled Tribe population is about 34.91 % and 0.09% respectively.
- ❖ The population of main workers are about 44.25%, 8.73% comes under marginal worker category and 47.02 % belongs to non-workers category
- ❖ Literacy rate of the population in the study area is about 71.40%.

a. Population Projection of the Study Area

Regression is a statistic based path to find affiliation between two or more variables and is used for the projection of population.

$$Y=a+bt$$

where,

Y = Dependent variable (Population)

a = Intercept

b = Slope

t = Interdependent variables (Time)

Above formula was applied to project population for the years 2021, 2031, 2041 and 2051. To avoid the errors in manual calculation the statistical software SPSS (version 26) was used to calculate the intercept and the slope. Accordingly the population of the study area in the year 2001 and in the year 2011 is 1,41,020 and 1.61,708, respectively. The population projection for the year 2021, 2031, 2041 and 2051 calculated is given in Table 3.29.

Table 3.28: Demographic Structure of the Study Area

S.No	Village Name	Household	Population			SC Population	ST Population	Literacy	Main workers	Marginal Workers	Non workers
			Total	Male	Female						
Primary Zone (0-2 km)											
1	Eraiur	1,427	6,074	3,030	3,044	1,880	16	4,559	2,475	288	3,311
2	Thevaiyur(North)	1,281	4,655	2,330	2325	2,416	10	2,698	2,582	33	2,040
Total		2708	10,729	5,360	5,369	4,296	26	7,257	5,057	321	5,351
Secondary Zone (2-5 km)											
5	Peraiyur	725	2,600	1,258	1,342	893	0	1,749	1,165	219	1,216
6	Thevaiyur (South)	788	2,794	1,324	1,470	504	7	1,685	1,351	51	1,392
7	Thirumandurai	1,014	4,034	1,991	2,043	2,014	0	2,581	1,564	510	1,960
8	Pennakonam (South)	899	3,932	2,102	1,830	1,661	0	2,551	2,007	88	1,837
9	Sirumathur	1,408	5,421	2752	2,669	2,387	0	3,412	2,524	586	2,311
10	Peramathur (South)	874	3,406	1644	1,762	1,595	0	2,279	1,873	73	1,460
Total		5,708	22,187	11,071	11,116	9,054	7	14,257	10,484	1,527	10,176
Tertiary Zone (5-10 km)											
16	Pasumbalur (North)	848	3,047	1,469	1,578	1,837	0	2,040	1,749	156	1,142
17	Pasumbalur (South)	695	2,674	1,360	1,314	0	0	1,339	1,425	8	1,241
18	Pimbalur	731	2,621	1,288	1,333	1,357	0	1,420	1,510	103	1,008
19	V.Kalathur	2,200	9,230	4,649	4,581	1,960	1	6,570	2,907	532	5,791
20	Agaram	354	1,376	705	671	577	0	876	750	5	621
21	Neikuppai	981	3,359	1,646	1,713	1,168	0	2,019	1,686	296	1,377
22	Anukkur	1,131	3,903	1,889	2,014	644	5	2,245	1,994	231	1,678
23	Mettupalayam (South)	671	2,538	1,268	1,270	931	1	1,405	1,023	269	1,246
24	Vallikandapuram	1,435	5,385	2,552	2,833	1,037	5	3,461	2,046	348	2,991
25	Brahmadesam	744	2,649	1,334	1,315	620	2	1,751	1,647	65	937
26	Sengunam	1,264	4,621	2,319	2,302	2,125	0	2,949	2,096	214	2,311
27	Elambalur	2,256	10,357	5,606	4,751	2,503	11	7,369	3,727	540	6,090

28	Ogalur (West)	230	915	473	442	580	0	525	389	48	478
29	Ogalur (East)	1,058	3,948	1,874	2,074	1,657	0	2,541	1,501	307	2,140
30	Athiyur (South)	173	561	254	307	4	0	388	250	32	279
31	Kilamathur (south)	798	2,678	1,258	1,420	289	5	1,556	1,452	31	1,195
32	Vadakalur	989	3,620	1,778	1,842	1,552	58	2,399	1,220	938	1,462
33	Nannai (West)	316	1,275	625	650	311	0	730	55	696	524
34	Nannai (East)	735	2,831	1,451	1,380	841	0	1,791	397	1,165	1,269
35	Olaippady (West)	937	3,591	1,847	1,744	1,210	0	2,164	1,724	381	1,486
36	Olaippady (East)	1,179	4,350	2,094	2,256	1,516	0	2,502	2,100	354	1,896
37	Malavarayanallur	175	633	342	291	0	0	400	10	325	298
38	Elumur (East)	778	3,027	1,567	1,460	1,128	0	1,956	1,086	830	1,111
39	Elumur (West)	561	2,165	1,108	1,057	1,170	1	1,356	728	373	1,064
40	Asur	559	2,091	1,036	1,055	1,212	0	1,175	1,098	208	785
41	Sithali (East)	656	2,400	1,139	1,261	540	0	1,325	1,384	15	1,001
42	Sithali West	473	1,859	950	909	1,126	0	1,088	1,092	8	759
43	Varagur	961	3,717	1,890	1,827	1,359	0	2,536	1,256	572	1,889
44	Melakalpoondi	291	1,262	621	641	493	0	811	178	624	460
45	Kilakalpoondi	281	1,171	585	586	639	0	710	273	229	669
46	Chithur Va.	248	1,013	536	477	342	0	596	473	76	464
47	Alathur	367	1,499	751	748	884	0	984	852	12	635
48	Vaidhyanathapuram	305	1,148	566	582	329	0	791	485	213	450
49	Thathchur	624	2,526	1,305	1,221	1,041	0	1,372	1,588	121	817
50	Tholudur	943	3,687	1,863	1,824	932	0	2,464	1,805	234	1,648
51	Ramanatham	994	4,181	2,099	2,082	1,094	22	2,843	1,719	73	2,389
52	Perangiyam	222	921	470	451	409	0	582	367	173	381
53	Eluthur	744	3,064	1,570	1,494	1,594	0	1,735	1,779	163	1,122
54	Venkanur	433	1,750	883	867	518	0	1,000	807	222	721

55	Endal T.	343	1,508	790	718	448	0	812	823	21	664
56	Arangur	535	2,152	1,070	1,082	444	0	1,352	803	174	1,175
57	Vagaiyur	437	1,613	786	827	709	0	1,340	143	799	671
58	Akkanur	549	2,098	1,001	1,097	889	0	1,220	1,059	41	998
59	Keelapuliur (North)	1,337	5,091	2,539	2,552	1,912	4	3,234	3,035	26	2,030
60	Keelapuliur (South)	738	2,687	1,318	1,369	1,171	0	1,553	1,519	25	1,143
Total		33,279	1,28,792	64,524	64,268	43,102	115	81,275	56,010	12,276	60,506
Grand Total		41,695	1,61,708	80,955	80,753	56,452	148	1,02,789	71,551	14,124	76,033

Source: <https://censusindia.gov.in/>

Table 3.29 Population Projection of the Study Area

S.No	Year	Projected Population (Estimated (Approximately))
1.	2021	1,82,396
2.	2031	2,03,084
3.	2041	2,23,772
4.	2051	2,44,460

b. Population Growth rate of the Study Area

The Growth Rates from one period to another is calculated from the formula:

$$PR = \frac{(V_{\text{Present}} - V_{\text{Past}})}{V_{\text{Past}}} \times 100$$

N

where,

PR = Percent Rate

V_{Present} = Present or Future Value

V_{Past} = Past or Present Value

N = Number of Years

The population growth rate in the study area is given in Table 3.30 and the graphically represented in Figure 3.29

Table 3.30: Population Growth Rate in Study Area

Year	Actual Population	Growth Rate
2001	1,41,020	-
2011	1,61,708	11.47
2021	1,82,396	11.28
2031	2,03,084	11.13
2041	2,23,772	11.02
2051	2,44,460	10.92

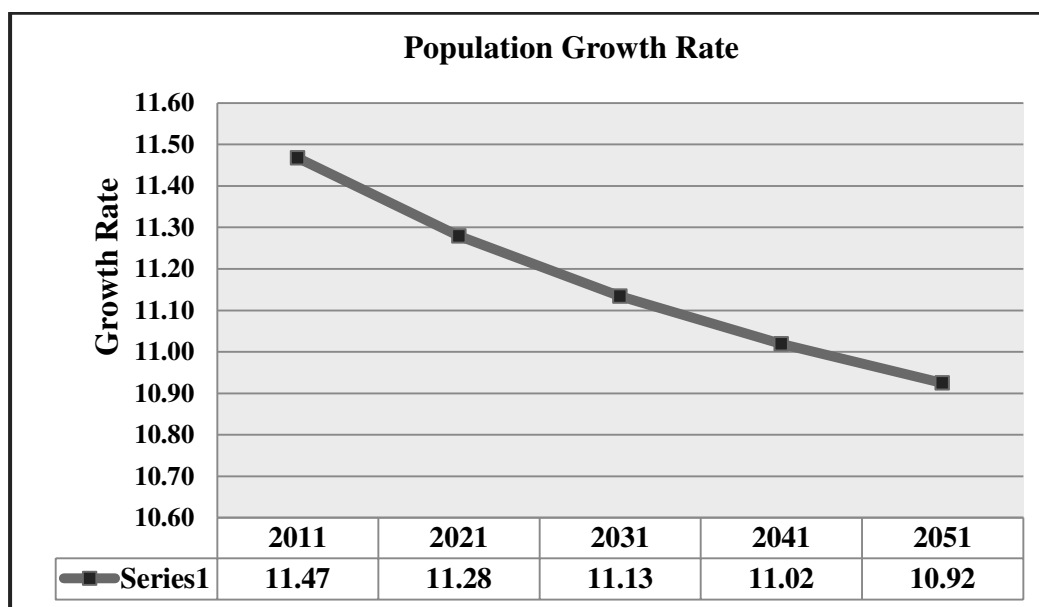


Figure 3.29: Chart showing Population Growth Rate

The population from 2001 to 2051 rises from 1,41,020 to 2,44,460, reflecting sustained development and expansion in the region. However, the decadal growth rate shows a gradual decline over time from 11.47% in 2011 to 10.92% projected for 2051. This declining growth rate may be due to factors such as improved socio-economic conditions, reduced fertility rates

or urbanization trends. Overall, the data indicates that the study area will continue to experience population growth, but at a gradually decreasing rate.

c. Gender Ratio

Gender ratio is used to describe the number of females per 1000 of males. According to the Census of 2011, gender ratio in India 2011 is 940 females per 1000 of males. The study area has 998 females per 1000 males. Table 3.31 and Figure 3.30 entails information about gender ratio of 53 villages in the study area.

Table 3.31: Gender Ratio of the Study Area

S.No	Buffer Zone	Gender Ratio of the Study area
1	Primary Zone (0-3 km)	1002
2	Secondary zone (3-7 km)	1004
3	Tertiary Zone (7-10 km)	996
Study area		998

Source: Census of India, 2011

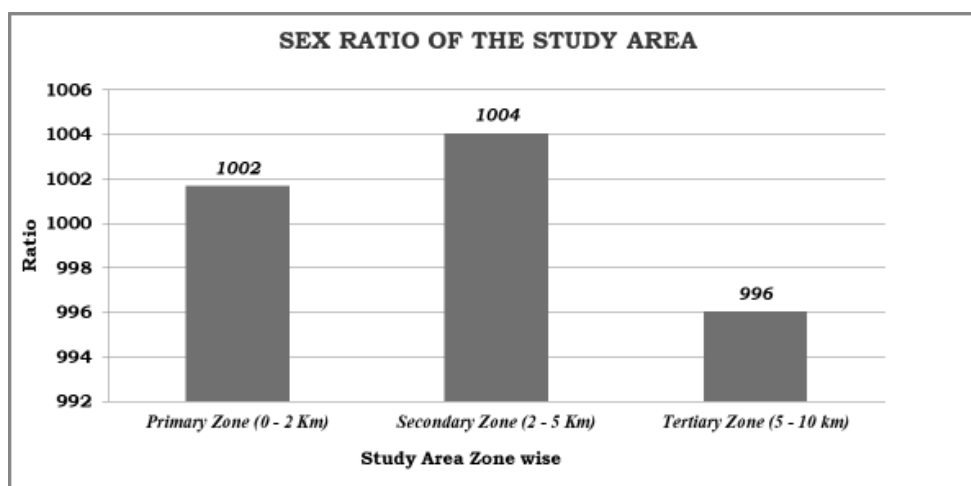


Figure 3.30: Gender Ratio of the Study Area

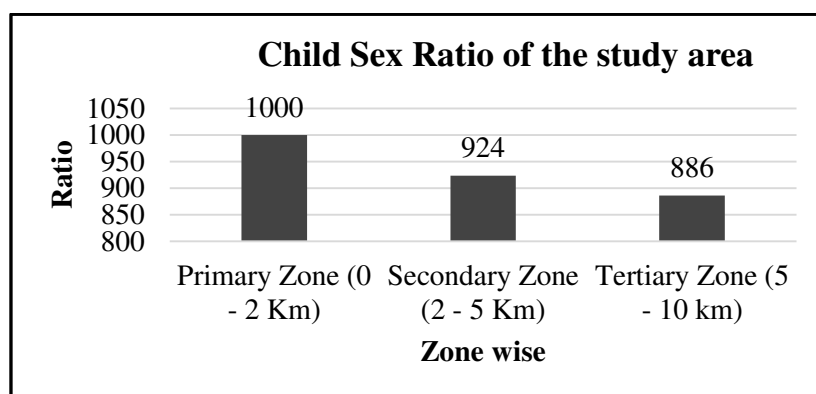
d. Child Gender Ratio

The child gender ratio is the number of girls per 1,000 boys in the age group of 0–6 years in a population. In India, the standard is to use the ratio of girls to boys, which is the opposite of the convention used in other literature on sex ratios. Table 3.32 and Figure 3.31 entails information about gender ratio of 53 villages in the study area.

Table 3.32: Child Gender Ratio of the Study Area

S.No.	Buffer Zone	Child Gender Ratio
1	Primary Zone (0-3 km)	1000
2	Secondary zone (3-7 km)	924
3	Tertiary Zone (7-10 km)	886
Total		898

Source: Census of India, 2011

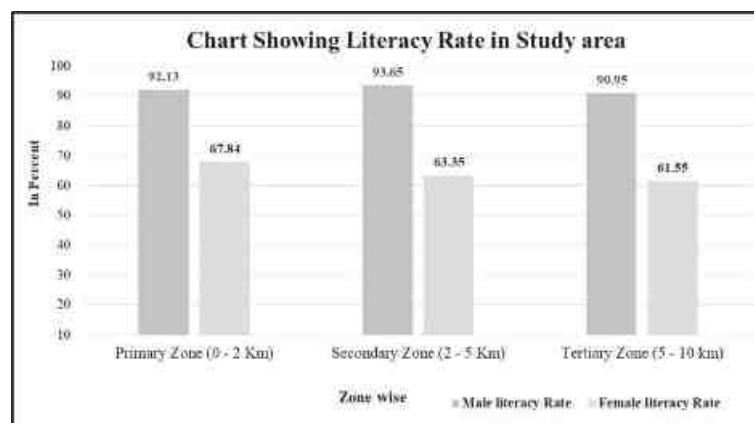
**Figure.3.31 Child Sex Ratio in the Study Area****e. Literacy Rate in the Study Area**

Literacy Rate is the percentage of people with the ability to read and write. The study area demonstrates a literacy rate of 71.40% as per census data 2011. The male literacy rate in the study area is 91.3% whereas the female literacy rate, which is an important indicator for social change, is observed to be 62.22% as per the census data 2011. Table no 3.33 and Figure 3.32 gives details on the Literacy rate of the study area.

Table 3.33: Literacy Rate of the Study Area

Zone	No. of Villages	Male Literate Population	Male Literacy Rate	Female Literate Population	Female Literacy Rate	Total Literate Population	Total Literacy Rate
Primary Zone (0 - 2 Km)	2	3,971	92.13	3,286	67.84	7,257	74.98
Secondary Zone (2 - 5 Km)	6	7,988	93.65	6,269	63.35	14,257	72.57
Tertiary Zone (5 - 10 km)	45	45,810	90.95	35,465	61.55	81,275	70.90
Study Area	53	57,769	91.39	45,020	62.22	1,02,789	71.40

Source: Census of India, 2011

**Figure 3.32: Literacy Rate in the Study Area**

f. Vulnerable Groups in the Study Area

Population in the marginalized and vulnerable groups in the study area as per census 2011 is given in Table 3.34 and represented graphically in Figure 3.33. The Scheduled caste (SC) population is 34.91 % and Scheduled Tribe population 0.09% in the total study area.

Table 3.34: Vulnerable Groups of the Study Area

Zone	No. of Villages	Vulnerable Groups					
		SC Population	%	ST Population	%	Other Population	%
Primary Zone (0 - 2 Km)	2	4,296	40.04	26	0.24	6,407	59.72
Secondary Zone (2 - 5 Km)	6	9,054	40.81	7	0.03	13,126	59.16
Tertiary Zone (5 - 10 km)	45	43,102	33.47	115	0.09	85,575	66.44
Study Area (0 -10 km)	53	56,452	34.91	148	0.09	1,05,108	65.00

Source: Census of India, 2011

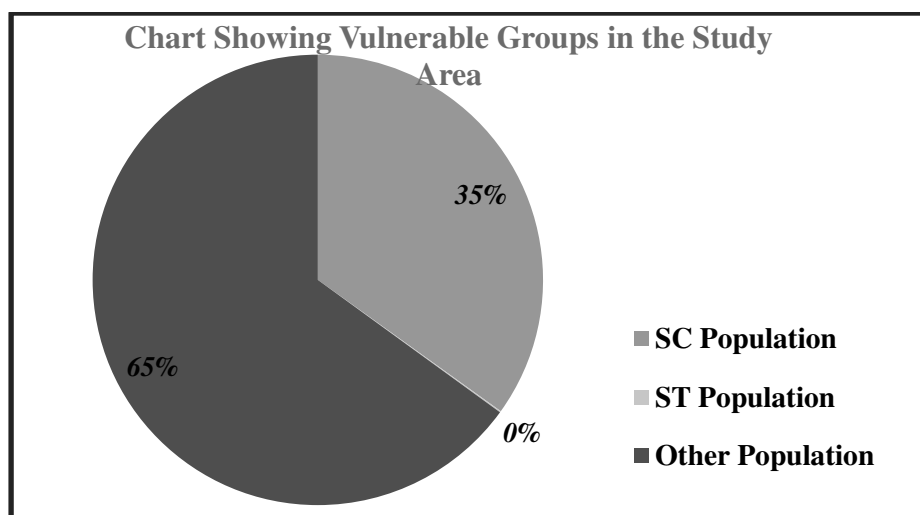


Figure.3.33 Vulnerable groups in the Study Area

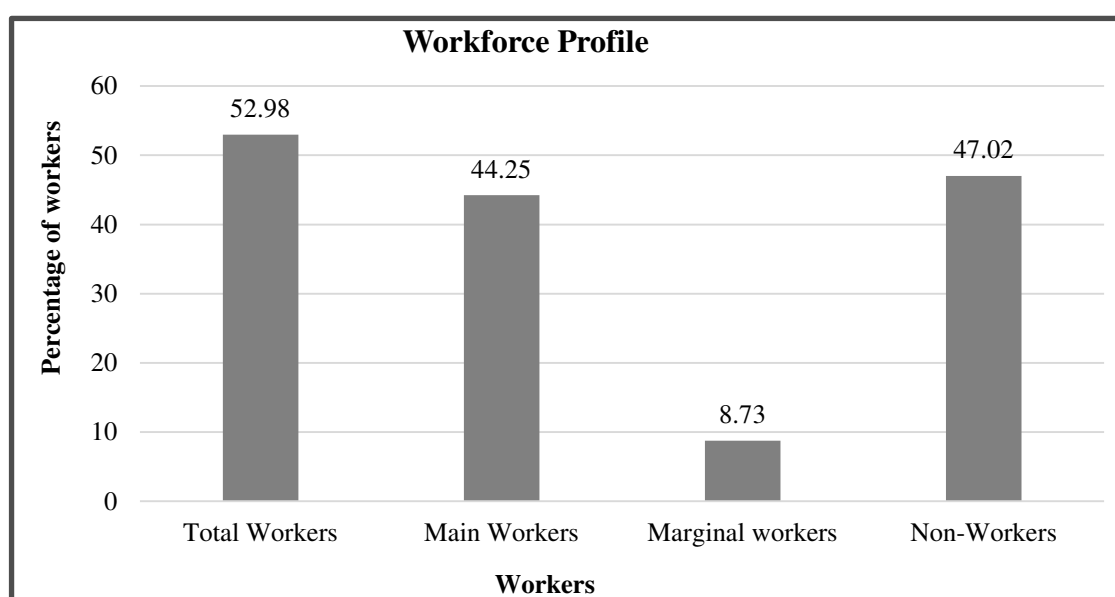
g. Workforce Profile of the Study Area

The workforce profile of people in the study area is understood from the category of work viz., Main workers and Non-workers. The main workers include cultivators, labourers, those engaged in industrial jobs and people working in other sectors. The non-workers include students, retired persons, dependents, vagrants etc. The employment pattern of the study area is shown in Table 3.35 and Figure 3.34. It shows that 52.98% of the total population are workers, while 47.02% are non-workers. Among the workers, main workers constitute the largest share at 44.25%, that is majority of the employed population is engaged in stable or regular employment. Marginal workers account for 8.73%, reflecting a smaller segment of people who work only for part of the year or have irregular employment. Overall, the employment structure suggests moderate workforce participation with a considerable portion of the population still dependent or not engaged in economic activities.

Table 3.35: Workforce Profile of the Study Area

Zone	No. of Villages	Total Workers	%	Main Workers	%	Marginal workers	%	Non-Workers	%
Primary Zone (0 - 2 Km)	2	5378	50.13	5,057	47.13	321	2.99	5351	49.87
Secondary Zone (2 - 5 Km)	6	12,011	54.14	10,484	47.25	1,527	6.88	10,176	45.86
Tertiary Zone (5 - 10 km)	45	68,286	53.02	56,010	43.49	12,276	9.53	60,506	46.98
Study Area (10 Km)	53	85,675	52.98	71,551	44.25	14,124	8.73	76,033	47.02

Source: Census of India, 2011

**Figure 3.34: Workforce Profile of the Study Area**

h. Infrastructure facilities

A review of infrastructural facilities available in the study area has been done based on the census data. (Source: Census of India 2011 - Tamil Nadu - Series 34 - Part XII A - District Census Handbook, Perambalur and Google earth imagery of the study area.) The details are given in the subsequent sub sections below.

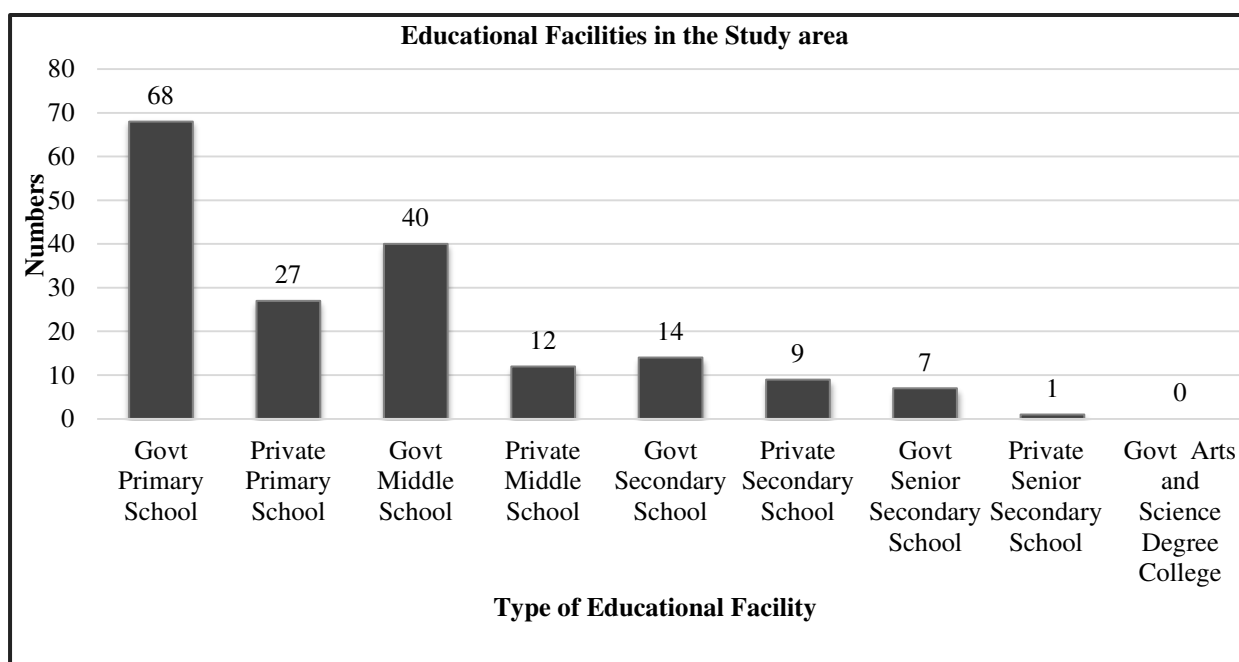
i. Educational facilities:

Primary School (till class 5) and Anganvadi Centres are available in most of the villages. The number of High Schools, Senior Secondary Schools and Colleges both government and private owned in the study area are listed in Table 3.36 and shown in Figure 3.35.

Table 3.36: Educational Institutions in the Study Area

Educational Institutions in the Study Area										
Zone	No. Villages	Govt Primary School	Private Primary School	Govt Middle School	Private Middle School	Govt Secondary School	Private Secondary School	Govt Senior Secondary School	Private Senior Secondary School	Govt and Science Degree
Primary Zone (0 - 2 Km)	2	0	0	0	0	0	0	0	0	0
Secondary Zone (2 - 5km)	6	14	6	4	4	1	3	0	1	0
Tertiary Zone (5 -10 km)	45	54	21	36	8	13	6	7	0	0
Study Area (0-10 Km)	53	68	27	40	12	14	9	7	1	0

Source: Census of India, 2011.

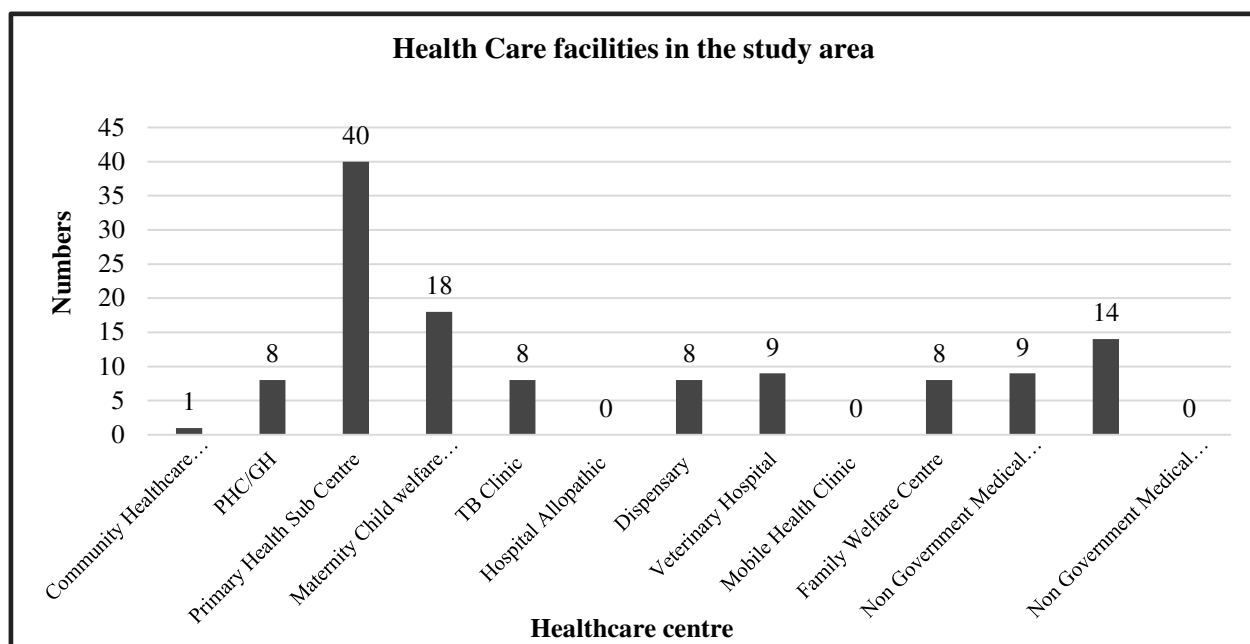
**Figure 3.35: Educational Institutions in the Study Area**

ii. Health Care Facilities

A review of health care facilities in the study area has been done based on the census data and is presented in Table 3.37 and Figure 3.36. (Source: Census of India 2011 - Tamil Nadu - Series 34 - Part XII A - District Census Handbook, Perambalur and Google earth imagery of the study area.)

Table 3.37: Health Care facilities in the Study Area

Zone	No. of Villages	Community Healthcare Centre	PHC/GH	Primary Health Sub Centre	Maternity Child welfare Centre	TB Clinic	Hospital Allopathic	Dispensary	Veterinary Hospital	Mobile Health Clinic	Family Welfare Centre	Non-Government Medical facilities	Non-Government Medical facilities Medical Shop
Primary Zone (0 - 2 Km)	2	0	0	2	0	0	0	0	0	0	0	0	0
Secondary Zone (2-5km)	6	0	1	6	2	1	0	1	2	0	1	1	1
Tertiary Zone (5-10km)	45	1	7	32	16	7	0	7	7	0	7	8	13
Study Area (0-10 Km)	53	1	8	40	18	8	0	8	9	0	8	9	14

**Figure 3.36: Health Care facilities in the Study Area**

The healthcare facilities in the study area shows an uneven distribution, with the Primary Zone (0–2 km) having only two Primary Health Centres and no other medical services, indicating very poor access to healthcare. The Secondary Zone (2–5 km) is moderately equipped with PHC/Government Hospital, maternity and child welfare centres, a TB clini, and limited support facilities such as a dispensary and medical shop. The Tertiary Zone (5–10 km) has the widest range of services, including Community Health Centre, PHCs, multiple maternity centres, TB clinics, dispensaries and several non-government medical facilities. Overall, the area is mainly supported by basic and primary healthcare facilities with the core and secondary zones remaining underserved and requiring improved medical infrastructure.

iii. Water Supply and Drainage facility in the Study Area

The study area has access to multiple water sources, with most villages having both treated and untreated tap water, along with hand pumps and bore wells as major groundwater based supplies. Wells are commonly used, while natural sources like springs, rivers and canals are largely absent. Only a limited number of villages depend on tanks or ponds. Overall, water availability is adequate, but reliance on groundwater remains high across all zones.

The drainage pattern in the study area shows that closed drainage systems are largely absent; with only a few villages mainly in the buffer zone having limited closed drains. Open drainage is the most common system, present in almost all villages across all zones, indicating basic but incomplete wastewater management.

iv. Communication Facilities**a. Telecommunication**

Telecommunication services are well established, with all major mobile network operators providing coverage across the region. Internet connectivity is increasingly available, extending even into rural settlements.

b. Road, Rail and Air connectivity

Road connectivity within the study area is supported by a network of rural roads that provide all-weather access, facilitating movement between villages and nearby towns. Rail connectivity is available through the Ariyalur railway station, located approximately 23 km southeast of Eraiyur, offering regional and inter-district rail services. Air connectivity is ensured through Tiruchirappalli International Airport, situated about 70 km southwest of the village, linking the district to major domestic and international destinations.

c. Public Transport

The State Express Transport Corporation (SETC) and the Tamil Nadu State Transport Corporation (TNSTC), supplemented by private bus operators, provide public transportation. These services offer reliable mobility for daily commuters, traders and long-distance travelers, contributing to improved livelihoods and economic integration.

v. Culture, Heritage and Religion

Religious and cultural life in the study area reflects the broader diversity of Perambalur district, where Hinduism is the predominant faith. Festivals such as Pongal, Karthigai Deepam, Aadi Perukku and Thaipusam are widely celebrated. Also Muslim and Christian communities adds to the region's cultural and religious diversity. Perambalur district also possesses a rich cultural and heritage background displayed through traditional practices, local architecture, and community customs, highlighting the region's historical significance and cultural identity.

vi. Power Supply

The study area is well connected to the regional electricity distribution network. All settlements within the area receive power supply through the Tamil Nadu Generation and Distribution Corporation (TANGEDCO). Electricity is available for domestic, commercial, agricultural, industrial and public utility needs ensuring reliable access for households and local institutions. Overall, the electricity infrastructure in the study area is adequately

developed, supporting both routine household needs and socioeconomic development activities.

The photographs of various infrastructure in the Study Area is given in Figure 3.37

Educational Institutions in the Study Area



Anganwadi - Peraiyur



Govt Aided Middle School- Eraiur



Vivekananda Mat.Hr.sec. School-Keelapuliur



St.Anne's Middle School – Eraiur

Healthcare Facilities in the Study Area



Community Health centre-Keelapuliur



PHC- Neikuppai

Water supply system in the Study Area



Water tank-Pennankonam



Hand Pump system – Devaiyur South

Drainage system in the Study Area



Open Drainage - Devaiyur South



Open Drainage - Peraiyur

Figure 3.37: Photographs showing Infrastructure Facilities in the Study Area

3.9.5 Filed Survey and Investigation

Primary data collection was carried out through field surveys to document the availability of physical, social and economic infrastructure in the study area. Information was gathered through door-to-door surveys, interviews with residents, government officials, village heads, direct observations and photographic documentation of surveyed villages. The survey covered basic amenities such as drinking water, sanitation, education, healthcare, transportation, electricity supply, solid waste management and community resources.

3.9.6 Rationale behind selection of villages and sample size

The villages for primary data collection were selected based on:

- Proximity to the project site (Beneficiaries)
- Presence of vulnerable population groups (e.g., Scheduled Castes and Scheduled Tribes)

Table 3.38 presents the list of beneficiary villages its total population, and the sample size surveyed selected based on proportional representation.

Table 3.38: Populaiton of Beneficiary Villages in the Study Area

S. No	Village	Household	Total Population	Sample size
0-2km				
1	Eraiur	1,427	6,074	50%
2	Thevaiyur(North)	1,281	4,655	
	Total	2,708	10,729	
2-5km				
S. No	Village	Household	Total Population	Sample size
3	Peraiyur	725	2,600	40%
4	Thevaiyur (South)	788	2,794	
5	Thirumandurai	1,014	4,034	
6	Pennakonam (South)	899	3,932	
7	Peramathur (South)	874	3,406	
	Total	4,300	16,766	
5-10km				
S. No	Village	Household	Total Population	Sample size
8	Mettupalayam (South)	671	2538	10%
9	Ogalur (West)	230	915	
10	Malavarayanallur	175	633	
11	Keelapuliyur (North)	1,337	5,091	
Total		2,413	9,177	
Grand Total		9,421	36,672	
Sample Size			380	

The data collected during the primary survey in the select villages are complied and presented in Table 3.39. Photographs of household surveys and village interactions (Eraiur, Thirumandurai, Pennakonam, Keelapuliur, Peraiyur, Perumathur, Mettupalayam, Ogalur, Sirumathur, etc.) were collected as shown in Figure 3.38 to support field observations.

Table 3.39: Data Collected during Primary Survey in Select Villages

S.No	Parameters	Eraiur	Mangalam	Peraiyur	Thirumandurai	Pennan konam	Keelapuliyur North	Mettupalayam South	Ogalur West	Perumathur (South)	Thevaiyur (North)
1	Household	1427	376	725	1014	899	1337	671	230	874	1281
2	Occupation	MGNREGA Scheme, Daily Wagers,	Daily Wagers, Agriculture Labourer, Factories,	Weekly Labour, Maligai Business	MGNREGA Scheme, Daily Wagers,	Daily wage Labourer	Weekly wage labourers, Painters	Daily wagers, Painters	Daily wage Labourers Cattle rearing	Daily wage Labourers	Daily wage Labourers
3	Crops	Paddy	Sugarcane Paddy	Paddy, Cholan,	Groundnut	Paddy, Cholan	Groundnut, Sugarcane, Paddy	Sugarcane	Paddy, cholan	Groundnut, Sugarcane, Paddy	Groundnut, Sugarcane, Paddy
4	Drinking Water facilities	Panchayat Water	Panchayat Water	Panchayat Water	Panchayat Water	Piped Water Supply with water ATM	Piped Water Supply	Panchayat Water	Piped Water Supply	Piped Water Supply	Piped Water Supply
5	Schools	Primary school Adequate	Adequate	Adequate, Anganwadi & Primary school	Adequate	Adequate	Adequate	Primary school Adequate	Primary School, Anganwadi Adequate	Primary School, Anganwadi Adequate	Primary school Adequate
6	Hospitals	Adequate	Inadequate	Adequate	Inadequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
7	Electricity	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
8	Sanitation facilities-Toilets	Adequate	Adequate	Inadequate	Inadequate	Adequate	Adequate	Inadequate	Basic	Basic	Adequate
9	Transportation	Adequate	Adequate	Adequate	Inadequate	Inadequate	Inadequate	Adequate	Inadequate	Inadequate	Adequate
10	Public roads	Adequate	Adequate	Adequate	Inadequate	Adequate	Adequate	Adequate	Adequate	Basic	Basic
11	Bank/ATM	Adequate	Adequate	Basic	Basic	Basic	Basic	Basic	Basic	Basic	Basic
12	Market shops	Inadequate	Inadequate	Basic	Inadequate	Inadequate	Inadequate	Basic	Basic	Inadequate	Inadequate
13	Place of worship	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
14	Community self groups	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
15	Solid waste management	Adequate	Basic	Inadequate	Inadequate	Basic	Inadequate	Basic	Basic	Inadequate	Inadequate

**Thirumandurai (Panchayat President)****Pennankonam****Keelapuliur****Peraiyur****S.Aduthurai (Ogalur North)****Mangalam (Village discussion)****Mettupalayam North****Mettupalayam South****Figure 3.38: Photographs taken during Field Survey**

3.9.7 Factor Analysis

Factor analysis was applied to the primary survey dataset using SPSS (Version 26) software. Variables used included 15 socio-economic and demographic indicators,

such as occupation, income, education, toilet facility, housing type, drinking water, water quality, healthcare accessibility and household composition. The analysis utilized 380 valid samples. Each variable was standardized and principal component analysis (PCA) was used to extract meaningful factors explaining socio-economic conditions.

Dimension 1: Socio-economic Status

The factor (Eigenvalue: 2.515; 14.635% variance) reflected household amenities and demographic conditions.

- High positive factor loading was arrived for toilet facilities (0.894) showing availability of household toilets.
- Gender and number of graduates showed moderate improvement.
- Water bodies such as the Pennar River and perceived water quality also contributed positively.
- Negative loadings were arrived for age, family size, occupation type and housing type indicating that large households, temporary houses and daily-wage occupations still dominate the socio-economic landscape.

Dimension 2: Quality of Water and Working Status

The factor (Eigenvalue: 2.515; 14.635% variance) reflected Quality of Water and working status.

- Drinking water availability (0.833) and water quality (0.286) were arrived, indicating access to panchayat and borewell water that is generally perceived as safe.
- Positive loadings were arrived at for occupation suggesting active engagement of both men and women in work.
- Education and house type were weak contributors.
- Negative loadings for income and working population were arrived indicating relatively low and unstable earnings.

Dimension 3: Status of Workers in the Study Area

The factor (Eigenvalue: 1.708; 11.384% variance) reflected status of workers in the Study Area

- Positive loadings were arrived at for Number of graduates (0.788) and age (0.643) indicating improving literacy rate among both genders.
- Household size and occupation show moderate positive contributions.
- Negative loadings for Drinking water availability were arrived (-0.146), highlighting concerns about purification needs and the risk posed by open drainage near water sources.

3.9.8 Findings of the Primary Survey

Survey results indicate that facilities such as drinking water supply, electricity, schools, public roads and places of worship are generally adequate across the surveyed villages. Community self-help groups are also active.

During the survey, residents across villages have expressed the need for:

- Employment opportunities
- Improved transportation facilities
- Banking and ATM services
- Public toilets
- Primary healthcare centres and sub-centres
- Better drainage and sanitation infrastructure
- Strengthened community resources

No objections were raised against the proposed Industrial Estate. Residents indicated that the project would bring positive socio-economic benefits to the region. The community expects further improvement in livelihood opportunities.

3.10 TRAFFIC STUDY

A Traffic Study was carried out near Veppanthattai Village Entrance (Abutting National Highway (NH) 38 abutting the project site to assess the existing traffic during the morning and evening peak hours.

3.10.1 Methodology adopted for the Traffic Study

The following methodology was adopted to conduct the Traffic Study

- Identification of Road and Type of Carriageway
- Assessment of existing traffic conditions in the selected roads: Traffic count of vehicles under different heads (Two Wheelers, Three Wheelers, Four Wheelers, Six Wheelers and Others like Carts etc.) observed at every 30 min interval for 8 hours, Morning 7.00 am to 11.00 am and Evening 4.00 pm to 8.00 pm in the identified approach roads and recorded.
- Estimation of percentage composition of vehicles and conversion to equivalent Passenger Car Unit (PCU) factors.
- Volume- to- Capacity Analysis:
 - i) Estimation of incremental traffic volume (V) from proposed project in PCU's/hour.
 - ii) Capacity of Existing Road in PCUs per Hour as per IRC 106-1990 (C):
- Interpretation on Level of Service of the identified road from (V/C) value.

The traffic count of vehicles under different heads observed during the morning and evening hours is compiled in Table 3.40 and Table 3.41, respectively.

Table 3.40 – Traffic observed during Morning Peak Hours

Project Site: Proposed Development of Industrial Park				Location: Near Veppanthattai Village Entrance (Abutting National Highway (NH) 38 - Trichy - Thindivanam Highway)			
Type of Carriageway : (4 Lane – 2 Way)							
Time (hrs)	Two Wheelers (Motor cycle, Scooter)	Auto-rickshaw	Passenger cars, Pickup vans	Light commercial vehicles	Trucks & Buses	Bi-cycles	Other (Carts etc)
Morning Peak							
07.00 - 07.30	44	22	85	22	45	6	0
07.30 - 08.00	62	29	107	28	49	7	0
08.00 - 08.30	68	43	125	38	56	9	0
08.30 - 09.00	76	49	142	44	59	21	0
09.00 - 09.30	125	82	232	70	82	22	0
09.30 - 10.00	137	103	242	73	109	22	0
10.00 - 10.30	145	121	234	82	113	18	0
10.30 - 11.00	165	152	205	74	110	14	0
Total	821	602	1,371	430	622	118	0
Total Number of Vehicles							3,964
Percentage Composition	21	15	35	11	16	3	0
M. Factor	0.75	2.00	1.00	2.00	3.70	0.40	2.00
PCU	616	1204	1371	861	2301	47	0
Total No. of PCUs (For 4 Hrs)							6,399
Total No. of PCUs/Hr (Avg.)							1,600

Table 3.41 – Traffic observed during Evening Peak Hours

Project Site: Proposed Development of Industrial Park				Location: Near Veppanthattai Village Entrance (Abutting National Highway (NH) 38 - Trichy - Thindivanam Highway)			
Type of Carriageway : (4 Lane – 2 Way)							
Time (hrs)	Two Wheelers (Motor cycle, Scooter)	Auto-rickshaw	Passenger cars, Pickup vans	Light commercial vehicles	Trucks & Buses	Bi-cycles	Other (Carts etc)
Evening Peak							
16.00 - 16.30	52	40	95	24	62	5	0
16.30 - 17.00	63	27	96	43	67	10	0
17.00 - 17.30	71	40	107	52	86	13	0
17.30 - 18.00	78	45	117	75	105	18	0
18.00 - 18.30	97	57	154	94	109	13	0
18.30 - 19.00	111	75	178	113	140	16	0
19.00 - 19.30	120	88	197	118	165	9	0
19.30 - 20.00	148	110	157	105	184	7	0

Item Total	740	481	1,101	625	916	92	0
Total Number of Vehicles							3,955
Percentage Composition	19	12	28	16	23	2	0
M. Factor	0.75	2.00	1.00	2.00	3.70	0.40	2.00
PCU	555	961	1101	1251	3391	37	0
Total No. of PCUs (For 4 Hrs)							7,295
Total No. of PCUs/Hr (Avg.)							1,824

Table 3.42 - Traffic Summary

Existing Traffic Load in PCUs/hr	Increase in Vehicular Population due to Proposed Development	Estimated Future Traffic Volume in PCUs/hr (V)	Capacity of Existing Road in PCUs per hour as per IRC 106-1990 (C)	V/C Ratio
MP – 1600	844 PCUs/Hr	MP – 2444	3000 PCU	0.89
EP – 1824		EP – 2668		

3.10.2 Interpretation of V/C Ratio

The Volume to Capacity (V/C) ratio at the assessed location is 0.89. As per the Indian Roads Congress (IRC) guidelines, IRC:106-1990 and IRC:64-1990, V/C ratio below 1 indicates that the road operates under acceptable service conditions with no serious congestion or delay.

- **$V/C \leq 0.75$** – Excellent Level of Service: Free flow conditions.
- **$0.75 < V/C \leq 0.85$** – Good Level of Service: Stable flow, acceptable delays.
- **$0.85 < V/C \leq 1.0$** – Approaching capacity; increasing delays.
- **$V/C > 1.0$** – Oversaturated; unstable flow with frequent stoppages.

Therefore, a V/C ratio of 0.89 implies that the roadway is operating within its design capacity and no significant adverse impact is anticipated from the projected increase in traffic volume. The traffic circulation plan of the industrial estate is enclosed as Annexure VIII.

CHAPTER 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 INTRODUCTION

The chapter presents the assessment of various impacts due to the project activity in the study area. The construction and operational phase of the project comprise various activities each of which will have an impact on some or the other environmental parameter.

4.2 IDENTIFICATION OF IMPACTS

The "Matrix Method" was adopted for impact identification. This involves an understanding of the cause-condition-effect relationship between an activity and environmental parameters. The potential impact of the proposed project was evaluated both phase-wise and environmental component wise as below.

- Construction/Establishment Phase
- Operation Phase
- Decommissioning/ Closure Phase
- Accident/Emergency Phase

4.3 IMPACT AND MITIGATION MEASURES FOR MINIMIZING THE ADVERSE IMPACT IDENTIFIED DURING CONSTRUCTION PHASE

4.3.1 Air Environment

- The project activities that are likely to affect the air environment are site clearance and levelling, excavation, material storage and handling, generation and disposal of waste, vehicular movement and operation of temporary DG sets by individual industries.
- The aspects like increase in dust and particulate matter concentration, generation of dust clouds and dispersion of dust particles will cause the impact to the air environment.

The potential impacts are:

- Air emissions comprising of particulate matter (PM₁₀ and PM_{2.5}), carbon monoxide (CO) and sulfur dioxide (SO₂) from diesel-powered DG sets, manufacturing equipment and material handling/storage can lead to respiratory health issues such as cough, wheezing, shortness of breath, asthma exacerbation and pneumonia, especially among construction workers and residents in nearby areas.
- Ambient PM₁₀ concentrations may rise by 5–15 µg/m³, and PM_{2.5} by 2–5 µg/m³ above the baseline, especially during dry and windy conditions.

- Carbon monoxide (CO) emissions from DG sets and diesel machinery can bind with hemoglobin in the blood, reducing oxygen transport, which may lead to headaches, dizziness and fatigue upon prolonged exposure.
- Sulphur dioxide (SO₂) emissions, though moderate can aggravate bronchial symptoms and respiratory irritation in sensitive individuals.
- Fugitive dust and particulate emissions may cause reduced visibility in the working area and surrounding roads particularly during peak activity hours or windy days.
- The mitigation measures proposed are as follows:
 - Regular water spraying (3–4 times/day) on unpaved roads, excavation area and material handling areas to reduce airborne dust, especially during dry or windy conditions shall be done.
 - Fine construction materials like cement, sand and fly ash shall be stored in covered sheds or silos. All transport vehicles shall be covered with tarpaulin to prevent spillage and dust dispersion.
 - CPCB Stage II-compliant diesel generators and machinery with proper emission controls shall be installed.
 - Routine maintenance and servicing of all equipment to ensure optimal combustion and minimal emissions shall be done.
 - PPE's to workers involved in high-exposure tasks (excavation, drilling, etc.) shall be provided and regular health checks during peak construction phases shall be done.
 - Temporary barricade walls of heights ranging from 5m - 8m shall be installed all around the site to prevent the movement of dust from the inside to outside.

4.3.2 Noise Environment

- The project activities that are likely to affect the noise environment are site clearance, Leveling, Site excavation, Material Storage and Handling, Disposal of debris, Vehicular Movement, Usage of Power and Energy and use of heavy fabrication work (like cutting, welding, laying underground pipeline, etc.).
- The potential impact anticipated are:
 - An increase in day time noise in the project site (80 to 90 dBA) during working hours may cause fatigue to more serious issues such as cardiovascular disease, cognitive impairment, tinnitus and hearing loss.
 - Noise and vibration from operation of DG sets and Machinery (55–60 dB(A)) may cause annoyance, headache, high blood pressure etc. to workers and people in nearby areas.
 - Workers operating near high-noise equipment may be exposed to 80–90 dB(A) continuously for 8 hours, increasing the risk of noise-induced hearing loss, stress and fatigue.
 - Development activities such as excavation, leveling and the movement of heavy earth-moving vehicles will generate noise and vibration, which may

cause annoyance, headaches and discomfort to construction workers and nearby habitations.

- Also, an increase in noise level will make animals and birds relocate to a calm area for their habitation.
- Nuisance to local residents and Complaints may typically rise when noise exceeds ambient levels by 10 dB(A).

Noise prediction by Quantitative construction Noise assessment:

Equipment: Bulldozer

$$\begin{aligned}
 L_{eq}(equip) &= E.L + 10 \log(U.F) - 20 \log(D/50) - 10G \log(D/50) \\
 &= 85\text{dB(A)} + 10 \log(1) - 20 \log(440/50) - 10(0.66) \log(440/50) \\
 L_{eq}(equip) &= 60 \text{ dB (A)}
 \end{aligned}$$

Analysis:

- Predicted Noise Level at 440 ft from bulldozer: 60 dB(A)
- Permissible Residential Area Noise Limit (Daytime): 55 dB(A)
- Exceedance: 60–55=5 dB(A)
 - ✓ The nearest residential area is located 440 feet to the North direction of the Aaryuer village
 - ✓ The predicted bulldozer noise level exceed the residential daytime noise limit by 5 dB (A) even at a separation distance of 440 feet.
- The mitigation measures proposed are as follows:
 - Workers shall use earplugs or earmuffs and rotate shifts to limit continuous noise exposure to less than 8 hours/day.
 - Operation of heavy machinery shall be limited to 9:00 AM to 6:00 PM, avoiding nighttime disturbances.
 - Temporary barricade walls (noise barriers) of heights ranging from 5m - 8m shall be installed all around the site to contain the noise.
 - DG sets, compressors and generators shall be equipped with acoustic enclosures and high-efficiency silencers to reduce noise at the source.
 - Regular maintenance and lubrication of equipment/machinery shall be ensured.
 - Nearby residents shall be notified on peak construction schedules and set up a grievance redressal mechanism to address noise-related concerns.

4.3.3 Land Environment

The project activities that are likely to affect the land environment are site clearance and leveling of the site area, Soil excavation, Littering/spillage of Materials (like Paints, cement, etc.) and Infiltration of Leachate into the Soil.

The aspects like loss of soil fertility and micro species on the land, loss of topsoil and its nutrients, organic matter and biological activity, loss of Green Cover, decreasing soil stability, increasing soil erosion, contamination of soil, decreasing mineral content and reduction in the ion exchange capacity due to above said activities will cause the impact on the land environment.

- The potential impact anticipated are:
 - Loss of soil fertility and micro species on the land, loss of topsoil and its nutrients, organic matter and biological activity, loss of Green Cover, decreasing soil stability.
 - Increasing soil erosion, contamination of soil, decreasing mineral content and reduction in the ion exchange capacity due to above said activities.
 - Contamination of top soil by improper storage of diesel, lubricants and paints which will reduce the growth of flora and yield of the plants.
 - Accumulation of construction and demolition (C&D) wastes, such as concrete chunks, bricks and wood, can occupy valuable land area, block drainage and cause soil erosion or water stagnation. Approximately 40–60 kg of solid waste per square meter of built-up area is anticipated from the development.
- The mitigation measures proposed are as follows:
 - Stripping and stockpiling of topsoil (25 - 30 cm) shall be undertaken; this ensures its preservation for later use with its stored plant seeds and other organic matter. The stored topsoil shall be utilized in the area earmarked for the greenbelt.
 - Vegetation and other green cover shall be retained where possible to shield soil from erosion; by intercepting rainwater and improving soil permeability.
 - Vehicles and equipment shall be maintained to ensure no oil or fuel leakages. Oils, fuel and hazardous wastes shall be collected separately and shall be stored in earmarked location with impervious flooring and shall be disposed through authorized recyclers.
 - Hazardous and non-hazardous waste shall be segregated at source. C&D waste shall be sent to approved recycling facilities to dispose of hazardous waste as per HW Rules, 2016.
 - A waste collection and storage zone with impervious flooring and proper labeling shall be earmarked and implement a construction waste management system, with daily logbooks and authorized transporters.

4.3.4 Water Environment

The project activities that are likely to affect the water environment are water extraction/consumption, sewage generation and disposal, spillage of chemicals (such as Paint, additives, etc.).

The aspects of pollution are

- Surface runoff from demolition sites may carry sediments and pollutants into nearby water bodies, degrading water quality.
- The aspects like depletion of water resources and scarcity in the surrounding, Increased BOD level, Clogging of storm runoff due, presence of pathogens, odour issues due to above said activities will cause the impact on the water environment.
 - Total water demand (domestic and construction) is estimated to be 100 to 150 KLD, which could stress water suppliers and indirectly impact nearby users.
 - About 80% of domestic water requirement will be converted into sewage, if not properly treated, it can cause soil and groundwater contamination.
 - Water wastage is envisaged in conventional curing process.
 - Activities like concrete mixing generate wastewater with suspended solids, which may pollute nearby if discharged untreated.
 - Continuous movement of private tankers (10–15 trips/day) may lead to accidental spillage and deterioration, affecting the local area.
- The mitigation measures proposed are as follows:
 - Excavation shall be avoided during monsoon season.
 - Storehouse shall be earmarked at a distance away from the water storage area to prevent accidental release or spillage.
 - Silt fences, sediment traps and covered storm water drains shall be installed to prevent contaminated runoff.
 - Admixtures shall be used in the development activity to save water.
 - Preliminary coating with gunny bags before spraying of water shall be ensured.
 - Mobile STP shall be installed during construction phase to eliminate improper discharge of sewage.
 - A temporary drain with a silt trap shall be provided to collect the runoff during the monsoon.

4.3.5 Socio-Economic Environment

- The project activities that may have likely impact on the socio-economic environment are site clearance, leveling, excavation, heavy fabrication, cutting Gas works, Painting, etc., vehicular movement
- The aspects like generation of local employment trigger influx of local population, engagement of migrant workers, increase in revenue to the local government and changes in the economic pattern of the locals.
- The potential impact will be as follows:
 - The project will create direct jobs for approximately 100 to 150 local and migrant laborers, improving household incomes, especially in informal sectors
 - A temporary population influx of 100 workers may increase pressure on public utilities like water supply, sanitation and public transport.
 - Local retail trade will benefit from daily spending by the workforce, boosting local micro-businesses.

- Influx of migrant laborers may lead to cultural or social friction with host communities
- Informal or low-skilled laborers may be exposed to unsafe working conditions and inadequate medical access, increasing their health risk burden.

The mitigation measures proposed are as follows:

- Priority will be given to local workers and few outside workers will be engaged based on the requirements to mitigate the change in local demography, culture etc.
- Laborers will be screened for their health, age & background and NCLE principle shall be strictly followed.
- Comply with the safety procedures, norms and guidelines (as applicable) as outlined in the document Part 7 Constructional practices and safety, 2005, National Building code of India, Bureau of Indian Standards.
- Establish well-managed labor camps with separate water supply, toilets and waste management to reduce pressure on public services under the contractor scope.
- Procure daily-use materials (e.g., food, PPE, supplies) from local vendors to economically benefit surrounding communities.
- Conduct periodic community engagement sessions to address local concerns and promote peaceful coexistence.
- Ensure all workers are covered under ESI/insurance schemes and provided with health check-ups and PPE.

4.3.6 Biological Environment

- The project activities that are likely to affect the biological environment are Site Clearance and Leveling, Excavation, wastewater generation and disposal, disposal of debris and vehicular movement.
- The aspects like loss of native species, decrease in species density, Loss of natural resources, Dust settlement on Flora and Fauna in the surrounding area and loss of micro -species in the project site due to above said activities will cause an impact on the biological environment.
- The potential impacts will be as follows:
 - Felling of 8 fully grown trees in the Industrial Estate footprint.
 - Fragmentation of habitats and reduced availability of food sources for local fauna, including birds, reptiles, pollinators and small mammals.
 - Discharge of wastewater into water bodies will affect aquatic biodiversity in nearby ponds and streams.
 - Noise from construction activities potentially disturb wildlife, especially avifauna in agricultural and forest patches nearby.
 - Improper disposal of C&D wastes posing risks to small ground-dwelling animals.

The mitigation measures proposed are as follows:

- The nutrient-rich topsoil Top soil to the depth of 0.3 m to be collected and stored as the bund considering the soil quality and the same to be utilized for green belt development.
- Water baths and pots as well as feeding ground shall be set in the open area. This would also attract more birds thereby providing a natural and conducive atmosphere.
- Compensatory afforestation shall be undertaken at a ratio of at least 1:10 (Ten saplings for each tree removed) 80 trees of native drought-resistant species. A greenbelt of 10–15 meters as earmarked around the site boundary shall be implemented to act as a buffer and wildlife refuge.
- Biodiversity patches within the industrial estate shall be developed to provide nesting and foraging grounds for small animals and birds.
- Noise reduction measures as briefed in Section 4.3.2 shall be adopted as during ground breaking, clearance, levelling and excavation works.
- Transplantation of the felled trees shall be done in the proposed Green Belt area.
- Trees away from the Industrial Estate footprint shall be retained.

4.3.7 Geology & Hydrogeology:

Impacts:

- Geologically, The study area is underlain by the Charnockites, Granites and Gneisses traversed by Quartz and Pegmatite veins and the area falls under the moderate Seismic Zone II.
- The area is considered stable. There is no scope for landslide or land subsidence, erosion and major landscape modification etc.
- Excavation during development may intersect shallow aquifers, leading to water ingress and dewatering needs.
- Accidental spillage of oils, cement slurry, or chemicals during construction could contaminate shallow unconfined aquifers, especially given their high vulnerability.
- Sustainable manufacturing practices such as water-based adhesives and non-toxic dyes shall be used in the manufacturing process to prevent ground water contamination.
- Ground water levels and quality shall be monitored by constructing two piezometers well and fixing Automatic Water Level Recorder (AWLR) with a telemetric system within the estate to understand the likely impact on ground water system to take appropriate mitigation measures.
- There may not be much change in landscape and land-use patterns.

The mitigation measures proposed are as follows:

- Ensure the building design is aligned with IS 1893 for Seismic Zone II and anchor foundations into stable charnockite bedrock.
- Construct temporary storm water drains and silt traps around the site to ensure quick runoff and prevent water stagnation or flooding.
- Store fuels, oils, and chemicals on impermeable surfaces with secondary containment to prevent accidental leaching into aquifers.

The overall impact evaluation matrix for the construction phase is given below **Table 4.1**.

Table 4.1: Impact Evaluation Matrix – Construction Phase

Environmental Parameter	Project Activities	Aspect	Probable Impact	Type & Nature of Impact Direct /Indirect & Positive/ Negative	Significance				Mitigation/ EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (SXP)	Impact Scoring	
AIR ENVIRONMENT	Site Clearance & Leveling	Increase in dust & Particulate Matter (PM) concentration in ambient air	Create health Hazard to humans like Respiratory Problem, Lung Disorder, and Visual Impairment.	Direct & Negative	-2	3	-6	Minor	Yes
	Site excavation	Increase in dust & PM Concentration in ambient air	Create health hazard to humans leading to reduce in lungs performance and triggers lung diseases.	Direct & Negative	-3	2	-6	Moderate	Yes
	Material Storage & Handling	Increase in concentration of PM & Fugitive emission.	PM will create health hazard to human by passing through their bloodstream and Fugitive emissions will cause Respiratory related Diseases, cause irritation to eyes, nose and throat.	Direct & Negative	-2	3	-6	Minor	Yes
	Generation and disposal of debris	Generation of dust clouds	Will create health hazard to humans leading to reduce in lungs performance and triggers lung diseases.	Indirect & Negative	-2	2	-4	Minor	Yes
	Vehicular Movement	Increase in Concentration of PM, CO, NO ₂	PM will create health hazard to human related Respiratory Problems. CO will cause Blockage of oxygen supply when it reacts with hemoglobin upon inhaling	Direct & Negative	-3	3	-9	Moderate	Yes
	Generation of Dust during development activity	Dispersion of dust particles in ambient air due to development activities	Causes Respiratory Illness to the workers in the site and surrounding Reduces Visibility in the area	Indirect & Negative	-2	2	-4	Minor	Yes
	Operation of DG Sets	Increases PM concentration	PM will create health hazard to human related Respiratory Problems.	Indirect & Negative	-3	1	-3	Moderate	Yes

Environmental Parameter	Project Activities	Aspect	Probable Impact	Type & Nature of Impact Direct /Indirect & Positive/ Negative	Significance				Mitigation/ EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (SXP)	Impact Scoring	
NOISE ENVIRONMENT	Site Clearance & Leveling	Increase in Noise & Vibration due to Heavy Machinery works	Increase in noise will cause health hazard to humans like fatigue from lack of sleep to more serious issues such as cardiovascular disease, cognitive impairment, tinnitus and hearing loss.	Indirect & Negative	-2	2	-4	Minor	Yes
	Site excavation	Increase in Noise level due to Excavation work by Machineries		Direct & Negative	-2	3	-6	Minor	Yes
	Groundwork	Increase in Noise and Vibration due to filling of materials in the Foundation and reinforcement works	Also increase in noise level will make animals & birds to relocate to a calmer area for habitation.	Indirect & Negative	-2	2	-4	Minor	Yes
	Material Storage & Handling	Increase in Noise due to handling of Materials and equipment's used for movement & Storage	Increase in vibration will leads to fatigue, stomach problems, headache, loss of balance and "shakiness" shortly after or during exposure.	Indirect & Negative	-2	2	-4	Minor	Yes
	Disposal of debris	Increase in Noise due to transportation of the Waste		Indirect & Negative	-1	1	-1	Non – Significant	Yes
	Vehicular Movement	Increase in Noise due to Movement of Vehicles		Direct & Negative	-3	3	-9	Moderate	Yes
	Usage of Power & Energy	Increase in Noise due to DG Sets		Direct & Negative	-2	2	-4	Minor	Yes
	Heavy Fabrication Work (like cutting, welding, laying underground pipe line, etc.)	Increase in ambient noise level		Direct & Negative	-2	2	-4	Minor	Yes
LAND ENVIRONMENT	Site Clearance & Leveling	Loss in soil fertility/ Loss in micro species in the land	Reduces the possibility of proper plant growth in the land.	Direct & Negative	-3	2	-6	Moderate	Yes
		Loss of Top Soil	Leads to reduction in micro species in the surrounding area.						
		Loss of top soil functionality and reduces its nutrient, organic matter and biological activity.	Reduces the richness of the Top soil required for Flora						
	Soil excavation	Loss of Green Cover	Leads to increase in air & noise pollution. Reduces the Soil stability and increase in Soil erosion.	Direct & Negative	-2	2	-4	Minor	Yes
	Groundwork	Decrease the soil stability. Soil erosion	Decline in Organic Matter which leads to reduction in Flora and Fauna in the Surrounding.	Direct & Negative	-1	2	-2	Non – Significant	Yes
	Littering/ spillage of Construction Materials (like Paints, cement, etc.)	Loss of Soil Fertility	Reduces the possibility of proper plant growth in the land.	Direct & Negative	-3	3	-9	Moderate	Yes
		Decrease in Soil Nutrients due to chemicals contamination	Leads to reduction in micro species in the surrounding area.						

Environmental Parameter	Project Activities	Aspect	Probable Impact	Type & Nature of Impact Direct /Indirect & Positive/Negative	Significance				Mitigation/ EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (SXP)	Impact Scoring	
	Infiltration of Leachate into the Soil	Decreases the mineral content of the Top Soil	Reduction in the ion exchange capacity and in water and nutrient use efficiency.	Direct & Negative	-2	2	-4	Minor	Yes
WATER ENVIRONMENT	Water Extraction/Consumption	Depletion of Water resource in the surrounding	Will leads to water scarcity in the surrounding area.	Direct & Negative	-2	3	-6	Minor	Yes
	Sewage Generation & Disposal	Increase BOD level Presence of Bacteria & Pathogens Creates Foul odor	Increase in concentration of BOD & COD will reduces the concentration of Dissolved oxygen which will turn the water source into septic condition. Presence of Pathogens will cause health hazard to humans like diarrhea, vomiting, cramps, nausea, headaches, fever, fatigue, etc.	Direct & Negative	-2	2	-4	Minor	Yes
	Spillage of Chemicals (Such as Paint, additives, etc.)	Increase in chemical constituents of Surface / Ground Water Increases COD level in the water Changes in pH of the water	Increase in chemical concentration & pH above the threshold limit in surface water environment can lead to hazard to the aquatic species which may lead to loss of particular species.	Direct & Negative	-3	2	-6	Moderate	Yes
SOCIO ECONOMIC ENVIRONMENT	Site Clearance & Leveling, Excavation, Groundwork Works, Heavy Fabrication, Cutting, Gas Works, Painting, etc.	Generation of Local Employment	Increases the earning potential of the individual employee which leads to enhancements in the living standards	Indirect & Positive	+2	2	+4	Minor	Yes
	Resettlement & Rehabilitation of people	Influx of humans in the local area	Will leads to human settlement in the surrounding area and creates Indirect employment.	Indirect & Positive	+2	2	+4	Minor	Yes
	Vehicular Movement	Provides employment opportunity for the locals	Creates direct employment to the surrounding people	Indirect & Positive	+3	3	+9	Moderate	Yes
	Economic Activity	Increases revenue to the local government & local employee due to Direct and Indirect jobs Changes in Economic pattern of the Locals	Increases life standard of Local people Leads to improvement in infrastructure of the surrounding area.	Indirect & Positive	+2	2	+4	Minor	Yes
	Public Health & Safety	Vulnerable to diseases in new environment	Will create Occupational Health Hazard to the employee in the surrounding area.	Indirect & Negative	-2	2	-4	Minor	Yes
BIOLOGICAL ENVIRONMENT									
	Site Clearance & Leveling	Habitat loss of native species	Leads to species isolation, reduces the	Direct & Negative	-2	2	-4	Minor	

Environmental Parameter	Project Activities	Aspect	Probable Impact	Type & Nature of Impact Direct /Indirect & Positive/ Negative	Significance				Mitigation/ EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (SXP)	Impact Scoring	
		Loss of Species Decrease in Species Density	area where they can live, and creates new ecological boundaries.	Direct & Negative	-2	2	-4	Minor	Yes
	Site excavation & Foundation Works	Loss of natural resources	Loss of Micro Biodiversity in the surrounding area due to loss of top soil	Direct & Negative	-1	1	-1	Non – Significant	Yes
	Generation and disposal of construction waste	Dust Settlement on Flora & Fauna in the Surrounding area	Reduces the plant and animal growths, reduced chlorophyll of plants, and creates respiratory diseases in animals, eye defects, etc.	Indirect & Negative	-2	3	-6	Minor	Yes
	Vehicular Movement	Loss of Micro Species in the Project Site		Direct & Negative	-2	2	-4	Minor	Yes

4.4 IMPACT AND MITIGATION MEASURES FOR MINIMIZING THE ADVERSE IMPACT IDENTIFIED DURING OPERATION PHASE

This stage is highly critical as it may lead to lasting consequences. The activities involved in operating the proposed project are expected to bring about both favorable and adverse effects on the surrounding region. The potential impacts are anticipated across the following environmental components:

- Air Environment
- Noise Environment
- Water Availability and Quality
- Soil Characteristics, Land Use and Landscape
- Ecology and Biodiversity
- Socio-economic Environment

4.4.1 Air Environment

Phoenix Kothari Private Limited has not proposed DG sets as backup power supply for common infrastructure facilities, Hence air emission is envisaged from the manufacturing process of individual industries and the DG sets that will be installed as power back up. Individual industries will be mandated to install air pollution control systems in line with CPCB/TNPCB regulations.

Baseline monitoring of ambient air quality shows that concentrations of PM₁₀, PM_{2.5}, SO₂, and NO₂ are within the National Ambient Air Quality Standards (NAAQ) applicable to industrial, residential, rural and other areas. With the commencement of proposed operations, the primary emissions expected include particulate matter, sulphur dioxide, nitrogen oxides and carbon monoxide. Incremental Ground Level Concentrations after the establishment of the proposed industrial estate was determined using AERMOD and CALINE modeling. The results are attached as Annexure XI.

Mitigation Measures

Based on the results it is observed that the total concentrations of PM, SO₂, NO_x, and CO from the uncontrolled emissions of the proposed project remain well within the National Ambient Air Quality Standards (NAAQS). Therefore, the proposed project is anticipated to have an insignificant impact on the surrounding environment and nearby habitations. Nevertheless, the following mitigation measures are recommended to further minimize potential impacts:

- All individual industries will be instructed to provide adequate stack height for the DG Sets in accordance with CPCB/TNPCB guidelines.
- Regular ambient air quality monitoring shall be conducted at identified locations to compare actual monitored values with the predicted concentrations.
- Any exceedance of NAAQS shall be thoroughly investigated and the efficiency of the Air Pollution Control systems shall be reviewed.
- Water sprinkling shall be implemented on internal roads to control dust generation.
- A greenbelt covering 43.03 acres will be developed to enhance air quality and act as a buffer.

4.4.2 Noise Environment

During the operation phase of the industrial estate, various industrial activities can contribute to elevated noise levels within and around the project area. Major noise sources typically include continuous operation of machinery, compressors, pumps, generators, material handling equipment, loading/unloading operations, and increased vehicular movement for transportation of goods and workforce. These sources may generate steady, intermittent, or impulsive noise depending on the type of industry operating within the estate.

The anticipated impacts are

- Prolonged exposure to elevated noise levels can cause potential health impacts including annoyance, stress, sleep disturbance, and reduced work efficiency.
Disturbance of sleep due to operation of industries during night
- Ecological receptors, especially fauna, may also experience disturbance due to continuous industrial noise.

The proposed mitigation measures are

- Acoustic management such as enclosures for DG Sets and machinery and dampers for equipment causing vibration and noise shall be used.
- Development of greenbelt shall be done along the periphery of individual industries and in common areas of the estate as a buffer.
- Enforcement of equipment maintenance schedules to avoid noise due to wear and tear

- Zoning of noisy operations to day time and avoid operations during night hours
- Regular monitoring of ambient noise levels to ensure compliance and minimize adverse impacts on the noise environment.

4.4.3 Water Environment

There will be no abstraction of Ground Water in the Industrial Estate. The fresh water requirement for the Industrial Estate will be supplied through SIPCOT water supply scheme. The water concurrence is enclosed as Annexure – XIII.

The anticipated potential impacts are

- Discharge of untreated sewage / effluent from the project activity can adversely affect the physico-chemical and biological conditions of nearby surface water bodies, leading to deterioration of water quality and aquatic life.
- Runoff from paved areas carry sediments, oils, chemicals and solid waste end up into nearby drains or water bodies thereby polluting the same.
- Decline in groundwater levels due to extraction for industrial use or domestic demand within the estate.
- Contamination of aquifers through seepage of untreated wastewater, leakages from pipelines, storage areas, or unlined disposal sites.

The proposed mitigation measures are

- Individual Industries within the Industrial Estate shall install their own STPs and ETPs.
- The sewage generated from the industries shall be utilized for flushing, greenbelt development within the industrial estate.
- The effluent generated from the process, utilities of each industry shall be treated in their own ETPs, and the treated effluent shall be reused for their own process and utilities.
- Every industry shall adopt Zero Liquid Discharge (ZLD).
- Install oil and grease traps in vehicle parking, workshop, and loading/unloading areas.
- Implement a solid and hazardous waste management system to prevent discharge of contaminants.
- Maintain regular monitoring of groundwater quality and levels through observation wells.
- The treated sewage and treated effluent characters shall meet the CPCB/TNPCB norms.
- Implement a Water Conservation Plan: flow meters, leak detection, recycling loops.
- Train workers on safe handling of chemicals to avoid spills.
- Prepare a spill control and emergency response plan for accidental releases.
- Install automatic shut-off valves and alarms in storage and treatment systems.

4.4.4 Land Environment

- The project activities that are likely to affect the land environment are Spillage of used oil from DG Sets, Spillage of untreated Sewage, Rainwater Harvesting, Improper storage and disposal of Solid Waste and Soil contamination due to leachate.
- The aspects like contamination of heavy metals and Contamination of topsoil, Increase/Decrease in pH and decrease in soil nutrients will have an impact on the land environment.

The anticipated potential impacts are

- Soil contamination from leakage or spillage of fuels, oils, chemicals, hazardous waste and solid waste.
- Disposal of biodegradable waste from individual industries may lead to anaerobic decomposition, resulting in foul odour and leachate contaminating surface/groundwater.
- Accumulation of non-biodegradable waste from individual industries, if not collected daily may cause land littering, soil pollution affecting the green belt and promote pest infestation.
- Improper disposal of ETP salt will result in localized soil contamination affecting the green belt and nutrient imbalance.
- Spillage of used oil (hazardous waste from DG sets) on unpaved ground can result in reduced soil fertility and contamination.

The proposed mitigation measures are

- Each industry shall mandate Zero Liquid Discharge (ZLD) to avoid discharge of sewage and effluent on land.
- Provide impervious flooring in fuel storage, chemical handling, and hazardous waste areas.
- Use of spill containment systems, drip trays, and bunds to prevent soil contamination.
- Regularly monitoring of soil quality for pH, heavy metals and organic matter.
- Solid Waste Management Plan as per SWM Rules, 2016 shall be implemented.
- Ensure segregation, collection, storage, and disposal of waste through authorized vendors or facilities.
- Handle hazardous waste as per Hazardous and Other Wastes Rules, 2016 with proper labeling, storage and disposal.

4.4.5 Socio Economic Environment

- These activities are expected to bring positive socio-economic impacts such as increased employment opportunities for both skilled and unskilled workers,

promotion of local business activities, improvement in living standards and overall economic growth in the surrounding region.

- Furthermore, the establishment of industries will enhance ancillary business opportunities, strengthen local infrastructure and create a safer and more structured working environment through the adoption of proper occupational health and safety measures.
- However, impacts such as increased traffic movement, pressure on local utilities and minor socio-cultural changes may occur, which can be effectively mitigated through proper planning, community engagement and implementation of corporate social responsibility (CSR) / corporate environmental responsibility (CER) initiatives.

The anticipated impacts are

- **Employment Generation:** The establishment of the industrial park will create direct and indirect employment opportunities during both construction and operation phases, improving the local economy.
- **Infrastructure Development:** Development of roads, power supply, water supply and communication facilities will improve the overall infrastructure in the surrounding areas.
- **Boost to Local Economy:** Increased demand for goods and services (transport, accommodation, food and utilities) will support local businesses and traders.
- **Skill Development:** Training and employment opportunities will enhance the technical skills and livelihood potential of the local population.
- **Increased Influx of Population:** The migration of workers and professionals may create pressure on local housing, water supply, sanitation and healthcare facilities.
- **Socio-Cultural Changes:** The influx of people from diverse regions may lead to cultural shifts and potential social tensions if not managed properly.
- **Traffic Congestion and Noise:** Increased movement of vehicles during construction and operational phases may affect local traffic and cause temporary inconvenience.
- **Pressure on Public Utilities:** Higher demand for water, electricity and waste management services may strain existing local resources if not adequately planned.

Mitigation Measures

- **Employment Priority:** Give preference to local residents for skilled and unskilled employment to enhance community support and reduce migration pressure.
- **Skill Development Programs:** Conduct vocational and technical training programs in collaboration with local institutions to build local capacity.

- Infrastructure Support: Strengthen local infrastructure such as roads, drainage, and community amenities through corporate social responsibility (CSR) initiatives.
- Traffic Management: Develop an internal traffic management plan, provide separate entry/exit points for heavy vehicles, and schedule transportation during non-peak hours.
- Community Health and Welfare: Periodic health check-up camps, awareness programs on hygiene, and provision of clean drinking water and sanitation facilities for workers and nearby communities.
- Stakeholder Engagement: Maintain continuous dialogue with local communities and authorities to address concerns and ensure inclusive development.
- CSR/CER Initiatives: Implement community development programs focusing on education, healthcare, women empowerment and infrastructure improvement.

4.4.6 Biological Environment

- The project activities that are likely to affect the biological environment are increase in Fugitive emissions and emissions due to operations of equipment like DG Sets, STP, ETP and process machineries by the individual industries.
- The aspects like Disorder/Diseases/Loss of Flora and Fauna in the Local area and improved organic matter of the soil will have an impact on the biological environment.
- There is no Eco Sensitive / Wild Life Sanctuaries within the 10km radius.

The anticipated potential impacts are

- Reduced vegetation health due to deposition of air pollutants such as dust, SO₂, NO_x and particulate matter from industrial activities or vehicle movement.
- Loss of native plant diversity by spread of invasive species spread in disturbed areas.
- Disturbance to fauna due to increased noise, lighting, and continuous human activity.
- Avoidance of habitat by sensitive species because of elevated noise levels, vibrations and increased vehicular traffic.
- Possible displacement of avifauna (birds) due to lights pollution and increased noise disrupting nesting and feeding patterns.
- Risk of wildlife mortality from road kills due to increased traffic within and around the estate.
- Reduced availability of resources (water, shelter, food) for small mammals, reptiles, and insects as natural open areas shrink.

The proposed mitigation measures are

- Develop a dense greenbelt along the project boundary to act as a pollution buffer and noise barrier.
- Construct stormwater drains, silt traps and sedimentation pits to prevent runoff or contamination of nearby water bodies.
- Avoidance of bright, upward-focused lighting; using wildlife-friendly lights.
- Ensure all emissions, noise and effluent discharges remain within CPCB/TNPCB prescribed standards through effective pollution control systems.
- Adopt waste segregation and disposal practices to ensure that no solid or liquid waste is discharged outside the project premises.

4.4.7 Greenbelt Development

The total greenbelt area of 43.03 acres of Industrial Park will be provided. The list of existing trees are given in Table 3.25.

Out of the total 38 nos. of existing trees within the project site, 30 nos. of trees will be retained as they are located along the project periphery. Apart from this 8 nos. of trees which area located in the proposed road route and common areas will be removed. To compensate for this loss, a total of 80 trees will be planted within the proposed Industrial Park, following a 1:10 ratio. The plantation will primarily consist of native species as detailed in Table 4.2. The Green Belt layout with geographical coordinates of the greenbelt development is enclosed as Annexure - XIII. The tree plantation within the project site will also be carried out in consultation with the State Forest Department.

Table 4.2 – Proposed Native Species for Greenbelt Development

S.No	Scientific Name	Family	Common Name	Tamil Name	Method of Propagation
Trees					
1.	<i>Ailanthus excelsa</i>	Simaroubaceae	Tree of heaven	Perumaram	Seed
2.	<i>Azadirachta indica</i>	Meliaceae	Neem	Veppa	Seed, Cuttings, Root Suckers
3.	<i>Bauhinia racemosa</i>	Caesalpiniaceae	Bidi Leaf Tree	Aatthi	Shoot Cuttings
4.	<i>Bombax ceiba</i>	Malvaceae	Indian bombax	Mullilavu	Seed
5.	<i>Borassus flabellifer</i>	Arecaceae	Palmyra palm	Talam	Seed
6.	<i>Butea monosperma</i>	Fabaceae	Flame of	Kincukam	Seed

S.No	Scientific Name	Family	Common Name	Tamil Name	Method of Propagation
			the forest		
7.	<i>Cassia fistula</i>	Caesalpiniaceae	Indian Laburnum	Sarakkonna i	Seed
8.	<i>Casuarina equisetifolia</i>	Casuarinaceae	Australian pine	Savukku	Rooting of Young Shoots
9.	<i>Chloroxylonswietenia</i>	Rutaceae	Indian Satinwood	Porasu	Seed, Seedling, Root Suckers
10.	<i>Commiphoracaudata</i>	Burseraceae	Hill mango	Pachaikiluvai	Semi-Hardwood Cutting
11.	<i>Dalbergia sissoo</i>	Fabaceae	Sissoo	Sissoo	Seed, Stem Cuttings
12.	<i>Dichrostachyscinerea</i>	Mimosaceae	Sicklebush	Vedathalaa	Root Cuttings
13.	<i>Drypetesepiaria</i>	Putranjivaceae	Hedge Boxwood	Vellilambu	Seed
14.	<i>Erythrina indica</i>	Fabaceae	Indian Coral Tree	Kalyanamurungai	Large Cuttings
15.	<i>Hardwickiabinata</i>	Caesalpiniaceae	Anjan	Aacha	Air Layering
16.	<i>Lagerstroemia speciosa</i>	Lythraceae	Pride of India	Kadali	Juvenile Shoot Cuttings
17.	<i>Phyllanthus emblica</i>	Phyllanthaceae	Indian gooseberry	Nelli	Semi Hardwood Cuttings
18.	<i>Polyalthialongifolia</i>	Annonaceae	Cemetery tree	Vansulam	Seed
19.	<i>Pterocarpus marsupium</i>	Fabaceae	Bastard teak	Vaengai	Freshly Collected Seed
20.	<i>Terminalia arjuna</i>	Combretaceae	Arjun	Vella maruthu	Rooted Stem Cuttings
21.	<i>Vachellialeucophloea</i>	Mimosaceae	White babul	Velvaalam	Seed

S.No	Scientific Name	Family	Common Name	Tamil Name	Method of Propagation
22.	<i>Ziziphusmauritiana</i>	Rhamnaceae	Indian jujube	Ilanthai	Seed
Shrubs					
1.	<i>Barleriacristata</i>	Acanthaceae	Philippine violet	December Poo	Seed & Cuttings
2.	<i>Calotropis gigantea</i>	Apocynaceae	Crown flower	Malaiyerukku	Seed or Stem Cuttings
3.	<i>Canthiumcoromandelicum</i>	Oleaceae	Sambac	Madurai Malli	Stem Cuttings
4.	<i>Capparis brevispina</i>	Euphorbiaceae	Belly-ache Bush	Adalai	Stem Cuttings
5.	<i>Capparis spinosa</i>	Acanthaceae	Malabar nut	Adathodai	Rooted Cuttings
6.	<i>Carissa carandas</i>	Lythraceae	Henna	Marudani	Seed & Stem Cuttings
7.	<i>Carissa spinarum</i>	Euphorbiaceae	Castor oil plant	Amanakku	Seed & Cuttings
8.	<i>Clerodendrum japonicum</i>	Apocynaceae	Oleander	Chevarali	Cuttings
9.	<i>Clerodendrumpaniculatum</i>	Rhamnaceae	Zunna berry	Thodali	Seed
10.	<i>Colubrina asiatica</i>	Rubiaceae	Coromandel Canthium	Nallakkarai	Seed
11.	<i>Crossandrainfundibuliformis</i>	Capparaceae	Indian Caper	Karotti	Seed & Cuttings
12.	<i>Euphorbia antiquorum</i>	Capparaceae	Small flowered spiny caper	Curai	Cuttings
13.	<i>Flueggealeucopyrus</i>	Apocynaceae	Karanda	Kalakkai	Seed, Cutting, Layering & Budding
14.	<i>Jasminum sambac</i>	Apocynaceae	Wild Karanda	Chirukila	Cuttings

S.No	Scientific Name	Family	Common Name	Tamil Name	Method of Propagation
15.	<i>Jatropha gossypifolia</i>	Laminaceae	Cat's Whiskers	Poonaiméesai	Stem Cuttings
16.	<i>Justicia adhatoda</i>	Verbenaceae	Sage Glory Bower	Taluddai	Root Cuttings
17.	<i>Lawsoniainermis</i>	Verbenaceae	Japanese Glorybower	Mysore malligai	Cuttings
18.	<i>Nerium oleander</i>	Verbenaceae	Pagoda Flower	Krishna Kireedam	Cuttings
19.	<i>Ricinus communis</i>	Acanthaceae	Firecracker flower	Kanakamparam	Rooted Stem Cuttings
20.	<i>Senna auriculata</i>	Rhamnaceae	Wild jujube	-	Seed & cuttings
21.	<i>Sidarthombifolia</i>	Euphorbiaceae	Tree Spurge	Chathurakalli	Cuttings
22.	<i>Tabernaemontana divaricata</i>	Fabaceae	Shrubby pencil flower		Seed & Cuttings
23.	<i>Ziziphus nummularia</i>	Malvaceae	Arrowleaf Sida	Chittamaddi Kurundotti	Seed
24.	<i>Ziziphus rugosa</i>	Fabaceae	Tanne's Cassia	Avarai	Seed and Stem Cutting
Sub-shrubs					
1.	<i>Indigofera longiracemosa</i>	Fabaceae	True Indigo	Avuri Neeli	Cutting
2.	<i>Jatropha heynei</i>	Fabaceae	Grey snoutbean		Seed, Root Stock
3.	<i>Rhynchosiacana</i>	Euphorbiaceae	Heyne's Jatropha	-	Seeds or Cuttings
Climbers					
1.	<i>Basella alba</i>	Fabaceae	Indian redwing	Karuindu	Cuttings
2.	<i>Merremia hederacea</i>	Convolvulaceae	Ivy Woodrose	Elikkatutali	Seed and Cuttings

S.No	Scientific Name	Family	Common Name	Tamil Name	Method of Propagation
3.	<i>Pterolobiumhexapetalum</i>	Basellaceae	Ceylon Spinach	Vasalakkirai	Tip Cuttings
Herbs					
1.	<i>Alysicarpus vaginalis</i>	Euphorbiaceae	Indian acalypha	Kuppaimeni	Stem Tip Cutting
2.	<i>Crinum asiaticum</i>	Amaryllidaceae	Spider Lily	Nari-venkayam	Bulb
3.	<i>Cenchrusorientalis</i>	Poaceae	Oriental fountain grass	-	Seed, Division
4.	<i>Artemisia japonica</i>	Asteraceae	Japanese Wormwood	-	Seed
5.	<i>Kalanchoe laciniata</i>	Crassulaceae	Christmas tree plant	Kattu Pirandai	Offset/ Stem Cutting
6.	<i>Celosia argentea</i>	Amaranthaceae	Silver spiked cockcomb	Makili-kirai	Seed, Cutting
7.	<i>Verbascumthapsus</i>	Scropulariaceae	Great Mullien		Seed
8.	<i>Cymbopogon flexuosus</i>	Poaceae	Cochin grass	Karppurappu	Seed

4.4.8 Impact Evaluation Matrix

The impact evaluation for the operation phase is provided below **Table 4.3**.

Table 4.3: Impact Evaluation Matrix – Operation Phase

Environmental Parameter	Project Activities	Aspects	Probable Impact	Type & Nature of Impact Direct / Indirect & Positive/Negative	Significance				Mitigation / EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (S X P)	Impact Scoring	
AIR ENVIRONMENT	Operation of DG Sets, STP, ETP & Other Equipment by Individual Industries	Increase in emissions like SO ₂ , NO ₂ , and Particulate matter	Causes Health hazards to humans such as Respiratory Problems, Lung Disorders, and Visual Impairment, etc.	Direct & Negative	-2	3	-6	Minor	Yes
	Usage of Power and Energy	Usage of High-Speed Diesel releases CO, PM, SO ₂ into the atmosphere	Causes Health hazards to humans such as Respiratory Problems, Lung Disorders, and Visual Impairment, etc.	Direct & Negative	-2	3	-6	Minor	Yes
	Movement of Vehicles	Generation of Dust Clouds, Increases the concentration of PM, NO ₂ , CO	Causes Health hazards to humans such as Respiratory Problems, Lung Disorders, and Visual Impairment, etc.	Direct & Negative	-3	4	-12	Moderate	Yes
NOISE	Operation of	Increase in Noise	Increase in noise	Direct & Negative	-2	3	-6	Minor	Yes

Environmental Parameter	Project Activities	Aspects	Probable Impact	Type & Nature of Impact Direct / Indirect & Positive/Negative	Significance				Mitigation / EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (S X P)	Impact Scoring	
ENVIRONMENT	DG Sets, STP, ETP & Other Equipment by Individual Industries		will cause health hazard to humans like fatigue from lack of sleep to more serious issues such as cardiovascular disease, cognitive impairment, tinnitus and hearing loss. Also increase in noise level will make animals & birds to relocate to a calmer area for habitation. Increase in vibration will leads to fatigue, stomach problems, headache, loss of balance and "shakiness" shortly after or during exposure.	Indirect & Negative	-2	2	-4	Minor	Yes
	Vehicular Movement	Increase in Noise		Direct & Negative	-3	4	-12	Moderate	Yes
Land Environment	Spillage of Spent Oil from DG Sets by Individual Industries	Contamination of Heavy Metals in the Soil	Reduces the growth of Flora Reduces Yield of the plant in the contaminated Soil	Direct & Negative	-2	2	-4	Minor	Yes
	Spillage of untreated Sewage / Effluent by Individual Industries	Decreases the DO concentration in Soil Creates Fly nuisance in the surrounding	Turns the soil into a septic condition (anaerobic) which is not suitable for Flora Creates nuisance to humans due to flies breeding due to sewage disposal on ground.	Direct & Negative	-3	1	-3	Moderate	Yes
	Rainwater Harvesting	Improving the Ground Water Storage	Increases ground water storage and reduce the dependency on freshwater due to harvesting rainwater.	Direct& Positive	+3	3	+9	Moderate	Yes
	Improper Storage and Disposal of Solid Waste by Individual Industries	Creates Fly nuisance in the surrounding Contamination of Top Soil	Unhygienic conditions and the spread of diseases to the humans	Indirect & Negative	-2	2	-4	Minor	Yes
	Soil Contamination due to leachate	Increase/Decrease in pH and Constituents of Soil	Reduction in the ion exchange capacity and water and nutrient use efficiency.	Indirect & Negative	-2	2	-4	Minor	Yes
	Green Belt Development/ Increase in Green Cover	Increases the Soil Stability, Soil Nutrients.	Increases the richness of Top Soil Reduces the Air/Noise pollution level within the site boundary	Direct& Positive	+3	2	+6	Moderate	Yes
WATER ENVIRONMENT	Extraction of Surface/Ground Water	Reduces the availability of Water to the surrounding people and activity	This will leads to water scarcity in the surrounding area.	Direct & Negative	-3	3	-9	Moderate	Yes
	Operation of STP, ETP & Other Equipment by Individual	Recycling & reuse of water	Reduces Water Consumption and dependency on fresh water for domestic activity	Direct& Positive	+3	2	+6	Moderate	Yes

Environmental Parameter	Project Activities	Aspects	Probable Impact	Type & Nature of Impact Direct / Indirect & Positive/Negative	Significance				Mitigation / EMP Proposed
					Significant (S)	Probability (P)	Total Weightage (S X P)	Impact Scoring	
	Industries	Mixing of Sewage to the nearby Natural Drain	An Increase in the concentration of BOD & COD will reduce the concentration of Dissolved oxygen which will turn the water source into a septic condition. The Presence of Pathogens will cause health hazards to humans like diarrhea, vomiting, cramps, nausea, headaches, fever, fatigue, etc.	Direct & Negative	-3	3	-9	Moderate	
		Increase in Sewage generation due to Housekeeping activities		Direct & Negative	-2	2	-4	Minor	
	Rainwater Harvesting	Use harvested water for infiltration Collecting the rainwater for future use by storing	Reduced the dependency on freshwater from Surface / Ground Water Increases Groundwater table in the vicinity.	Direct& Positive	+3	2	+6	Moderate	Yes
SOCIO ECONOMIC ENVIRONMENT	Industrial	Increases the employment opportunities	Improve the lifestyle and local infrastructure of the local area.	Direct& Positive	+3	2	+6	Moderate	Yes
	Operation of STP, ETP & Other Equipment by Individual Industries	Avoiding the direct disposal of sludge to the nearby surrounding	Act as manure on composting which helps to improve the topsoil richness and helps the plant growth.	Direct& Positive	+3	3	+9	Moderate	Yes
	Rainwater Harvesting	Increase the water level of the surrounding	Increases the groundwater table and availability of water to the surrounding people and activities.	Direct& Positive	+3	2	+6	Moderate	Yes
	Transportation of Raw Materials & Products	Increase in Local Employment	Improve the lifestyle and local infrastructure of the local area.	Direct& Positive	+3	3	+9	Moderate	Yes
	Implementation of Occupational Health & Safety Practices	Healthy and Safe working environment for the employees	Creates a better and healthy workplace for the employees	Direct& Positive	+2	3	+6	Minor	Yes
BIOLOGICAL ENVIRONMENT	Increase in Fugitive emission & Emissions due to operations of Equipment's like DG Sets, STP and ETP by individual industries	Disorder/Diseases/Loss of Flora and Fauna in the Local area	This leads to species isolation, reduces the area where they can live, and creates new ecological boundaries.	Direct & Negative	-3	2	-6	Moderate	Yes
	Usage of Manure for Green Belt	Improved organic matter in the Soil	Increases the richness of the topsoil which will help the plant growth	Direct & positive	+3	2	+6	Moderate	Yes

The impact evaluation for the accidental/emergency phase of the project is given in the below Table 4.4.

Table 4.4: Impact Evaluation Matrix – Accidental/Emergency Phase

Environmental Parameter	Project Activities	Aspects	Probable Impacts	Type & Nature of Impact Direct /Indirect & Positive/Negative	Significance				
					Significant (S)	Probability (P)	Total Weightage (S X P)	Impact Scoring	Mitigation / EMP Proposed
AIR ENVIRONMENT	Earthquake	Probable release of Dust into the atmosphere	Will create health Hazard to humans like Respiratory Problems, Lung Disorders, and Visual Impairment. Also, create health hazard/Loss of the fauna present in the surrounding	Indirect & Negative	-3	2	-6	Moderate	Yes
	Fire Accident	Increase of emissions to the atmosphere		Direct & negative	-3	2	-6	Moderate	Yes
	Spillage or Accidental Release of Substances	Increase of Chemical concentration in the atmosphere		Direct & negative	-3	3	-9	Moderate	Yes
NOISE ENVIRONMENT	Earthquake	Increase in ambient Noise	An increase in noise will cause health hazards to humans like fatigue from lack of sleep to more serious issues such as cardiovascular disease, cognitive impairment, tinnitus and hearing loss. Also, an increase in noise level will make animals & birds to relocate to a calmer area for habitation.	Indirect & Negative	-2	2	-4	Minor	Yes
	Fire Accident	Impulsive Noise due to fire Accident		Indirect & Negative	-2	2	-4	Minor	Yes
LAND ENVIRONMENT	Flood	Topsoil Removal Reduces Soil Stability Leaching of Soil nutrients like organic matter, NPK, etc.	The reduction of Topsoil and Soil nutrients will lead to a reduction in floral growth and loss of microspecies density in the surrounding.	Direct & negative	-3	3	-9	Moderate	Yes
WATER ENVIRONMENT	Flood	Contamination of Surface Water	Contamination of the water leads to an increase in health hazards to human loss of aquatic species	Direct & negative	-2	2	-4	Minor	Yes
	Fire Accident	Contamination of Surface Water		Direct & negative	-2	2	-4	Minor	Yes
SOCIO-ECONOMIC ENVIRONMENT	Earthquake	Loss of Livelihood of people Damage to the Plant and types of machinery on the project site	Property Damage and Loss of Humans and animals.	Direct & negative	-2	2	-4	Minor	Yes
	Flood	Loss of Livelihood of people		Direct & negative	-2	2	-4	Minor	Yes
	Fire Accident	Loss of lives & Property		Direct & negative	-2	2	-4	Minor	Yes
BIOLOGICAL ENVIRONMENT	Earthquake	Migration of Faunal Species	This leads to species isolation reduce the area where they can live, and creates new ecological boundaries.	Indirect & Negative	-2	2	-4	Minor	Yes
	Flood	Loss of Flora & Fauna species		Direct & negative	-3	2	-6	Moderate	Yes
	Fire Accident	Loss of Flora & Fauna species	Reduction in Species Diversity and its density	Direct & negative	-3	2	-6	Moderate	Yes
RISK AND HAZARD	Fire Hazard	Fire due to Spillage or Leak of Chemical/Electrical in the warehouse	Possibility of injury or loss of lives of people in the near surroundings.	Direct & negative	-3	2	-6	Moderate	Yes
	Electrical Hazard	Electrocution due to Electrical items	Loss/injury to the employee	Direct & negative	-2	2	-4	Minor	Yes
	Slips, Trips & Fall	Falling of objects from Heights	Injury/Loss of employee	Direct & negative	-3	2	-6	Moderate	Yes

The impact evaluation for the Closure phase of the project is given in the below **Table 4.5**.

Table 4.5: Impact Evaluation – Closure Phase

Environmental Parameter	Project Activities	Aspect	Probable Impact	Type & Nature of Impact Direct /Indirect & Positive/Negative	Significance				
					Significant (S)	Probability (P)	Total Weightage (S X P)	Impact Scoring	Mitigation / EMP Proposed
AIR ENVIRONMENT	Excavation and Demolition of Existing Structures	Increase in PM Concentration	PM will create health hazards to humans by passing through their bloodstream	Direct & negative	-3	2	-6	Moderate	Yes
NOISE ENVIRONMENT	Excavation and Demolition of Existing Structures	Increase in Impulsive Noise Level	An increase in noise will cause health hazards to humans like fatigue from lack of sleep to more serious issues such as cardiovascular disease, cognitive impairment, tinnitus and hearing loss.	Indirect & Negative	-3	2	-6	Moderate	Yes
LAND ENVIRONMENT	Excavation and Demolition of Existing Structures	Contamination of topsoil with debris	Loss of micro species on the topsoil	Indirect & Negative	-2	2	-4	Minor	Yes
	Spillage and Contamination of Soil	Increase in chemical constituents in Soil	Decrease in Dissolved Oxygen level of Top Soil	Direct & negative	-2	2	-4	Minor	Yes
	Land use change due to the closure of the Unit	Loss of Green Cover established earlier in the Project Site.	Loss or Reduction of Micro Species in the Green cover establishes on the project site.	Direct & negative	-1	2	-2	Non – Significant	Yes
WATER ENVIRONMENT	Excavation and Demolition of Existing Structures	Contamination of Surface Water due to debris	Create Health hazards to humans and increases the cost of treatment of the water.	Indirect & Negative	-2	2	-4	Minor	Yes
	Dismantle Machinery, Equipment, STP, etc.	Contamination of Metal Scrap & Other Wastes during Housekeeping		Direct & negative	-2	1	-2	Minor	Yes
SOCIO-ECONOMIC ENVIRONMENT	Excavation and Demolition of Existing Structures	Loss of Livelihood	Loss of Employment	Direct & negative	-1	2	-2	Non – Significant	Yes
	Dismantle Machineries & Equipment	Loss of Employment	Reduces the spending power of the people due to loss of employment and decrease in living standards.	Direct & negative	-3	2	-6	Moderate	Yes
		Loss of Revenue to the Government		Direct & negative	-3	2	-6	Moderate	Yes
BIOLOGICAL ENVIRONMENT	Excavation and Demolition of Existing Structures	Loss of Micro Habitat in the surrounding	This leads to species isolation, reduces the area where they can live, and creates new ecological boundaries.	Indirect & Negative	-3	2	-6	Moderate	Yes

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS

The implementation of the proposed industrial park project will involve certain environmental commitments that are considered irreversible and irretrievable in nature. These refer to the permanent changes or losses to environmental components that cannot be recovered or restored to their original state even after project completion. The following aspects outline such commitments:

1. Land Use Conversion:

- The conversion of the existing land into industrial and infrastructure areas represents a permanent change in land use.
- This alteration is irreversible, as the developed land cannot be restored to its original form once industrial and infrastructure facilities are established.

2. Loss of Topsoil and Vegetation:

- During site development and construction, a portion of topsoil and natural vegetation cover will be removed, resulting in irretrievable loss of soil productivity and natural habitat.
- However, the impact will be minimized through planned landscaping, topsoil reuse, and greenbelt development.

3. Change in Natural Drainage Pattern:

- Site grading, road construction and Industrial building development may alter local drainage patterns.
- Though stormwater management measures are proposed, the natural flow regime may not be fully restorable.

4. Consumption of Natural Resources:

- Use of materials such as sand, aggregates, cement, steel and water during construction represents an irretrievable commitment of finite natural resources.
- Energy consumption during the operational phase also contributes to long-term depletion of non-renewable resources.

5. Alteration of Visual and Aesthetic Quality:

The transformation from open or agricultural land to an industrial landscape result in a permanent change in the visual and aesthetic character of the area.

6. Ecological Disturbance:

Though the project area is not located within any eco-sensitive zone or wildlife sanctuary, partial disturbance to local flora and fauna in the surrounding region is possible during initial phases, which may be partially irreversible.

CHAPTER 5

ANALYSIS OF ALTERNATIVES

(TECHNOLOGY AND SITE)

5.1 Introduction

This chapter presents the systematic assessment of reasonable alternatives considered for the proposed Industrial Estate development inside the notified industrial zone. The development is limited to common infrastructure (internal roads, solid waste yard, storm water drains and pits, utilities corridors and ancillary facilities). Individual units that later occupy plots will be responsible for their process-specific environmental management plans (EMPs).

Alternatives were developed and screened using the following criteria:

- Environmental performance (soil, water, air, biodiversity, noise)
- Public health and safety
- Technical feasibility
- Cost (capital and lifecycle)
- Land-use compatibility with the notified industrial zone
- Ease of operation and maintenance
- Regulatory compliance and ease of permitting
- Socio-economic benefits (employment, local service access)

Considered alternatives include: alternate site(s) within the notified zone, alternate layout and design options, alternate construction techniques/materials, alternate infrastructure/technology choices for stormwater and waste management, and the No-Project option.

5.2 Description of each Alternative

a. Alternate Site

The proposed project is strategically located within the industrial area earmarked by M/s. State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT) at Eriayur Village, Veppanthattai Taluk, Perambalur District, Tamil Nadu. This industrial area spans 98.58 hectares (243.59 acres) and has been specifically earmarked for the establishment of footwear and allied industries.

Phoenix Kothari Footwear Limited, a reputed leader in footwear manufacturing, has selected this location for its proposed non-footwear manufacturing cluster, leveraging the park's designation for related industrial activities. The Industrial Estate offers a range of advantages that make it an ideal site for the proposed development, including its strategic geographic location, proximity to raw material sources and markets, and the availability of robust infrastructure such as roads, power, and water supply.

In addition, the park's location within a notified industrial zone minimizes potential conflicts with surrounding land uses and ensures compliance with regulatory and environmental requirements. Given these factors, there was no alternative site proposed by the project proponent.

b. Alternate Layout

Different layout options for the Industrial Estate were studied by comparing road lengths, drainage arrangements, land use and environmental protection needs.

i) Description of the Proposed Layout

The proposed layout follows a compact and well-organized arrangement of plots, internal roads and greenbelt areas. The estate consists of five plots (Plot 1 to Plot 5), connected through a network of internal roads that ensure smooth traffic movement within the site. The layout includes two entry/exit points—one connecting to the Eriayur road and another to the Namaiyur side—providing good external connectivity.

A solid waste management area is located near the entrance for easy access and collection. All plots are surrounded by a continuous greenbelt, which acts as a buffer and helps in reducing dust, noise and visual impacts. Additional common greenbelt space is provided along the boundary near the village road offering better environmental buffer.

Overall, the design keeps the plots compact, minimises road length and provides adequate green buffers, making the layout efficient, environmentally friendly and easy to maintain.

ii) Other options:

Linear spread layout

Plots will be spread out linearly, resulting in longer internal roads, more hard surface area, higher stormwater runoff and increased development cost.

Green-buffer oriented layout

Similar to the compact layout but includes wider greenbelt areas along the estate boundary to reduce impacts on nearby settlements

The best alternative is the compact clustered layout combined with peripheral green buffers. This provides efficient land use, lower costs and better environmental protection.

c. Alternate Technology / Infrastructure Choices

• Stormwater Management

Different stormwater management options were analysed to ensure safe drainage, reduce flooding and improve water quality.

i. Detention basins with silt traps :

These structures are simple to construct and maintain. They help store excess runoff temporarily, remove sediments and release water gradually, thereby reducing peak flow during heavy rains.

ii. Underground storage tanks:

Although effective in storing runoff, they involve a higher construction cost and do not provide additional ecological benefits such as infiltration. Hence, they are not preferred for this project.

iii. Proposed Arrangement for the Estate:

Based on the evaluation, the estate has adopted a combined system that integrates both engineered drainage and infiltration features. The layout includes stormwater drains of 1200 mm width, designed with a slope of 1 in 100 to ensure efficient gravity flow of runoff. Along the drain network, rainwater harvesting (RWH) pits are proposed to promote infiltration, recharge groundwater and reduce the load on the central drainage system.

• Solid Waste Yard and Management

- i. Proposed centralized engineered yard with segregation and covered storage and leachate control:** Provides controlled handling for estate-level non-hazardous municipal-type wastes and temporary holding for industrial wastes pending transfer to licensed facilities.
- ii. Decentralized individual handling:** Places burden on each unit; inconsistent practices and higher environmental risk. Recommendation: Provide a centralized, engineered yard operated under estate management with clear SOPs; hazardous/process wastes to be stored only in licensed containers and dispatched to authorized facilities.

d. No-Project Scenario

If the project is not implemented:

- The notified zone would remain underutilised; potential economic growth and employment opportunities would be delayed.
- Unplanned, ad-hoc industrial development could occur elsewhere causing greater environmental harm (fragmented infrastructure, poor waste handling).
- Opportunity to provide centralized, technically sound facilities for waste and stormwater management would be lost.

Thus, the No-Project option is undesirable from both socio-economic and environmental management perspectives.

In addition, the proposed site has been selected based on specific site criteria, in line with the technical guidance of MoEF&CC, ensuring that it does not fall within or adversely impact any ecologically sensitive areas.

CHAPTER 6

ENVIRONMENTAL MONITORING PROGRAM

An Environment Monitoring Plan is prepared for construction as well as the operation phase. It provides a delivery mechanism to address the adverse environmental impacts of a project during its execution, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. An environmental monitoring program is important as it provides useful information and helps to:

- Assist in detecting the development of any unwanted environmental situation and thus provides opportunities for adopting appropriate control measures.
- Define the responsibilities of the project proponents, contractors and environmental monitors and provide means of effectively communicating environmental issues among them.
- Define monitoring mechanism and identify monitoring parameters.
- Evaluate the performance and effectiveness of mitigation measures proposed in the Environment Management Plan (EMP) and suggest improvements in management plan, if required,
- Identify training requirements at various levels.

6.1 Details of Monitoring to Judge Effectiveness of Measure

To check the efficiency of the system with proposed modifications a regular monitoring programme has been drawn. The program has been outlined for the construction and operation phase.

6.2 Environmental Monitoring

The schedule for monitoring ambient air quality, ambient noise level, groundwater quality, soil quality and waste water quality both during the construction and operation phases of the project and the monitoring parameters is given in **Table 6.1** and **Table 6.2**, respectively.

Table 6.1: Environmental Monitoring Program Schedule - Construction Phase

S.No	Environmental Description	Monitoring Parameters	Number of Locations/ Samples	Frequency of Sampling and Analysis	Annual Recurring Budget in Rs.	Executing Agency	Responsibility	Reporting Schedule
1	Ambient Air Quality	PM10, PM 2.5, SO ₂ , NO ₂ CO	4	Monthly once	1,92,000/-	NABL/ MOEF&CC Accredited Laboratory	Project Proponent (Phoenix Kothari Private Limited)	Six monthly EC Compliance & Monitoring Reports (June 1 st Week & December 1 st Week)
2	Stack Emissions from DG set	Particulate Matter, SO ₂ , NOx & HC	2	Monthly once	60,000/-			
3	Ambient Noise Level	The Noise level in dB (A) Leq (Day & Night) time	6	Monthly once	12,000/-			
4	Water Quality Monitoring for Drinking water	pH, EC, TDS, Total Hardness, Ca, Mg, Cl, SO ₄ ,Na, PO ₄ , Fe, F, Cr, Total coliform & E.coli	2	Monthly once	1,32,000/-			
5	Soil Quality Monitoring	All parameters to check Top soil contamination	2	Monthly once	1,20,000/-			
Total Cost in Rs.					5,16,000/-			

Table 6.2: Environmental Monitoring Program Schedule - Operation Phase

S.No	Environmental Description	Monitoring Parameters	Number of Locations / Samples	Frequency of Sampling and Analysis	Annual Recurring Budget in Rs.	Executing Agency	Responsibility	Reporting Schedule
1	Ambient Air Quality	PM10, PM 2.5, SO ₂ , NO ₂ , CO & VOCs	4	Monthly once	3,36,000/-	NABL/ MOEF&CC Accredited Laboratory	Project Proponent (Phoenix Kothari Private Limited)	Six monthly EC Compliance & Monitoring Reports (June 1 st Week & December 1 st Week)
2	Work place Air Quality Monitoring	VOCs	3	Monthly once	72,000/-			
3	Stack Emissions from Utilities (Boiler, DG sets)	Particulate Matter, SO ₂ , NO _x	2	Monthly once	60,000/-			
4	Process Stack Emissions	Particulate Matter, SO ₂ , NO _x & VOCs	2	Monthly once	84,000/-			
5	Ambient Noise Level	The Noise level in dB (A) Leq (Day & Night) time	6	Monthly once	4,800/-			
6	STP Treated Water Testing	All parameters to check TNPCB Standards	1	Monthly once	22,000/-			
7	ETP Treated Water Testing	All parameters to check TNPCB Standards	1	Monthly once	24,000/-			
Total Cost in Rs.					6,02,800/-			

Note: Individual industries will mandate to carry out the Environmental Monitoring during their construction and operation phase.

CHAPTER 7

ADDITIONAL STUDIES

7.1 RISK ANALYSIS

7.1.1 Construction Phase

The Indian regulations dealing with the working conditions of construction workers include:

- The Fatal Accidents Act, 1855
- The Workmen's Compensation Act, 1923
- The Factories Act, 1948
- The Employees' State Insurance Act, 1948
- The Contract Labour (Regulation and Abolition) Act, 1970
- The National Building Code of India, 2016

On very rare occasions, activities such as excavation work, crane and hoisting operations, forklift usage and the use of ladders and electrical equipment the potential of causing injury to workers. These may happen due to electrocution, falling, injuries from wrong handling of tools, equipment and machines, accidents on site involving vehicular movement, injuries from manual handling operations, inhalation of odours from hazardous, chemicals, dust etc.

The work environment may also involve excessive noise levels, concentration of chemical substances and generation of dust. These too can impact the health and safety of workers if appropriate preventive measures are not practiced. The risk/hazard assessment and management measures considering the above are summarized in **Table 7.1**.

Table 7.1: Risk/Hazard Assessment - Construction Phase

S.No	Project Activity	Possible Risk / Hazard	Likely Consequences	Level of Risk	Likely Occurrence / Grading	Mitigation Measures	Budgetary Allocation (₹)
1.	Transportation of materials	Unauthorized vehicle operation, over speeding, vehicle movement during peak labor hours	Collision, injuries to workers, property damage	Moderate	Moderate to Low	Area survey, speed limit enforcement, authorization of personnel safety training	4,50,000
2.	Material handling	Improper stacking, overloading	Back injuries, slips/trips, fatalities	Medium	Moderate	Limit manual loads to 30 kg, provision-of trolleys, pre-medical checks, enforcement of PPE use	3,50,000
3.	Excavation and earthwork	Collapse of trenches, hits on underground utilities	Burial, severe injury, service disruption	Moderate	Moderate to Low	Shore up excavations, mark utilities, restricted access	4,00,000
4.	Concrete pouring and formwork	Formwork collapse, wet concrete contact	Injuries, chemical burns	Medium	Moderate	Use of approved formwork, training of workers, use of PPE	2,80,000
5.	Tower crane / hoist operation	Load swing, overloading, crane collapse	Fatal injury, equipment loss	High	Low to Moderate	Load limits, certified operators, regular inspection	4,50,000
6.	Brickwork / blockwork	Falling bricks, manual handling injuries	Injuries	Medium	Moderate	Safe Stacking, use of mechanical aids	2,20,000
7.	Plastering / painting / finishing	Chemical exposure, inhalation of fumes,	Health issues, fall hazards	Medium	Moderate	Ensuring ventilation, provision of masks, use	2,00,000

		slips				of PPE	
8.	Electrical installation	Electrocution, short circuits	Electric shocks, fire	High	Moderate	Insulated tools, shut power during work, licensed electricians	2,00,000
9.	Scaffolding erection/dismantling	Falls, tool drops, scaffold collapse	Severe injuries, fatalities	High	Moderate to High	Use certified scaffolds, inspection, fall protection	3,20,000
Total							28,70,000

7.1.2 Operation Phase

The operation phase of the Industrial Park involves continuous industrial activity, workforce movement and the use of various machineries and materials. These activities can give rise to a range of occupational health and safety hazards if not managed properly. Common risks include physical injuries, exposure to hazardous substances and environmental health impacts.

To ensure a safe working environment, it is essential to systematically identify potential hazards, evaluate their consequences, adopt preventive and control measures. The **Table 7.2** provides a summary of key risks associated with Industrial Park operations along with recommended considerations for their management. The risk assessment of individual industries will be carried out elaborately by individual industries at time of obtaining CTE from the Pollution Control Board.

Table 7.2: Risk/Hazard Assessment - Operation Phase

S.No	Possible Risk / Hazard	Likely-Consequences	Level of Risk	Likely Occurrence / Grading	Mitigation Measures	Budgetary Allocation (₹)
1.	Manual Handling & Ergonomics	Musculoskeletal disorders from heavy lifting, repetitive tasks, poor posture.	Medium	Frequent	Use of lifting aids, ergonomic workstations, worker training, job rotation.	3,00,000

2.	Slips, Trips & Falls	Injuries due to wet/slippery floors, uneven ground, or cluttered areas.	Medium	Occasional	Non-slip flooring, good housekeeping, maintenance of pathways, slip-resistant footwear.	2,00,000
3.	Machinery & Equipment	Crush injuries, cuts, entanglement during machine operation.	High	Occasional	Machine guarding, lock-out/tag-out, periodic maintenance, operator training.	5,00,000
4.	Chemical Exposure	Respiratory illness, skin irritation, long-term health effects from solvents/dyes.	High	Occasional	Adequate ventilation, PPE, safe storage, chemical handling training.	4,00,000
5.	Fire & Electrical Hazards	Fires, explosions, electric shocks due to faulty wiring/flammables.	High	Rare–Occasional	Fire alarms/extinguishers, hydrants, electrical inspections, fire drills.	6,00,000
6.	Noise & Vibration	Hearing loss, fatigue, vibration-related disorders.	Medium	Frequent	Noise monitoring, barriers, vibration control, ear protection, work rotation.	2,50,000
7.	Occupational Health & Hygiene	Poor air quality, sanitation issues affecting worker well-being.	Medium	Occasional	Ventilation systems, air monitoring, sanitation facilities, hygiene promotion.	3,50,000
8.	Workstation Ergonomics	Posture-related strain and discomfort.	Low	Frequent	Adjustable seating/furniture, posture awareness, regular breaks.	1,50,000
9.	Biological Hazards	Allergies and respiratory illness due to mold/fungal growth.	Low	Rare	Ventilation improvement, cleaning protocols, regular inspections, PPE.	1,00,000
10.	Security & Violence	Unauthorized entry, theft, workplace violence.	Medium	Occasional	Access control, CCTV surveillance, trained security personnel, emergency drills.	4,50,000
Total						33,00,000

Note: Operation cost will be spent by the individual industries during the period of industrial operation, if in case of any risk occurs.

7.1.3 Disaster Management Plan

The Disaster Management Plan (DMP) is designed to ensure protection of human life, safeguarding of the environment, security of installations, restoration of normal operations and salvage of property, in that order of priority. For effective implementation, the DMP must be widely communicated among stakeholders and personnel should be regularly trained through rehearsals and mock drills.

To effectively respond to a major emergency within the Industrial Park or its surrounding areas, a comprehensive DMP is required.

7.1.3.1 Objectives of DMP

The primary objectives of the Disaster Management Plan are to utilize the combined resources of the Industrial Park, local authorities, and external agencies to achieve the following:

- Provide effective rescue and medical treatment to affected persons.
- Ensure the safety of workers and surrounding community.
- Minimize damage to property, equipment, and the environment.
- Contain and control the incident at the earliest.
- Identify and account for all personnel, including casualties.
- Extend support and assistance to the relatives of victims.
- Disseminate accurate and authoritative information to the media and public.
- Facilitate the rehabilitation and restoration of affected areas.
- Preserve records, evidence, and equipment for investigation and inquiry into the incident.

7.1.3.2 Types of Disaster Covered under DMP

The Disaster Management Plan covers a wide range of natural and man-made emergencies, including but not limited to:

- Fire and Explosion (industrial fire, storage fire, gas leak, etc.).
- Electrical Hazards (short-circuit, transformer failure, DG set fire).
- Natural Calamities (earthquake, flood, cyclone, lightning).
- Structural Failures (collapse of storage tanks, buildings, or infrastructure).
- Chemical Emergencies (toxic release, spills, accidental exposure).
- Medical Emergencies (injuries, occupational illnesses, epidemics, mass casualty events).
- Transportation-Related Accidents (on-site or en-route with raw materials and finished products).
- Security Threats (sabotage, unauthorized access, workplace violence).

7.1.4 Emergency Evacuation Plan

The Emergency Evacuation Plan is an integral part of the Disaster Management Plan and is aimed at ensuring the safe, quick and orderly movement of people from hazardous zones to designated safe assembly areas during an emergency. The plan prioritizes the protection of human life, minimizes panic and ensures accountability of all personnel.

7.1.4.1 Objectives of Emergency Evacuation Plan

1 Alarm and Communication System

- Distinct audible sirens/alarms to indicate evacuation.
- Public address system and handheld radios for communication.
- Designated Emergency Control Room to coordinate evacuation.

2 Evacuation Routes

- Clearly marked, illuminated, and unobstructed escape routes.
- Maps showing evacuation routes displayed at prominent locations.
- Exit doors to open outward and remain unlocked during working hours.

3 Assembly Points

- Pre-designated safe assembly areas located at a safe distance from hazard zones.
- Clearly signposted and accessible from all blocks.
- Provision of basic amenities (first aid, drinking water).

4 Roles and Responsibilities

- Incident Controller → Declares evacuation and supervises operations.
- Floor Wardens → Guide personnel along evacuation routes and check all rooms/workstations.
- Security Team → Controls entry/exit, ensures only safe routes are used.
- First Aid Team → Provides immediate medical support at assembly points.
- Head Count Coordinator → Conducts roll call to account for all employees and visitors.

5 Special Considerations

- Evacuation support for physically challenged or injured personnel.
- Safe handling of critical equipment (shutdown of power supply, hazardous processes).
- Coordination with fire services, police and medical teams.

6 Training & Drills

- Mandatory evacuation drills at least twice a year.
- Mock scenarios (fire, chemical spill, earthquake) to test preparedness.

- Feedback and improvements incorporated into the plan.

7.1.4.2 Types of Emergencies Requiring Evacuation

- Major fire/explosion.
- Chemical spill or toxic gas release.
- Electrical hazard (short circuit, transformer fire).
- Natural calamities (earthquake, cyclone, flood).
- Structural failure (collapse of building/storage tank).
- Security threat (sabotage, bomb threat, violence).
- First Aid Centre in Amenities area provided by the SIPCOT.

7.3 PUBLIC CONSULTATION

The proposed project falls under Category 7(c) – Industrial Estates/parks/complexes/areas, export processing zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes as per the EIA Notification, 2006. Accordingly, the project requires Public Hearing.

7.4 REHABILITATION AND RESETTLEMENT (R & R)

The unit is located in SIPCOT Industrial Estate, Eriayur and land use is intended for industrial activity. Hence, R & R is not applicable.

CHAPTER 8

PROJECT BENEFITS

The proposed Development of Industrial Estate is expected to bring multiple benefits to the local economy, society and environment. The key benefits are outlined below:

8.1 Improvement of Physical and Social Infrastructure

a) Employment Generation

The project is expected to generate substantial employment opportunities, both directly in the core manufacturing sectors and indirectly through allied services such as logistics, maintenance and administration. This will lead to improved livelihoods and socio-economic upliftment of the local population.

b) Economic Development

The establishment of the industrial park will attract domestic and foreign investments, thereby stimulating local and regional economic growth. This will enhance state revenue through increased tax collections and contribute to the GDP of the region.

c) Technological Advancement and Innovation

By facilitating industries with a focus on advanced manufacturing, the park will serve as a hub for technological innovation, research and the adoption of state-of-the-art processes and equipment. This will enhance the region's competitiveness in global markets.

d) Skill Development and Human Capital Enhancement

The anticipated demand for a skilled workforce will drive the development of vocational training centres, technical institutes and industry-academia partnerships, thereby improving the skill profile and employability of the local population.

e) Strengthening of Supply Chains

The park will promote the creation of a robust, localized supply chain, enabling just-in-time delivery, reducing logistics costs and ensuring greater operational efficiency for industries and suppliers operating within and around the park.

f) Economies of Scale and Cost Efficiency

Clustered industrial activity will enable shared infrastructure and services, thereby reducing production costs through economies of scale. The proximity of manufacturers and service providers will minimize transport and handling costs.

g) Knowledge Sharing and Collaboration

The co-location of multiple industries within the park will foster a collaborative ecosystem that encourages best practice sharing, joint problem-solving and the development of sector-specific innovations.

h) Regional Infrastructure Development

The project will catalyse infrastructure upgrades, including road networks, power supply, water distribution and amenities, leading to the holistic development of the surrounding region and improved quality of life.

i) Social Up-liftment and Inclusion

By offering employment and training opportunities to marginalized groups and rural communities, the park will contribute to inclusive development and poverty reduction, enhancing the region's overall human development index.

j) Environmental Sustainability

Industries within the park will be mandated to adopt eco-friendly technologies, resource-efficient practices and waste minimization strategies, thereby reducing their ecological footprint and promoting sustainable industrialization.

8.2 Other Tangible Benefits

- Stimulation of regional economic growth through domestic and foreign investment.
- Increase in state revenue via taxes and contribution to regional GDP.
- Promotion of technological advancement and adoption of modern industrial practices.
- Creation of robust and efficient supply chains for industries and ancillary services.
- Facilitation of knowledge sharing and collaboration among co-located industries.
- Improvement of regional infrastructure, including roads, power supply, water and amenities.
- Contribution to social upliftment and inclusive development for local and marginalized communities.
- Encouragement of environmentally sustainable practices, such as resource efficiency, waste minimization and green belts.

CHAPTER 9

ENVIRONMENTAL COST BENEFIT ANALYSIS

Environmental cost benefit analysis was not prescribed in the ToR issued for the project. Hence, it is not carried in this EIA study.

CHAPTER 10

ENVIRONMENTAL MANAGEMENT PLAN

This section outlines the key environmental management and safeguards that shall be initiated by the project proponent to minimize the project's key environmental concerns and issues. The Environmental Management Plan (EMP) will serve as a working document that must be clearly understood and actively implemented by all on-site personnel to ensure effective environmental management throughout the project lifecycle.

10.1 ENVIRONMENT MANAGEMENT SYSTEMS

The following components will be part of the EMS:

- Environmental Management Cell - Structure and Responsibility
- Operation and Maintenance of Environmental Management Facilities like Rain water harvesting, Storm Water Management, Greenbelt development and Solid waste management system
- Environmental Monitoring Program
- Short-term and long-term budgetary provisions for the EMP
- Emergency Planning

The Organization of Environmental Management Cell proposed for this project is given in **Figure 10.1**. The roles and responsibility of the individual person are given in the below table.

Designation	Responsibilities
Managing Director (Phoenix Kothari Private Limited)	Overall supervision, policy formulation, and decision-making for project implementation and environmental management.
General Manager (Projects)	Project coordination, monitoring of development works, and ensuring compliance with statutory and environmental requirements.
Site Engineer	Day-to-day supervision of project activities and coordination between consultants and management.
Environmental Consultant – 1	Obtaining statutory approvals from SEIAA, TNPCB, DTCP; implementing greenbelt development, stormwater management, and rainwater harvesting systems.
Environmental Consultant – 2	Ensuring environmental compliance, environmental monitoring and auditing, managing the Emergency and Disaster Management Cell, and overseeing Occupational Health and Safety programs.
Admin Staff	Providing administrative and technical support for environmental and project-related activities under the guidance of consultants.

10.2 Environmental Management Plan for the Construction Phase

The EMS team should be exclusively for the implementation of mitigation measures proposed. The team composition who will report directly to the head of the management is as follows:

- Site Manager – Storm Water Management
- Site Manager – Water and Waste Water Management
- Site Manager – Waste management
- Site Manager – Air and Noise environment
- Site Manager – Health and Safety
- Head – Environmental Health & Safety

The comprehensive Environmental Management plan for the Construction Phase is listed in **Table 10.1**.

Table 10.1 Environmental Management Plan for the Construction Phase

S. No.	Environmental Component	Identified Impact	Mitigation Measures	Responsibility
1.	Air Environment	Increased PM ₁₀ , PM _{2.5} , CO, SO ₂ causing health impacts to workers and nearby habitations	• Regular water spraying (3–4 times/day) • Covered storage for fine materials • Use tarpaulin for transport. • Deploy CPCB Stage-II compliant DG sets. • Maintenance of machinery. • PPE to workers • Temporary barricades (5–8 m)	Site Engineer – Air and Noise environment
2.	Noise Environment	• Elevated noise levels (80–90 dBA) • Hearing loss, stress, resident complaints	• Use of earplugs, earmuffs • Limit work hours (9 AM–6 PM) • Noise barriers (5–8 m) • Acoustic enclosures for DGs • Equipment maintenance • Grievance redressal for	Contractor / Site Engineer – Air and Noise environment

			complaints	
3.	Land Environment	• Soil erosion and compaction • Topsoil loss • C&D waste accumulation causing choking of drains • Soil contamination (chemicals, diesel) hence reduced fertility.	• Strip and store topsoil (25–30 cm) Reuse topsoil in greenbelt. • Maintain equipment to prevent leaks. • Segregation of hazardous/non-hazardous waste. • Disposal of C&D waste. • Impervious flooring in waste zones	Site Engineer – Waste management
4.	Water Environment	• High water demand (100 KLD). • Sewage generation (8 KLD) • Surface runoff flooding risk • Accidental chemical spills into shallow aquifers leading to ground water contamination	• Avoid free water flow for curing Use admixtures, gunny bags • Sewage collection via mobile STP • Provide drains with silt traps • Temporary storm drains with silt traps • Chemical storage on impermeable floors with bunding	Site Engineer – Water and Waste water management
5.	Socio-Economic Environment	• Influx of 100 workers • Pressure on local resources • Informal labor health risks • Cultural friction	• Preference to local labor • Labor screening • Labor camps with water, toilets, waste handling • Procure supplies locally • Periodic community consultations • ESI/insurance for workers	Head – Environmental Health & Safety (Environmental Consultant 2)
6.	Biological Environment	• Habitat loss (flora/fauna)	• Store topsoil for greenbelt	Landscape Consultant / Site

		• Tree felling • Dust deposition on surrounding vegetation • Disturbance to avifauna	• Create bird feeding/watering zones • Minimize noise during clearing • Use silt traps, prevent nallah discharge • Transplant trees; retain non-interfering trees	Manager
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10.3 COVID-19 Health Management Plan

The SIPCOT is committed to ensuring the health and safety of all construction workers in the event of a future COVID-19 outbreak. The following measures will be implemented during the construction phase to minimize the risk of exposure:

a. Pre-Screening and Medical Examination

- Mandatory thermal screening of all personnel entering or exiting the site.
- Re-screening will be conducted for those leaving and re-entering the site during a shift.
- Daily temperature checks and symptom assessments before work begins.
- Employees diagnosed with COVID-19 will not return to work until they meet the official criteria for ending home isolation.
- A doctor will visit the site at least once a week for medical support.
- Workers will be encouraged to stay home if they feel unwell.
- A system will be in place for workers to report any health or safety concerns.

b. Social Distancing

- A minimum distance of six feet will be maintained between workers wherever possible.
- Meals must be consumed only in designated areas, maintaining social distancing. Shared seating arrangements will be avoided.
- Workers will dispose of waste individually in designated bins to maintain hygiene.
- During attendance, training and meetings social distancing will be strictly followed. No-touch attendance systems will be used.

c. Cleaning and Disinfection

- Regular cleaning and disinfection of tools, equipment, trailers, bathrooms, and common areas will be carried out.
- Only approved disinfectants with efficacy against coronavirus will be used.
- Daily disinfection of the entire construction site, including the site office, labour camp, canteen, toilets, entry/exit points, and pathways.

d. Personal Protective Equipment (PPE)

- Mandatory use of PPEs (face masks, gloves, etc.) for everyone entering the site.
- Reusable PPEs must be properly cleaned and not shared.
- All employees will be provided with face masks, which must be worn at all times at the workplace.

e. Sanitization and Personal Hygiene

- Hand washing must be practiced
 - On arrival and before leaving the site
 - Before and after meals, between tasks
 - After using the toilet
 - Before putting on and after removing gloves or face coverings
- Alcohol-based sanitizers (minimum 60% alcohol) and hand wash stations will be provided at all entry/exit points and common areas.
- Everyone must sanitize their hands before entering or exiting the site and before/after using PPEs.
- Adequate quantities of soap, sanitizer, and cleaning materials will be maintained.
- Spitting of Gutka, tobacco and paan are strictly prohibited on-site.

f. Quarantine Protocol

- Any worker showing symptoms or testing positive will be quarantined for at least 15 days, with support from the State Government.
- Workers staying on-site will not be allowed to leave. All essential supplies will be provided at the site.
- In special cases, workers may leave the site with prior supervisor approval and proper PPE.
- No new external workers will be allowed on-site without following the prescribed procedures.

g. Emergency Contacts

- A list of nearby hospitals/clinics authorized to treat COVID-19 patients will be maintained and displayed prominently at the site.

h. Awareness and Signage

- Signboards with COVID-19 safety guidelines will be displayed in languages understood by all workers.
- Workers will be regularly trained on hygiene practices and social distancing.

i. Vaccination

- COVID-19 vaccination is mandatory for all construction workers.

10.4 Environmental Management Plan for Operation Phase

During the operation phase, monitoring will address environmental and socio-economic issues that may continue beyond construction. The focus will be on assessing the effectiveness of implemented mitigation measures while maintaining baseline monitoring and sampling. The mitigation measures during this phase will primarily aim to prevent and minimize any potential adverse impacts of the project.

10.4.1 Air Quality Management

The primary sources of air pollution from the industries will be DG sets, vehicular movement and other emissions from the process.

- Individual industries shall adopt air pollution control measures for the source of emissions from manufacturing process as per CPCB/TNPCB norms to ensure proper dispersion of pollutants.
- DG sets shall be provided with stack height as per CPCB norms. Retorfitting of DG sets shall be done as and when applicable.
- Green belt shall be developed as per MoEF&CC OM dated 29th October 2025 on “Regularisation of Green belt for Individual Industries” and implement TNPCB’s Kurungadugal Scheme.
- Workers in the industries shall be provided with PPE’s, Goggles.
- Safety precautions shall be taken by individual industries to avoid health risks to workers.
- Regular Monitoring of Ambient Air Quality in the Industrial Estate shall be done as summarized in Chapter 6 of the EIA report.
- Process stack emissions shall be monitored by the individual industries to check emission rates are as per norms prescribed by the Pollution Control Board.

10.4.2 Noise Level Monitoring

To minimize the adverse impacts of project operations on the surrounding noise environment, individual industries will implement the following measures:

- All noise-generating equipment will be designed and operated to ensure that noise levels at the plant boundary remain within 75–70 dB(A), in line with CPCB/SPCB standards.
- Regular maintenance will be carried out to reduce noise emissions from equipment.
- Acoustic enclosures will be provided for DG sets and process equipment as feasible.
- Compliance with noise standards will be prioritized during equipment procurement, with noise control requirements specified in purchase orders and guarantees sought from suppliers.
- Green belt shall be developed as per MoEF&CC OM dated 29th October 2025 on “Regularisation of Green belt for Individual Industries” and implement TNPCB’s Kurungadugal Scheme to act as as natural noise barriers.

- Training programs will be conducted to raise awareness among personnel about the impacts of noise and the importance of using PPEs.

10.4.3 Water and Wastewater Management

- During the operation phase, sewage generated by individual industries will be treated in their respective Sewage Treatment Plants (STPs) and the treated water will be utilized for greenbelt development and flushing within the individual industries.
- Similarly, effluent from individual industries will be treated in their respective Effluent Treatment Plants (ETPs). The treated effluent will be reused within the premises for process and utilities. Sludge generated from the ETPs will be disposed through TNPCB-authorized hazardous waste management facilities, while the ETP salts will be sent to the nearest TSDF for safe disposal by the individual industries. The ETP's will operate on Zero Liquid Discharge concept.
- No untreated sewage, effluent will be disposed to storm water drains, nearby water bodies. STP's and ETP's proposed will be operated and maintained at all times.
- The project proponent of individual industries will install Energy Meter, Electro Magnetic Flow Meter and Online Continuous Emission/Effluent Monitoring System as mandated by the Pollution Control Board to ensure continuous operation of treatment plants.

10.4.4 Solid Waste Management

Every industry shall ensure on-site segregation of waste. Organic waste shall be composted and utilized as manure for greenbelt development within the Industrial Estate, while inorganic waste will be sent to TNPCB-authorized recyclers or approved local vendors.

Solid waste management facility (Sheds for recovery and recycling facility) including shed for E-Waste Collection and segregation is proposed by the developer.

10.4.5 Hazardous Waste & E-Waste Management

Hazardous waste and e-waste generated by individual industries will be stored separately within designated storage areas in their premises and handed over to TNPCB-authorized vendors for recycling. The disposal of hazardous waste will be carried out in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 1989, as amended in 2016, while e-waste will be managed and disposed of as per the E-Waste (Management) Rules, 2016 and subsequent amendments.

10.4.6 Socio Economic Environment

- Local manpower will be employed in the individual industries as workers and maintenance staff

- Skill development training will be conducted by individual industries as required.
- CER/CSR initiatives will be carried out by the developer and the project proponent as applicable for local development
- Revenue generation to the local body through tax generation and local infrastructure development
- Periodic maintenance of approach roads shall be undertaken.
- Provision for safe drinking water, toilets and rest areas for workers.
- Proper grievance redressal mechanism for workers.

10.4.7 Biological Environment

- The individual industries and the developer shall develop green belt with native species as listed in Table 4.2.
- Multi-tier plantation (trees, shrubs and grass) shall be adopted.
- Regular watering of green belt area and weeding activities shall be carried out
- Use of chemical fertilizers shall be avoided; compost from composting of biodegradable waste shall be utilized.
- Landscaping shall be done along roads, open spaces and boundary areas.
- Speed limits shall be enforced within the estate.
- Survival rate of plantation shall be monitored regularly.
- Replacement plantation shall be carried out for dead saplings.
- Periodic inspection of green belt and landscaped areas.
- Storm water drainage system with harvesting system shall be implemented and maintained regularly to avoid soil erosion and loss of top soil.

10.4.8 Conservation Plan for Schedule I species –

The Schedule I species identified during the Baseline study are *Troides minos* (Southern Birdwing) and *Circaetus gallicus* (Short-toed Snake-Eagle)

Habitat Protection & Greenbelt Development: A greenbelt shall be developed using indigenous trees, shrubs, flowering plants and host plants (*Aristolochia spp.*) to support butterfly life cycles and provide perching and foraging habitat for raptors.

Minimisation of Disturbance: Restrict construction activities near vegetated patches and tall trees; avoid disturbance during breeding seasons (butterflies: post-monsoon; raptors: December–May).

Chemical Use Control: Prohibit or minimise the use of pesticides, herbicides and rodenticides within the industrial estate to protect butterflies, prey species and the food chain.

Tree and Landscape Management: Preserve mature trees used for nesting/perching by birds; avoid monoculture plantations and maintain open patches interspersed with vegetation.

Bird-Safe Infrastructure: Power lines and electrical installations shall be with insulated conductors and adequate spacing to prevent raptor electrocution and collision.

Invasive Species Control: Prevent the introduction and spread of invasive plant species that can displace native flora important for butterflies and prey fauna by regular dweeding.

Regulatory Compliance: Ensure strict compliance with wildlife protection provisions and integrate conservation measures into the Environmental Management Plan (EMP).

10.5 Budgetary allocation for EMP

The budgetary allocation for the various environmental management measures proposed for the Construction Phase and Operation Phase is given in **Table 10.2** and **Table 10.3**, respectively.

Table 10.2: EMP Budgetary Allocation – Construction Phase

Environmental Management Plan	Capital Expenses (Rs. in Lakhs)	Annual Operational Expenses (Rs. in Lakhs)
Drinking water and Sanitation Facilities	6.36	9.95
Storm water management	7.00	0.18
Solid waste and debris waste management	10.00	5
Occupational Health & Safety	6.25	5
Total	29.61	20.13

Table 10.3: EMP Budgetary Allocation – Operation Phase

Environmental Management Plan	Capital Expenses (Rs. in Lakhs)	Annual Operational Expenses (Rs. in Lakhs)
Rainwater Harvesting System	17.0	1.2

Storm Water drain	220.0	1.0
Environmental Monitoring	-	5.0
Solid Waste Management	6.5	4.8
Energy Conservation	20.0	1.1
Greenbelt Development (Gardening & Landscaping)	60.0	2.4
Total	323.5	15.5

10.6 Corporate Environment Responsibilities (CER)

As per the MoEF&CC Office Memorandum No. 22-65/2017-IA.III, dated 25.02.2021, Phoenix will allocate INR 1.16 Crores under Corporate Environment Responsibility (CER). The amount will be spent as listed in Table 10.4.

Table 10.4: Budgetary Allocation – Corporate Environmental Responsibility (CER) Activity

Beneficiary	Type of CER Activity	Budgetary Allocation (Rs. In Lakhs)
Government Higher Secondary School, Valikandapuram, Veppanthattai Taluk, Perambalur	Construction of Science Laboratory with laboratory equipment for students of Class 6 to 10	116 Lakhs
	Construction of Biology Laboratory for Higher Secondary Classes	
	Construction of Computer Laboratory with Computers and supporting infrastructure.	

CHAPTER 11

SUMMARY AND CONCLUSION

11.1 OVERALL JUSTIFICATION FOR IMPLEMENTATION OF THE PROJECT

The EIA study of the proposed project highlights the benefits accruing to the locality, neighborhood, region and nation through the creation of direct and indirect employment opportunities during the construction and operational phases of the industrial park. The establishment of the project will generate a positive impact on the regional economy by attracting new industries, fostering ancillary businesses and enhancing trade and commerce.

Further, the project will stimulate the development of essential infrastructure and public amenities in and around the site, including improved water supply systems, solid waste management, power supply, road connectivity and telecommunication facilities.

By creating a well-planned industrial hub in a strategic location, the project will not only provide a conducive environment for industrial growth but also promote sustainable regional development, thereby contributing significantly to the state's economic progress.

11.2 EXPLANATION ON HOW ADVERSE EFFECT WILL BE MITIGATED

The proposed industrial park has been designed with due consideration to environmental safeguards and regulatory compliance. Potential adverse impacts during construction and operation phases will be effectively minimized through the following measures:

11.2.1 Air Pollution Control:

- Individual industries will be mandated to provide suitable Air Pollution Control Measures for dispersion of flue gases in line with CPCB/TNPCB guidelines.
- DG sets to be provided with stack as per CPCB norms.

11.2.2 Noise Control:

- Individual industries will mandate to develop a maximum of 15% greenbelt within their plots as applicable.
- In addition, The industrial estate has proposed a common greenbelt area (15 m along periphery of the industrial estate).
- Industries will also provide acoustic enclosures for DG sets and process machineries and equipment as noise suppression measure.

11.2.3 Wastewater Management:

- Effluent generated will be treated in individual ETPs and industries will adopt a Zero Liquid Discharge (ZLD) system. Treated effluent will be reused for process and utility, ensuring minimal impact on soil and groundwater.
- Sewage generated from industries will be treated in individual STPs. Treated sewage will be utilized for greenbelt development and flushing within the Industrial Estate.

11.2.4 Water Environment:

- Freshwater requirement will be sourced from the Tamil Nadu Water Supply and Drainage (TWAD) Board.
- Tapping of ground water is not envisaged

11.2.5 Stormwater Management:

- Stormwater will be effectively managed within the premises and utilized through rainwater harvesting.
- Excess stormwater will be safely diverted to nearby water bodies without causing flooding or after filtration.

11.2.6 Solid and Hazardous Waste Management:

- Solid waste from individual industries will be segregated at source.
 - **Organic waste** will be processed in a common municipal waste processing facility using an Organic Waste Converter (OWC) and converted into manure.
 - **Inorganic waste** will be sent to TNPCB-authorized recyclers through a Material Recovery Facility (MRF).
- Hazardous waste will be collected, stored in secured areas within individual units and handed over to TNPCB-authorized TSDFs/recyclers, as applicable.

11.2.7 Environmental Monitoring:

- Phoenix Kothari Private Limited will conduct regular monitoring of Ambient Air Quality (AAQ), noise levels, surface and groundwater and soil quality to ensure compliance with prescribed standards.

11.2.8 Environmental Management Cell (EMC):

- A dedicated Environmental Management Cell is proposed to oversee and implement the mitigation measures proposed for the project and ensure adherence to environmental regulations.

With very minimal negative impacts, the project positively leads to business opportunities, employment opportunities, increased revenue and infrastructural development.

CHAPTER 12

DISCLOSURE OF CONSULTANTS ENGAGED

Name of the Organization : Eco Services India Pvt. Ltd.

Contact Person:

Name : Dr. P. Kalaiselvan

Designation : Director

Address/Location : No. 1/134, Dhanakotiraja Street

Sundar Nagar, Ekkaduthangal

Guindy, Chennai – 600 032

Tel: +91-44- 4310 2232

Mobile: +91- 93839 99109

E-mail: kalaiselvan@ecoservices.in

Status of NABET Accreditation:

M/s. Eco Services India Pvt. Ltd. is accredited by NABET/QCI for handling projects in the Sector Nos. 4, 8, 21, 29, 31, 38 & 39 (i.e., Item Nos.1d, 3a, 5f, 7a, 7c, 8a & 8b of the Schedule to EIA Notification, 2006). Please refer to the List of Accredited Consultant Organizations with their Certificate / Extension Letter no. as updated by NABET every month. We herewith enclose our NABET Accreditation certificate for your reference.

Status of NABL Accrediation:

M/s. Eco Services India Pvt. Ltd. (Laboratory Division) is accredited by NABL for testing facilities in the field of chemical and biological analysis. Please refer to the certificate of Accrediation valid upto 01.05.2026. We herewith enclose our NABL Accreditation certificate for your reference.

NABET Accreditation Certificate

 भारतीय गुणवत्ता परिषद् QUALITY COUNCIL OF INDIA Creating an ecosystem for Quality	 NABET		
National Accreditation Board for Education and Training			
Certificate of Accreditation			
<u>Eco Services India Private Limited, Chennai</u>			
1/134, Dhanakotiraja Street, Sundar Nagar, Ekkaduthangal, Guindy, Chennai – 600032			
<i>The organization is accredited as Category-A under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors:-</i>			
S. No	Sector Description	Sector (as per)	Cat.
1.	Thermal power plants	4	1 (d)
2.	Metallurgical industries (ferrous only)	8	3 (a)
3.	Synthetic organic chemicals industry	21	5 (f)
4.	Airports	29	7 (a)
5.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)
6.	Building and construction projects	38	8 (a)
7.	Townships and Area development projects	39	8 (b)

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated May 03, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3251 dated May 24, 2024. The accreditation needs to be renewed before the expiry date Eco Services India Private Limited, Chennai following due process of assessment.

Issue Date:
May 24, 2024

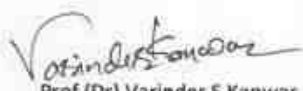
Valid up to
April 03, 2027



Mr. Ajay Kumar Jha
(Sr. Director, NABET)



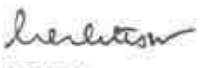
Certificate No.
NABET/EIA/24-27/RA 0332



Prof (Dr) Varinder S Kanwar
(CEO-NABET)

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

NABL Accreditation Certificate

		National Accreditation Board for Testing and Calibration Laboratories
CERTIFICATE OF ACCREDITATION		
ECO SERVICES INDIA PRIVATE LIMITED (LABORATORY DIVISION)		
has been assessed and accredited in accordance with the standard		
ISO/IEC 17025:2017		
"General Requirements for the Competence of Testing & Calibration Laboratories"		
for its facilities at		
NO. 1/134, DHANAKOTIRAJA STREET, SUNDAR NAGAR, EKKADUTHANGAL, GUINDY, CHENNAI, TAMIL NADU, INDIA		
in the field of		
TESTING		
Certificate Number:	TC-5664	
Issue Date:	02/05/2024	Valid Until: 01/05/2026
This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL. (To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)		
Name of Legal Entity: Eco Services India Pvt. Ltd.		
Signed for and on behalf of NABL		
	 N. Venkateswaran Chief Executive Officer	

Annexure – I
Land Ownership Document – Lease Deed

97/2023 Original with 1 Duplicate

भारतीय गैर न्यायिक INDIA NON JUDICIAL
एक हजार रुपये
रु.1000
ONE THOUSAND RUPEES
Rs.1000

தமிழ்நாடு தமிழ்நாடு TAMILNADU

15 DEC 2022

BB 339222

Phoenix Kothari Footwear Limited
Chennai

R. RAGUPATHI
STAMP VENDOR, L/No. C3/4839/83
No. 37, VILLAGE ROAD, NOW KNOWN AS
No. 79/91, VALLUVARKOTTAM HIGH ROAD
NUNGAMBAKKAM, CHENNAI-600 034
MOBILE: 9445114347

TP/140969805/2023

LEASE DEED

MEMORANDUM OF THIS LEASE DEED entered into at Perambalur on this **6th** day of **January 2023** (Two thousand twenty-three only) BETWEEN State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT), a company registered under the Companies Act, 1956 and having its Registered Office at No.19-A, Rukmani Lakshmipathy Road, Chennai-600 008 represented by **Tmt R. Thamizhselvi (Aathar No.2153 8734 9138)** Daughter of **Thiru. V. Ramalingam**, Project Officer i/c, SIPCOT Industrial Park, Perambalur and hereinafter referred to as the LESSOR, which term shall, unless the context otherwise requires mean and include its representatives, administrators, successors and assigns on the one part.

R. Thamizhselvi
PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

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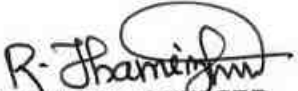
..2..

AND

M/s. PHOENIX KOTHARI FOOTWEAR LIMITED a limited company incorporated under the Indian Companies Act, 2013 and having its registered office at Kothari Building, 114, Box No.3332, Mahatama Gandhi Salai, Nungambakkam, Chennai - 600 034 represented by its Chairman **Thiru. J. Rafiq Ahmed** Son of **Thiru. Jinnah N K** aged about **48 years (Aathar No. 5907 2949 5191)** residing at **No.25/8, 2nd Street Perambur High Road, Perambur Barracks, Chennai, Tamil Nadu-600 012** hereinafter referred to as the LESSEE, which term shall, unless repugnant to the context otherwise requires, mean and include their representatives, administrators, successors and assigns on the OTHER PART.

WHEREAS :

- a) The LESSOR has been incorporated as a Limited Company with an objective to develop industrial area with basic infrastructural facilities and maintenance of such industrial area in Tamil Nadu.
- b) The LESSOR has acquired the property more fully described in the Schedule 'A' hereunder and hereinafter referred to as the said property.
- c) For the due fulfilment of its principal object, the LESSOR has laid out the said property into various plots, besides setting apart land for the purpose of laying roads, drains and for other common amenities for the benefit of the occupants of the plots so laid out and WHEREAS it also proposes to effect improvements and betterment schemes for the benefit of all the allottees of the Industrial Park/Complex/Growth Centre.


PROJECT OFFICER
SIPCOT, ERAIYUR.

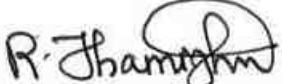
For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

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Registering Officer.



- d) The LESSOR proposes to allot the plot on a long lease of 99 years in as much as it is felt that the characteristics and homogeneity of the Industrial Park should not be altered with or tampered.
- e) The LESSOR shall have control over the common amenities and facilities such as roads, street lighting, water supply system and sanitation, drainage, common buildings, avenue plants, parks etc., intends to make available these facilities to the LESSEE as well as other Allottees in a reasonable and equitable manner.
- f) The LESSOR has decided to make available to entrepreneurs/industries, plots in the said property on terms and conditions mentioned hereunder, for the purpose of their locating any approved industry or other business or activity in the said plots under the terms of the lease deed;
- g) The LESSEE made an application to the LESSOR for allotment of a plot in the Industrial Park, Eraiyur at Perambalur for the purpose of putting up the project for the manufacture of **Footwear, Footwear Components and allied products.**
- h) The LESSOR allotted the Plot No. **A-1** measuring to an extent of **182.09 acres** (including 0.49 acre of vandipathai) in the said Industrial Park more fully described in Schedule 'B' hereunder and shown distinctly in the plan attached hereto and hereunder referred to as the allotted plot by the Order of Allotment Ref No.**P-III/SIP-Eraiyur/Phoenix Kothari/2022** dated. **25.11.2022** for an extent of **233.49 acres** (including 1.77 acre of vandipathai) in Plot No. **A-1** Subsequently, the said allotment was amended vide Amendment letter


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

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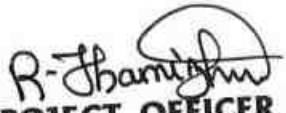
No. **P-III/SIP-Eraiyur/Phoenix Kothari/2022** dated **05.01.2023** for an extent of **182.09** acres (including 0.49 acre of vandipathai) in Plot No. **A-1** subject to the terms and conditions contained therein. The LESSEE has accepted the Order of Allotment.

- i) The property described in the Schedule 'A' is intended to be utilized only for the purpose of locating an Industrial unit and the restrictions and conditions stipulated in this deed are intended only to preserve the character of the said property as an Industrial Park and for the benefit of the other plots held by the LESSOR or allotted or intended to be allotted by it to other parties similarly situated as the LESSEE.

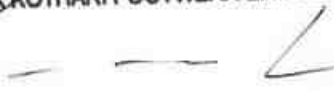
NOW THIS LEASE DEED WITNESSETH THAT:

1 DEFINITIONS

- 1.1 "Allotment"** means allotment of plot for establishment of Industrial/Commercial/Housing/Service unit etc., as prescribed in the Allotment Order.
- 1.2 "Allotment Order"** means the order issued by the LESSOR confirming the allotment of plot, with specific terms and conditions.
- 1.3 "Allottee"** means an individual or person including a group of individuals under Indian Partnership Act of 1932 or a company registered under the Companies Act 1956/2013 or Limited Liability Partnership Act of 2008, or Co-operative Institution, or a body incorporated under any Act of Indian Law, established for the purpose of setting up of Industrial/Commercial/Housing/Service unit etc., to whom any plot has been allotted by the LESSOR.


PROJECT OFFICER
SIPCOT, ERAIYUR.

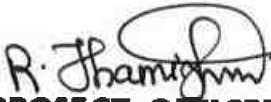
For PHOENIX KOTHARI FOOTWEAR LIMITED


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- 1.4 "Caution Deposit"** means the interest free deposit that shall be refunded if the Allottee implements the project within the stipulated time period as per the Allotment Order.
- 1.5 "Change in Constitution"** means change in legal status of the Allottee.
- 1.6 "Change in Management"** means, (a) change in the proprietorship of the concern; (b) the change in the shareholding pattern due to induction of new partners/share-holders and where more than 50% of the shareholding is transferred to the new members resulting in total change or substantial change in ownership of the existing Allottee; (c) transfer of leasehold rights of the allotted plot, wherein the original promoters hold less than 50% shares in the transferee entity.
- 1.7 "Competent Authority"** means any Department or Agency of the Government, Corporation, Board, Local Body or other authority established by the Government which are entrusted with the powers or responsibilities, inter alia, to grant or issue clearances/approvals.
- 1.8 "Implementation"** means the condition where the unit has commenced commercial production/operation within the stipulated time as specified in the allotment order/lease deed or within the permitted extension time and also complying with 50% plot utilization.
- 1.9 "Industrial Park/Complex/Growth Centre"** means an area developed primarily for establishment of manufacturing industries and/or service sector industries and having basic infrastructural facilities like roads, water storage and distribution infrastructure, storm


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

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Registering Officer.				



water drainage, streetlight and such other facilities/support services as may be required. Wherever, the word "Industrial Park" is indicated, it also means Industrial Complexes, Industrial Growth Centers, SEZs, IT Parks, Industrial Development Areas as the case may be.

1.10 "Participatory Infrastructure Development Programme" means the infrastructure development programme jointly undertaken by LESSOR and Allottees/Association of Allottees for an Industrial Park. For projects identified under this scheme, the LESSOR shall meet out the project cost upfront and 50% of the project cost shall be recovered from the Allottees/Association of Allottees of the concerned Industrial Park.

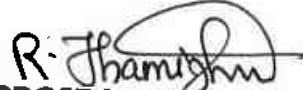
1.11 "Plot" means the demarcated land parcel within the Industrial Park provided with basic infrastructure facilities for the purpose of allotment

1.12 "Plot Cost" means the amount paid by the LESSEE towards the usage of land along with infrastructure facilities provided by the LESSOR.

1.13 "Plot Utilization" means the extent of the allotted plot covered with built-up space comprising of factory building/shed and covered utility/storage area, internal roads etc.

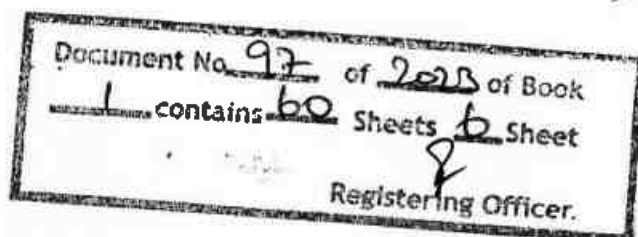
1.14 "Plug and Play Facility" means a facility where built up space is leased out for industrial activity.

1.15 "Project Officer" means an officer, who has been designated as project officer by LESSOR, deployed at the project office of the Industrial Park and performs tasks assigned by the LESSOR.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

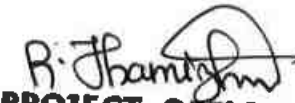


1.16 "Transfer Fee" means the amount to be paid by the LESSEE, towards Change in Management/Transfer of Leasehold rights in respect of the allotted plot.

1.17 "Transfer of Leasehold Rights" means transfer of lease hold rights of the allotted plot to another legal entity or to a newly formed legal entity resulting from the change in constitution of the Allottee.

2 GRANT OF LEASE, CAUTION DEPOSIT, TERM AND CHARGES

- 2.1** In consideration of the allotment of plot made by the LESSOR, the LESSEE has paid a sum of **Rs. 20,94,03,500/- (Rupees Twenty Crores Ninety four lakhs three thousand and five hundred only)** towards plot cost.
- 2.2** The LESSEE has paid a sum of **Rs.100/- (Rupees One hundred only)** towards 100% of the annual lease rent in advance. The annual lease rent is computed at **Re.1/-** per year for 98 years and **Rs.2/-** for the 99th year.
- 2.3** The LESSEE has paid **Rs.1,04,70,175/- (Rupees One Crore Four lakhs seventy thousand one hundred and seventy five only)** towards caution deposit which shall be interest free and refunded if the LESSEE implements the project within the stipulated time period as per the Allotment Order/Lease Deed.
- 2.4** The LESSOR allots the plot on lease bearing Plot No.**A-1** measuring to an extent of **182.09 acres (including 0.49 acre of vandipathai)** mentioned above and more fully described in Schedule 'B' to the LESSEE and the LESSEE takes the property aforesaid on lease for a


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED

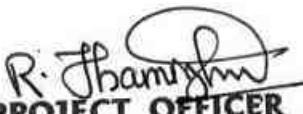
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period of 99 (ninety nine) years, AND the LESSEE also agrees to strictly abide by the conditions stipulated in the Lease Deed and also the terms and conditions of Allotment Order, a copy of which is enclosed with this deed.

- 2.5** The LESSOR shall not pay any interest to the LESEE for the amount remitted by the LESSEE.
- 2.6** The LESSEE shall execute an agreement for water supply at the time of taking possession of the plot and comply with all terms and conditions of the agreement. The LESSEE shall pay water charges at the rate fixed by the LESSOR from time to time abiding by the terms of water supply agreement executed.
- 2.7** In the event of LESSOR taking up any additional development facilities and/or in case of escalation in cost of development works in future, the LESSOR shall apportion such expenses among the allottees of the Industrial Park on pro-rata basis. In such an event, the LESSOR reserves the right to claim such apportioned expenses and the LESSEE shall pay the same without any demur, within thirty (30) days from the date of issue of demand notice by the LESSOR.
- 2.8** Annual maintenance charges for the common amenities and facilities like roads, street lighting, sanitation, drainage, common buildings, avenue plants, parks etc., will from time to time be apportioned among the Allottees in the Industrial Park as per the prevailing policy. The LESSEE shall pay the same without any demur within the period prescribed. Non-payment on due date will automatically entail an interest of 12% per annum or such other rate as may be prescribed from time to time.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

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- 2.9** The LESSEE shall pay the charges towards the cost of trees, wells and structures, if any, in the allotted plot as prescribed by the LESSOR.
- 2.10** The Participatory Infrastructure Development Programme is a scheme for upgradation of existing infrastructure and provision of support infrastructure facilities for the respective Industrial Park at the request of the Allottees/Association of Allottees in the Industrial Park. In the event of taking up of any such project under PIDP scheme by the LESSOR, the LESSEE shall pay proportionate amount of 50% of the project cost as per the prevailing policy.
- 2.11** The LESSEE shall pay all existing and future rates and taxes, charges, claims and assessments, chargeable against the LESSEE or arising out of the acts of the LESSEE in usage of the allotted plot and any building erected thereon and/or services received.
- 2.12** The LESSEE shall bear all expenses in connection with the drawing of power from the main lines to the plot for the supply of electricity and/or any other support infrastructure facilities.
- 2.13** The LESSEE understands and agrees not to raise any claim or seek refund of any of the above charges except for the caution deposit as mentioned in Clause 2.3.

3 COVENANTS OF THE LESSEE

- 3.1** The LESSEE shall enter upon and take possession of the said allotted plot as it is, within 15 days from the date of execution of this lease deed, in consideration whereof the LESSEE has paid 100% of plot cost, annual lease rent and caution deposit. Failure to do so will entitle the LESSOR to cancel the allotment and execute the cancellation deed.


PROJECT OFFICER
SIPCOT, ERAIYUR.

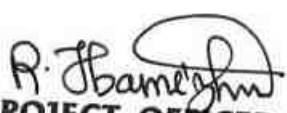
For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

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- 3.2** The LESSEE will take possession of the plot in 'as is where is' condition and no further demand for any development, such as earth filling, raising the level etc., shall be entertained. Any other improvement or developments inside the allotted plot is purely at the discretion of the LESSEE. Any cost incurred for such development will be borne by the LESSEE.
- 3.3** The LESSEE shall utilize the allotted plot only for the purpose for which it was allotted by the LESSOR and for which approvals are granted by the Competent Authorities.
- 3.4** The LESSEE shall, at its own cost, construct and maintain access roads leading from the Industrial Park to the said plot in strict accordance with the specifications and details prescribed by the LESSOR.
- 3.5** The LESSEE shall insure all the fixed assets in the plot and renew the insurance periodically.
- 3.6** The LESSEE shall keep the LESSOR indemnified against any and all claims for damages which may be caused to any adjoining buildings or other premises as a consequence of the erection of the buildings and industrial installations by the LESSEE. The LESSEE shall also keep the LESSOR indemnified against all payments whatsoever which, during the progress of work, may become payable or be demanded by the Local Authority in respect of the said works, or of anything done under the authority herein contained.
- 3.7** With the consent of the LESSEE, the LESSOR shall have the right of access into and utilising any portion of the allotted plot, as required at


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED

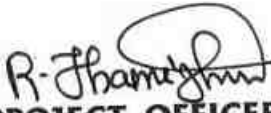

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all times, for the purpose of laying pipelines, cables, underground drainages, channels, or providing such other common facility. The LESSOR shall have further right within the area of the allotted plot including the building standing thereon as and when felt necessary by the LESSOR, to lay down, place, maintain, alter, remove or repair any pipes, pipe lines, conduits for service lines, posts, or other appliances or apparatus in, on, under, over, along or across the plot in such area for the purposes of providing any common amenities or services for the Industrial Park and the same may be done either directly by any person either generally or specially authorized by the LESSOR in this behalf and the LESSEE agrees for the same.

- 3.8** During the period of lease the LESSEE at their expense will keep the buildings, premises and other structures clean, free from defect and in good condition.
- 3.9** The LESSEE shall implement and conform to the various conditions in this deed in relation to the allotted plot at all times.
- 3.10** Ten percent of the jobs in the Industrial units coming up in the Industrial Park, shall be reserved to the members of the families of landowners whose lands have been acquired for the Industrial Park, subject to eligibility as per qualifications prescribed, mutually agreed upon by the parties, for the jobs.
- 3.11** The LESSEE shall have to commence construction of buildings within six months from the date of allotment order and complete within 30 months from the date of allotment order.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

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3.12 The LESSEE shall implement the project within 36 months from the date of allotment order. However, if the LESSEE requests for extension of duration for implementation of the project, the LESSOR shall grant extension of time subject to penalty as per the prevailing policy of the LESSOR. Failure will entail cancellation and resumption of the allotted plot as per the Clause 12 of this deed.

3.13 The LESSEE shall comply with the conditions applicable to it, in the Environmental Clearance/Approvals/NOC obtained from the respective Competent Authorities by the LESSOR from time to time.

4 COVENANTS OF THE LESSOR

4.1 The LESSOR reserves the right to sell, lease or otherwise deal with any plot unleased or unsold, in any manner it deems suitable and the LESSEE shall not raise objections to the same.

4.2 It shall be open to the LESSOR to deal with the allotted plot taken by it under the rights conferred on it as per Clause 7.2 and Clause 12.2 in any manner it likes either by retaining or by leasing it to any other person, without any let or any hindrance or claim whatsoever to the LESSEE to compensation and the LESSEE has no right to interdict the same.

4.3 The LESSOR shall have the power to grant extension of time, subject to such conditions as may be imposed to the LESSEE in all matters which are required to be done or completed within the prescribed time, under this deed by imposing suitable penalties as per the prevailing policy of the LESSOR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


PROJECT OFFICER
SIPCOT, ERAIYUR.


Chairman / Director

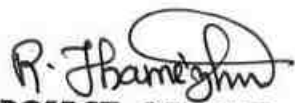
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- 4.4** The LESSOR or persons authorized by it shall have the right to enter upon and inspect the said allotted plot, during the currency of the lease at all times.
- 4.5** The LESSOR shall obtain the Environmental Clearances wherever applicable, DTCP approvals and other necessary statutory clearances for the Industrial Parks.
- 4.6** The LESSOR reserves the right to impose any further conditions and stipulations, or alterations in the regulations which are reasonable, justified and necessary at any time for the establishment of Industrial Park to implement the conditions of this deed and for the benefit of the Industrial Park as a whole by way of policy decisions and office orders/circulars which shall be published as and when imposed, which shall be binding thereon.
- 4.7** The LESSOR shall hold the original registered lease deed in its safe custody and a duplicate copy of the registered lease deed shall be given to the LESSEE.

5 CONSTRUCTION AND MAINTENANCE

- 5.1** The LESSEE shall construct all the buildings in the allotted plot, in conformity with the bye-laws of the local body and/or development and control regulations, building regulations in force from time to time, environmental laws, as well as any other laws, rules and regulations in force relating to the construction and use of premises.
- 5.2** All survey and other marks demarcating the boundaries of the plots, structures and installations shall be properly preserved and kept in


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For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

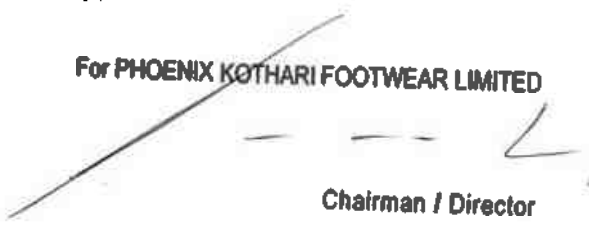


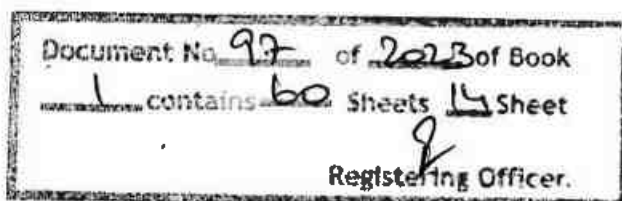
good condition by the LESSEE, at all times. Where more than one allottee is concerned with the same boundary marks and structures the LESSOR shall allocate this obligation suitably.

- 5.3** No temporary or semi-permanent structure shall be built on the plot except during the period of construction or reconstruction in future.
- 5.4** No construction with Katcha or inflammable materials will be permitted on the site allotted.
- 5.5** A setback of not less than 5 metres shall be left open to the sky, within the periphery of the plot on all sides.
- 5.6** The provision of any culvert across common drains must be got approved by the LESSOR.
- 5.7** Water lines should be designed in such a way that they are connected to the common lines of the LESSOR which will serve the plot.
- 5.8** The LESSEE should make its own arrangements to drain the rainwater from its plot into the common road drain provided by the LESSOR
- 5.9** The LESSEE shall not sink any well, bore well or tube well within the site allotted except with the prior permission of LESSOR, subject to the conditions as applicable. If any such well exists already in the plot it shall be closed when the LESSOR supplies water from a common source. If any bore well exists already, it shall be kept under the control of the LESSOR.


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SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director



5.10 LESSOR shall have the right to lay pipelines, sink bore wells or put up any facilities for common use within a strip of 5 meters left open on all sides within the periphery of the allotted plot without payment of any compensation or rental etc, to the LESSEE.

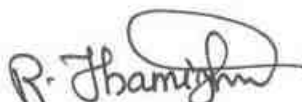
5.11 The LESSEE shall not draw water from their own Borewell/openwells/tubewells sunk in private lands adjacent to SIPCOT Industrial Park, through pipeline unauthorizedly trespassing into SIPCOT premises. If at any time, such trespass is found by LESSOR, penalty shall be levied as per the prevailing policy of the LESSOR and such trespassed water line shall be severed by the LESSOR and the same shall be removed by the LESSEE.

5.12 The LESSEE shall preserve the manholes constructed if any in the 5 metre corridor and raise the same at least 45 cm above the formation level in case the natural ground level is raised by the formation at their own cost with prior intimation and approval from the LESSOR.

6 ENVIRONMENTAL COMPLIANCES

6.1 The LESSEE has to make its own arrangements to treat the effluents solid/liquid to the required standards of the Competent Authorities and to regulate emissions and prevent fire hazards and comply with all the regulations in this regard.

6.2 The LESSEE shall not dump debris or any waste harmful or harmless materials within LESSOR's premises.


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For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

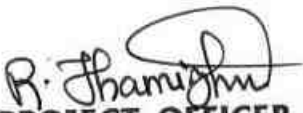
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- 6.3** The LESSEE shall not, at any time during the currency of the lease, cause or permit any nuisance in or upon the said allotted plot and in particular shall not use or permit the said allotted plot to be used for any purpose, which may be obnoxious or injurious or offensive by reason of deposits of solid matter or by harmful emissions or fire hazards or which may cause permanent damage to the allotted plot. The LESSOR shall have full right to prohibit or regulate these matters at all times.
- 6.4** The LESSEE shall carry out and comply with all conditions stipulated in the statutory Approvals/Clearance/NOC obtained from the Competent Authorities from time to time. In case of non-compliance of the LESSEE to such conditions, the same shall be communicated to the Competent Authorities to take remedial action.

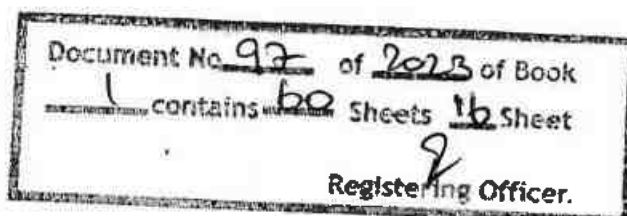
7 BANKING, MORTGAGE AND LOAN

- 7.1** It shall be open to the LESSEE to ask for in writing and the LESSOR to grant a 'No Objection' certificate, with or without conditions, to enable the LESSEE to mortgage its leasehold rights at any time after taking possession for obtaining financial assistance from Financial Institutions and banks for implementing the project in the allotted plot and for the projects implemented under the same legal entity of the LESSEE. The LESSEE shall not offer the allotted plot as a collateral security to avail loan for other purposes/sister concern etc.
- 7.2** The leasehold rights of the allotted plot shall not be sold or attached and sold in satisfaction of attachment of any debt(s) by the LESSEE


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

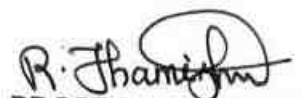


and if it so happens or is likely to happen without the knowledge of the LESSOR, the LESSOR shall be entitled to determine the lease and initiate proceedings under the provisions of the Tamil Nadu Public Premises (Eviction of Unauthorized Occupants) Act, 1975 or under any Statute for the time being in force for eviction against the LESSEE as well as for any other mode of recovery in force at that point of time as prescribed by law.

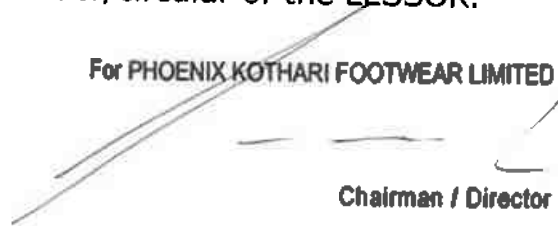
- 7.3** If the LESSEE fails to comply with any of the terms and conditions of the allotment order or of this lease deed, the NOC issued by the LESSOR in favor of the LESSEE for mortgaging the leasehold rights with the Financial Institutions/Banks shall stand cancelled and a copy of the notice mentioned in the Clause 12.1 shall be communicated to the Financial Institutions/Banks.

8 SUBLEASE AND ITS CONDITIONS

- 8.1** The LESSEE can sublease their built-up area for permitted industrial activity as per the prevailing office order/circular of the LESSOR, for a period of five years and renewable for every three years thereafter. The LESSEE shall pay the subleasing charges upfront annually at the rates specified in the prevailing office order/circular of the LESSOR.
- 8.2** The LESSEE shall communicate to the LESSOR of the sublease agreement entered into with the Sub-LESSE and the Self Declaration Form indicating the actual extent sub-leased, within 15 days from the date of the sub lease agreement. Any suppression of facts shall attract penalties as per the prevailing office order/circular of the LESSOR.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

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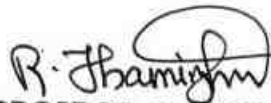
- 8.3** Further, if the LESSEE has implemented the project, LESSEE shall be permitted to construct Plug & Play Facility/Warehouse in the balance unutilized area and sub-lease the same, subject to remittance of applicable sub-leasing charges as per the prevailing office order/circular of the LESSOR.

9 TRANSFER OF LEASEHOLD RIGHTS

- 9.1** In an event where LESSEE wishes to transfer the leasehold rights either in whole or in part, the same shall be proceeded with after obtaining prior approval from the LESSOR.
- 9.2** On such approval from the LESSOR, a modified lease deed shall be executed by the LESSOR with the transferee entity to the extent transferred by the LESSOR.

10 CHANGE IN CONSTITUTION AND MANAGEMENT

- 10.1** The change in constitution in consonance with applicable laws, shall not be made without the prior approval of the LESSOR.
- 10.2** The change in management of the LESSEE entity shall not be made without the prior approval of the LESSOR. In such case, the LESSEE shall pay applicable transfer fee as per the prevailing Change in Management Policy of the LESSOR and a modified lease deed shall be executed and registered to that effect.
- 10.3** However, if any change in the directors/partners/shareholders of the LESSEE entity does not result in change in management, such change shall be intimated within 30 days from the date of change and


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Chairman / Director

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acknowledgement shall be obtained from the LESSOR. If there is any change in the name or the address of the registered office or administrative office of the LESSEE, the same should be intimated in writing to the LESSOR then and there along with the proof of such change.

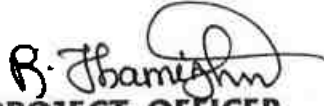
10.4 In the event of demise of the LESSEE, in a proprietorship concern, the legal heir or legal representatives shall intimate the same in writing to the LESSOR within 90 days from the date of such an event.

11 SURRENDER OF PLOT

11.1 The LESSEE may surrender the allotted plot or part thereof by executing/registering the surrender deed in favour of the LESSOR. In case of any existing mortgage of the allotted plot as stipulated in Clause 7.1, the LESSEE shall produce a "No Objection Certificate" or "No Due Certificate" from the concerned banks/financial institutions.

11.2 In case of any pending dues, charges, penalties to be paid by the LESSEE to any of the Competent Authorities and/or the LESSOR, the same shall be cleared by the LESSEE before executing the surrender deed.

11.3 Further, if any dues, charges or penalties are brought to the notice of the LESSOR after the execution of the surrender deed, the LESSEE shall be held responsible for clearing the same at any point of time after execution of the surrender deed.


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For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

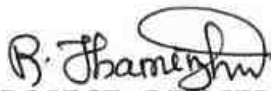
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- 11.4** On such a surrender, the LESSOR shall make a payment computed as per the prevailing surrender policy of the LESSOR. No compensation for improvement of building or other structures erected in the plot shall be made by the LESSOR.

12 CANCELLATION AND RESUMPTION

- 12.1** The LESSOR reserves the right to serve 90-days show cause notice for cancellation of the allotment and forfeiting the amount remitted for the plot allotted, if it is found that the LESSEE is in non-compliance of the terms and conditions of the allotment order or of this lease deed including non-implementation of the project and/or having unutilized extent of the allotted plot and/or non-payment of dues.
- 12.2** Unless it is rectified by the LESSEE within a period of ninety (90) days from the date of show cause notice issued by the LESSOR, the LESSOR reserves the right to cancel the allotment and initiate proceedings for resumption of the plot or part thereof under the provisions of the Tamil Nadu Public Premises (Eviction of Unauthorized Occupants) Act, 1975 or under any Statute for the time being in force for eviction against the LESSEE as well as for any other mode of recovery in force at that point of time as prescribed by law. In such an event, the LESSEE shall not be entitled for any compensation including plot cost, annual lease rent, interest and enhanced interest, compensation for any of the structures on the allotted plot or any refund of any amount that might have been paid by the LESSEE to the LESSOR by virtue of this deed.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

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12.3 In such case of resumption of the allotted plot or part thereof, the LESSEE shall remove the factory buildings, structures and fixtures located on the same, within the stipulated period as per the Acts and Statutes mentioned in Clause 12.2, failing which the LESSOR has the right to take possession of the same without paying any compensation for any of the factory buildings, structures and fixtures on the allotted plot or part thereof.

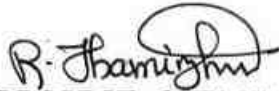
13 RENEWAL

13.1 The LESSOR, at the request and cost of the LESSEE at the end of the said term of 99 years may execute a new lease of the schedule mentioned plot by way of renewal for a similar period of 99 years on such covenants and provisions as may be mutually agreed to or as per the prevailing policy.

13.2 In case the LESSEE does not opt for renewal at the expiry of 99 years lease period, the LESSEE shall peacefully quit the allotted plot and deliver vacant possession to the LESSOR after removing the factory building, structures and fixtures without damaging the common amenities within a stipulated time. The LESSEE shall not claim any refund of any charges whatsoever.

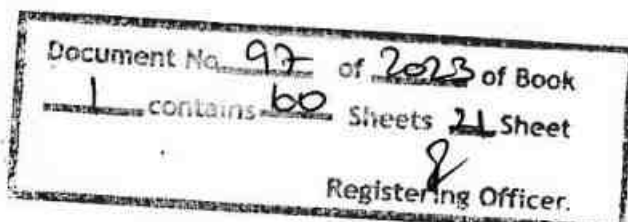
14 DISPUTE RESOLUTION, GOVERNING LAWS AND JURISDICTION

14.1 Any dispute or differences between the LESSOR and the LESSEE with regard to this lease deed shall be resolved amicably between the parties failing which such disputes shall be referred to a Sole Arbitrator. The Sole arbitrator shall be appointed by mutual consent of


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director



the LESSOR and the LESSEE as per the provisions of Arbitration and Conciliation Act 2016 or under any statute for the time being in force. This Lease deed shall be subject to the applicable laws of India and the courts in Chennai shall have exclusive Jurisdiction.

15 NOTICES

15.1 Unless otherwise notified in writing with acknowledgement due, the address for notice/correspondence to either of the parties hereto shall be hereunder:

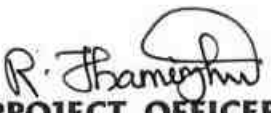
The LESSOR: M/s. State Industries Promotion Corporation of Tamil Nadu Limited, 19-A Rukmani Lakshmipathy Road, Egmore, Chennai - 600 008.

The LESSEE: M/s. Phoenix Kothari Footwear Ltd, Kothari Building, No. 114, Box No.3332 Mahatma Gandhi Salai, Nungambakkam High Road, Nungambakkam, Chennai - 600 034.

15.2 All notices/correspondence shall be sent in writing by electronic mail or by facsimile or by post.

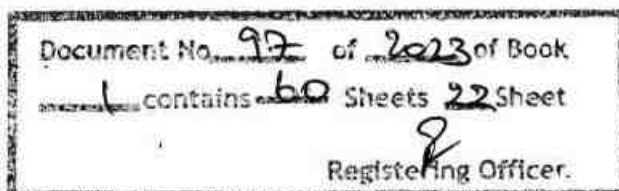
16 AUTHORISED SIGNATORIES

16.1 The signatories to this lease deed personally covenant that they are duly authorized to execute this lease deed on behalf of the respective party whom they represent.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

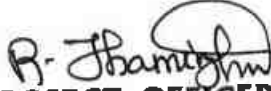


17 ORDERS

17.1 The LESSEE at all times shall strictly comply with prevailing office orders/circulars issued by the LESSOR which shall be published from time to time and shall be binding on the LESSEE thereon.

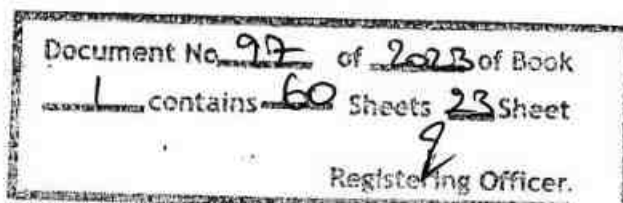
18 CONFIDENTIALITY

18.1 The parties agree that no announcement regarding the LESSOR/LESSEE and/or its business or the negotiations leading to this transaction will be made by the LESSOR/LESSEE to any third parties except to Court of Law and other persons who need to be aware of the transaction for the operation of the business of the LESSOR/LESSEE.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director



SCHEDULE - A

(Description of the Industrial Complex)

All that piece and parcel of land known as the Industrial Park Comprising of about **243.49** Acres of land situated in Eraiyur Revenue Villages of Veppanthattai Taluk, Perambalur District. But in compact block within the Taluk of Veppanthattai Valikandapuram Sub-Registration District of Perambalur of Revenue District. The Industrial Park, Eraiyur is bounded.

On the South by : Patta Land

On the North by : Patta Land

On the East by : Government & Patta Land

On the West by : M/s. Eraiyur Sugar Mill & Patta Land


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTRARI FOOTWEAR LIMITED


Chairman / Director

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SCHEDULE - B

(Description of the property concerned in this lease)

(Value of the property Rs 20,94,03,500 + Govt.

Subsidy Rs.10,47,01,750 = Rs. 31,41,05,250/-)

All that piece and parcel of land known as Plot No. **A-1** in the SIPCOT's Industrial Park at Eraiyur village within the village limits of Veppanthattai Taluk of Valikandapuram Sub-registration District of Perambalur in Revenue District containing by admeasurements **182.09 acres** or thereabouts and marked by Green Colored boundary lines on the plan annexed hereto, bearing Survey Nos. 241/2 pt,234,235/2,261 pt,259,233,232pt,231/3pt,273/1,273/3,273/2,275/1pt,275/3pt,276,277/2, 272,274/1,274/3pt,278,266,269,271/1,271/3pt,271/2,280pt,282pt,283pt, 267,268,270/1pt,270/3pt,270/2,281 as mentioned above and bounded.

On the South By : Private Land

On the North By : Private Land

On the East By : Private Land

On the West By : Private Land

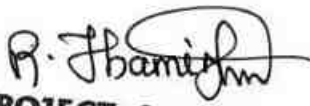
LINEAR MEASUREMENTS:

East to West on the North - 817.05 Meters.

East to West on the South - 1310.05 Meters.

North to South on the East - 3111.01 Meters.

North to South on the West - 1684.29 Meters.


PROJECT OFFICER
SIPCOT, ERAIYUR.

For PHOENIX KOTHARI FOOTWEAR LIMITED

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Registering Officer.

Chairman / Director



..26..

IN WITNESS WHEREOF Tmt R. Thamizhselvi (PAN: **AJSPT4386P**) Daughter of Thiru. V. Ramalingam, Project Officer i/c, SIPCOT Industrial Park, Eraiyur, Perambalur District acting for and on behalf of the LESSOR and Chairman Thiru. J. Rafiq Ahmed acting for an on behalf of the LESSEE have hereunto set their hands on the Day, Month Year first above written.


PROJECT OFFICER
SIPCOT, ERAIYUR.
Signature of Lessor
(Party of the First Part)

WITNESS:

1. 
(P. ANBARASAN)
SIPCOT Project Office
Cuddalore
2. P. Rajinder.
S/o. Patturaju
Semmanuruppan
Cuddalore.

For PHOENIX KOTHARI FOOTWEAR LIMITED


Chairman / Director

Signature of Lessee
(Party of the Second Part)

Signed and delivered in the presence of:

WITNESS:

1. 
(M. Motan)
Poondharali
Chennai.
2. S. Murugan
(S. Murugan)
S/o. Sathyan
Asirvathapuram,
Chennai.

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<u>2</u> Registering Officer.



..27..

IN WITNESS WHEREOF THE Common Seal of **M/s.Phoenix Kothari Footwear Limited** (the LESSEE has hereunto been affixed on this 6th day of **January 2023 (Two thousand twenty three only)** Pursuant to the Resolution of the Board dated **09th December 2022** in the presence of the company Chairman **Thiru.J.Rafiq Ahmed** of the company.

Common seal of the
Company



IN PRESENCE OF:

1.

DRAFTED BY:



Document writer Name
Address

: **S.RAMARAJ**
: **Main Road,**
: **Valikandapuram**

Mobile No
Licence No

: **9443326535**
: **D.L.No.A30/AYR/92,**

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Registering Officer.



UNDERTAKING

To
The Sub-Registrar,
Sub Registration Office
Valikandapuram

Date: 06.01.2023

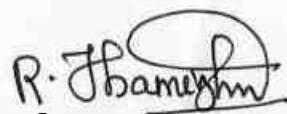
Sir,

I hereby informed that as per G.O.Ms.No.167, dated.27.11.2021, the Guidance , Tamil Nadu has categorized the Districts as A, B & C and in accordance with the guide lines issued by the Guidance, Tamil Nadu Industries Department granting concession of 100% stamp duty as defined in the Tamil Nadu Industrial Policy 2021.

In Notification -I, in exercise of the powers conferred by clause (a) of Sub-Section (1) of section 9 of the Indian Stamp Act, 1899 (Central Act II of 1899), the Governor of Tamil Nadu hereby remits the duty chargeable under the Act in respect of instruments of sale or lease or lease-cum-sale executed in respect of the 100% stamp duty exemption in respect of Large, Mega and Ultra-Mega projects in SIPCOT / SIPCOT JV / SIDCO Industrial Parks in "C" Category Districts. Perambalur District comes under the 'C' District.

Moreso, M/s. Phoenix Kothari Footwear Ltd was allotted 182.09 acres at Eraiyur village, Perambalur District for setting up Footwear, Footwear components and its allied products and has to create Rs.2020.94 crores towards eligible fixed assets and the Project comes under the category of "MEGA". Hence, as per the G.O. Ms.No.167 dt.27.11.2021 under the categorized the Districts "C". Hence, Tamil Nadu Industries Department granting concession of 100% stamp duty as defined in the Tamil Nadu Industrial Policy 2021.

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Registering Officer.


The Project Officer, 23
Sipcot Industrial Park, Eraiyur
Perambalur District.



R/வாலிகண்டாபுரம்/புத்தகம்-1/97/2023

1899ம் ஆண்டு இந்திய முத்திரைச் சட்டம் 42வது பிரிவின் கீழான சான்று

2023ம் ஆண்டு வரிசை எண் 28

பெரம்பலூர், பெரம்பலூர், பெரம்பலூர், தமிழ்நாடு, இந்தியா, 621212-ல் வசிக்கும் திருமதி தமிழ்ச்செல்வி என்பவரிடமிருந்து ₹ 20/- (ரூபாய் இருபது மட்டும்) இந்த ஆவணத்திற்காக இந்திய முத்திரைச் சட்டம் 41வது பிரிவின் படி குறைவாயிருந்த முத்திரைக் கட்டணம் வசூலிக்கப்பட்டது என நான் இதன் மூலம் சான்றளிக்கிறேன்.

சார்பதிவாளர் : வாலிகண்டாபுரம்
நாள்: 09/01/2023

சார்பதிவாளர் மற்றும் இந்திய முத்திரைச் சட்டம் பிரிவு
41ன் படி ஆட்சியர்



2023 ஆம் ஆண்டு ஜனவரி மாதம் 09ம் தேதி பி.ப. 04:07 மணியளவில் வாலிகண்டாபுரம் சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 20,995/- செலுத்தியவர்.

இடது பெருவிரல்



R. Jhamrath
PROJECT OFFICER
SIPCOT, ERAIYUR.

கூடுதல் விவரங்கள் ஆவண வாசகத்தில்
உள்ளபடி.

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



R. Jhamrath
PROJECT OFFICER
SIPCOT, ERAIYUR.

"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற
வழி இந்த நபரின் அடையாளம் விரல் ரேகை
மூலம் ஆதார் ஆணையத்துடன்
சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :

UKC:195592b698f6f05ae74d78ae589c3aae1ad74d

(Details from UIDAI : Thamizhselvi W/O Durairajan, 25-06-1965, xxxxxxxx9138)



எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்
இடது பெருவிரல்



For PHOENIX KOTHARI FOOTWEAR LIMITED

Chairman / Director

"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற
வழி இந்த நபரின் அடையாளம் விரல் ரேகை
மூலம் ஆதார் ஆணையத்துடன்
சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :

UKC:5057057ec0001289d8496aa67789cc5ee6f6ec

(Details from UIDAI : Rafiq Ahmed J S/O: Jinnah N K,
17-08-1974, xxxxxxxx5191)



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செல்லப்பெருமாள் த
சார்பதிவாளர்
வாலிகண்டாபுரம்

சார்பதிவாளர் : வாலிகண்டாபுரம்

சென்னைப் பொதுமன்றத் துறைமுகத்துறைமுகம்
சார்புத் துறைமுகம்



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1 contains 60 Sheets 30 Sheet
Registering Officer.

SIPCOT INDUSTRIAL PARK, ERAIYUR VILLAGE, PERAMBALUR DIST

Taluk : Veppanthattai

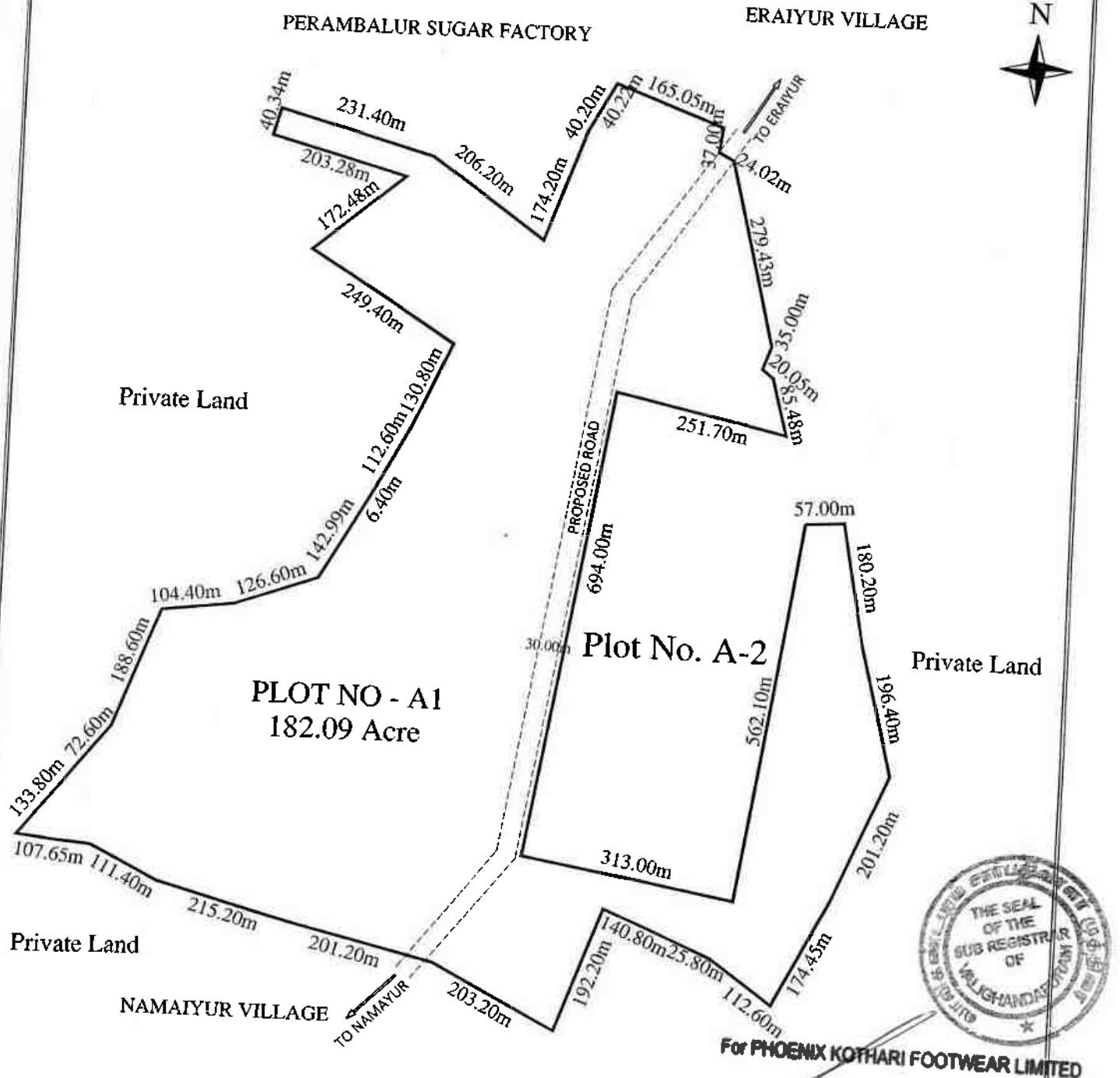
Plot No.: A-1

District: Perambalur

Village: Eraiyur

Extent : 182.09 Acres

S.F.No. Eraiyur: 241/2 Part, 234, 235/2, 261 Part, 259, 233, 232 Part, 231/3 Part, 273/1, 273/3
273/2, 275/1 Part, 275/3 Part, 276, 277/2, 272, 274/1, 274/3 Part, 278, 266, 269, 271/1, 271/3
Part, 271/2 , 280 Part, 282 Part, 283 Part, 267, 268, 270/1 Part, 270/3 Part, 270/2, 281



PLOT A-1 ALLOTTED TO M/S.PHOENIX KOTHARI FOOTWEAR LTD

SCALE 1:500

ALL DIMENSIONS IN METERS

R. Thangam
PROJECT OFFICER
SIPCOT, ERAIYUR.

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Registering Officer.

ந.க.அ2 /150/2022

நாள்: 25.11.2022



நில சுவாதின ஒப்படை சான்று

பெரம்பலூர் மாவட்டம், வேப்பந்தட்டை வட்டம், எறையூர் கிராமம் புல எண். 231/1 முதலானவற்றில் 98.58.00 ஹெக்டேர் நிலத்தை முன் நுழைவு அனுமதி வழங்கி பெரம்பலூர் மாவட்ட ஆட்சித்தலைவர் அவர்களின் செயல்முறைகள் ந.க.இ2/14640/2022 நாள்:09.09.2022 -ன் படியும் ஆணையிடப்பட்டுள்ளது.

மேற்படி முன் நுழைவு அனுமதி வழங்கப்பட்டுள்ள 98.58.00 ஹெக்டேர் நிலத்திற்குண்டான நில மதிப்பு தொகை ரூ.9,61,75,634/- உப்பிரிவு கட்டணம் 1200/- மற்றும் கல் கட்டண தொகை ரூ.833/- ஆக கூடுதல் ரூ.9,61,77,667/-(ரூபாய் ஒன்பது கோடியே அறுபத்தொரு லட்சத்து எழுபத்தேழாயிரத்து அறுநூற்று அறுபத்து ஏழு மட்டும்) -ஐ கோரிக்கை துறையினரான தமிழ்நாடு தொழில் முன்னேற்ற நிறுவனத்தினரிடம் இருந்து வங்கி வரைவோலையாக பெறப்பட்டு உரிய கணக்கில் 27.10.2022 அன்று செலுத்தப்பட்டுள்ளது. எனவே நில உரிமை மாற்றம் செய்யப்பட்டுள்ள கீழ்கண்ட அட்டவணையில் கண்டுள்ள புல எண்கள் M/S SIPCOT நிறுவனத்திடம் ஒப்படைக்கப்படுகிறது.

வ.எண்	கிராமம்	புல எண்	திட்டப்பரப்பு(ஹெக்டேர்)
1	எறையூர்	231/3	178.5
2	எறையூர்	232	3.875
3	எறையூர்	233	4.120
4	எறையூர்	234	3.875
5	எறையூர்	235/2	290.0
6	எறையூர்	241/2	3.275
7	எறையூர்	259	4.750
8	எறையூர்	261	293.0
9	எறையூர்	266	3.830

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10.	எறையூர்	267	4.06.5
11.	எறையூர்	268	4.98.0
12.	எறையூர்	269	5.07.5
13.	எறையூர்	270/1	2.96.0
14.	எறையூர்	270/2	0.12.0
15.	எறையூர்	270/3	0.33.5
16.	எறையூர்	271/1	3.05.0
17.	எறையூர்	271/2	0.17.0
18.	எறையூர்	271/3	0.74.5
19.	எறையூர்	272/1	0.00.5
20.	எறையூர்	272/2	4.50.0
21.	எறையூர்	273/1	3.68.0
22.	எறையூர்	273/2	0.19.50
23.	எறையூர்	273/3	1.74.0
24.	எறையூர்	274/1	2.98.5
25.	எறையூர்	274/2	0.18.0
26.	எறையூர்	274/3	1.24.5
27.	எறையூர்	275/1	1.62.5
28.	எறையூர்	275/2	0.32.0
29.	எறையூர்	275/3	1.95.5
30.	எறையூர்	275/4	0.41.5

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 Registering Officer 211



31	எறையூர்	276/1	0.90.5
32	எறையூர்	276/2	0.215
33	எறையூர்	276/3	3.675
34	எறையூர்	277/1	0.00.5
35	எறையூர்	277/2	2.915
36	எறையூர்	278	3.975
37	எறையூர்	279	4.745
38	எறையூர்	280	2.68.0
39	எறையூர்	281	2.89.0
40	எறையூர்	282	2.34.0
41	எறையூர்	283	2.55.0
		கூடுதல்	98.58.0

என்னால் ஒப்படைக்கப்பட்டது

[Handwritten Signature]
 வருவாய்துறை அலுவலர்
 வேப்பந்தலை.

என்னால் பெற்றுக்கொள்ளப்பட்டது

[Handwritten Signature]
 திரு. குமாரசென்
 திட்ட அலுவலர்
 சிங்காட், பெரம்பலூர்

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 Registering Officer.



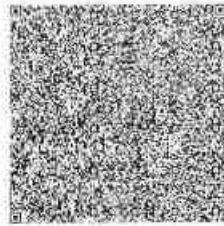


இந்திய அரசாங்கம்
Government of India

இந்திய அடையாள அமைப்பு ஆளமைப்பு அமைப்பு
Unique Identification Authority of India

பதிவேட்டு எண் / Enrolment No.: 2843/03001/00271

To
தமிழ்செல்வி
Thamizhselvi
W/O Durairajan
NO 1623
SUBBU NAGAR
KOOTHAPAKKAM
Cuddalore
Cuddalore Tamil Nadu - 607002
9442867320



உங்கள் ஆதார் எண் / Your Aadhaar No. :

2153 8734 9138

VID : 9103 2944 8150 5451

எனது ஆதார், எனது அடையாளம்



இந்திய அரசாங்கம்
Government of India



தமிழ்செல்வி
Thamizhselvi
பிறந்த நாள்/DOB: 25/06/1965
பெண் / FEMALE

2153 8734 9138

VID : 9103 2944 8150 5451

எனது ஆதார், எனது அடையாளம்



Government of India



AADHAAR

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று குடியரிமைக்கு அல்ல.
- பாதுகாப்பான OR குறியீடு ஆப்ஸைன் XML / ஆப்ஸைன் அங்கீகாரத்தைப் பயன்படுத்தி அடையாளத்தை சரிபார்க்கவும்.
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

INFORMATION

- Aadhaar is a proof of identity, not of citizenship.
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- This is electronically generated letter.

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.
- பல்வேறு அரசு மற்றும் அரசு சாரா சேவைகளை எளிதில் பெற ஆதார் உதவுகிறது.
- உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடியை ஆதாரில் புதுப்பிக்கவும்.
- நேரடியாக செயலிழைப்பு பயன்படுத்தி உங்கள் எம்மார்டு போனில் ஆதாரை எடுத்துக் செல்லுங்கள்.

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- Aadhaar helps you avail various Government and non-Government services easily.
- Keep your mobile number & email ID updated in Aadhaar.
- Carry Aadhaar in your smart phone – use mAadhaar App.

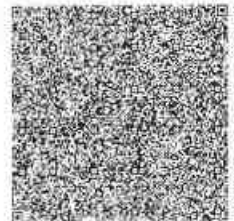


இந்திய அடையாள அமைப்பு ஆளமைப்பு அமைப்பு
Unique Identification Authority of India



முகவரி:
W/O துரைராஜன், எண் 1623, சுப்பு நகர்,
கூடலூர் பாககம், த.நா. (கூடலூர், த.கூடலூர்),
கூடலூர் - 607002

Address:
W/O Durairajan, NO 1623, SUBBU NAGAR,
KOOTHAPAKKAM, Cuddalore, Cuddalore,
Tamil Nadu - 607002



2153 8734 9138

VID : 9103 2944 8150 5451

1947

help@uidai.gov.in

www.uidai.gov.in

R. Thamizhselvi

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Registering Officer.





भारतीय विशिष्ट पहचान प्राधिकरण
भारत सरकार
Unique Identification Authority of India
Government of India



E-Aadhaar Letter

பதிவேட்டு எண்/Enrolment No.: 2017/30845/09544

Rafiq Ahmed J (ரஃபிக் அகமது ஜி)

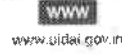
S/O: Jinnah N K, 25/8, 2ND STREET PERAMBUR
HIGH ROAD, Perambur Barracks, Chennai,
Tamil Nadu - 600012

உங்கள் ஆதார் எண்/ Your Aadhaar No.:

5907 2949 5191



ஆதார் -சாதாரண மனத்களின் ஆதிகாரம்



Signature Not Verified
Digitally signed by Sandeep Bhardwaj
Date: 2015.07.01 12:16:36 IST

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.
- ஆதார் ஆதார் பெறுவதற்கு ஒரே ஒரு முறை மட்டுமே நீங்கள்
லிண்டைப்பத்தை பூர்த்தி செய்து பதிவு செய்ய வேண்டிய
அவசியம் ஏற்படும்.
- தயவுசெய்து உங்களின் சமீபத்தைய பதிவு மெய்பைத் தம்பர்
மற்றும் e-மெயில் முகவரியை பதிவு செய்யவும். இதனால்
உங்களுக்கு பல்வேறு வசதிகளை பெற்றுக் கொள்ளும்
செளகரியம் கிடைக்கும்.

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भारतीय विशिष्ट पहचान प्राधिकरण
UNIQUE IDENTIFICATION AUTHORITY OF INDIA



ரஃபிக் அகமது ஜி
Rafiq Ahmed J
பிறந்த நாள்/ DOB: 17/08/1974
ஆண் / MALE



முகவரி:

தந்தை / தாய் பெயர்:
ஜின்னா என் கே. 25/8,
2வது தெரு பெரம்பூர் ஹை
ரோடு, பெரம்பூர் பேரகல்,
சென்னை,
தமிழ் நாடு - 600012

Address:

S/O: Jinnah N K, 25/8, 2ND
STREET PERAMBUR HIGH ROAD,
Perambur Barracks, Chennai
Tamil Nadu - 600012

5907 2949 5191

5907 2949 5191

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Registering Officer.





இந்திய அடையாள ஆய்வு அமைப்பு

இந்திய அரசாங்கம்

Unique Identification Authority of India
Government of India

பதிவேட்டு எண்/Enrolment No.: 0000/00381/03474

To
பொ அன்பரசன்
P Anbarasan
S/O Ponnurangam
83
Vinayagar koil veethi
T Kumarapuram
Tottappattu
Cuddalore Nathapattu
Tamil Nadu - 607109
9092318286

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Date: 17/07/2017



உங்கள் ஆதார் எண் / Your Aadhaar No. :

6479 6593 4646

எனது ஆதார், எனது அடையாளம்



இந்திய அரசாங்கம்
Government of India



பொ அன்பரசன்
P Anbarasan
பிறந்த நாள்/ DOB: 18/11/1989
ஆண் / MALE



6479 6593 4646

எனது ஆதார், எனது அடையாளம்

P. Anbarasan



Government of India



AADHAAR

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று, குடியுரிமைக்கு அல்ல.
- அடையாள சான்றை ஆன்லைன் ஆதனடிகேஷன் மூலமாகப் பெறவும்.
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

INFORMATION

- Aadhaar is a proof of identity, not of citizenship.
- To establish identity, authenticate online.
- This is electronically generated letter.

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.

- வருங்காலத்தில் அரசு மற்றும் அரசு சாரா சேவைகளை பயன்படுத்திக் கொள்ள ஆதார் உதவிகரமாக இருக்கும்.

- Aadhaar is valid throughout the country.

- Aadhaar will be helpful in availing Government and Non-Government services in future.



இந்திய அடையாள ஆய்வு அமைப்பு
Unique Identification Authority of India

முகவரி:
S/O பொன்னுரங்கம், எண்
83, விநாயகர் கோயில் வீதி,
டி குமராபுரம்,
தோட்டப்பட்டு, கடலூர்,
தமிழ்நாடு - 607109

Address:
S/O Ponnurangam, 83,
Vinayagar koil veethi, T
Kumarapuram, Tottappattu,
Cuddalore,
Tamil Nadu - 607109

6479 6593 4646

1947

help@uidai.gov.in

www.uidai.gov.in

Document No. 97 of 2023 of Book
1 contains 60 Sheets 37 Sheet
Registering Officer.



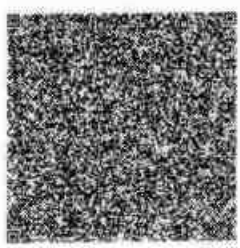
இந்திய அரசாங்கம்
Government of India

இந்திய தனிப்பட்ட அடையாள அமைப்பு
Unique Identification Authority of India

பதிவு எண் / Enrolment No.: 2726/12126/58265

To
வெங்கடேசன் பி
Rajendran P
S/O Patturaja R
No 15A
Semmankuppam
Cuddalore Tamil Nadu - 607005
9994949773

Validly unknown



உங்கள் ஆதார் எண் / Your Aadhaar No. :
6379 1503 2398
VID : 9178 3491 3348 4250

எனது ஆதார், எனது அடையாளம்

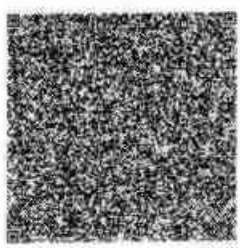
இந்திய அரசாங்கம்
Government of India

இந்திய தனிப்பட்ட அடையாள அமைப்பு
Unique Identification Authority of India

பதிவு எண் / Enrolment No.: 2726/12126/58265

To
வெங்கடேசன் பி
Rajendran P
பிறந்த நாள் / DOB: 10/01/1973
ஆண் / MALE

Validly unknown



உங்கள் ஆதார் எண் / Your Aadhaar No. :
6379 1503 2398
VID : 9178 3491 3348 4250

எனது ஆதார், எனது அடையாளம்

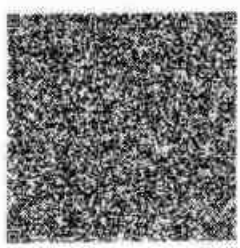
இந்திய அரசாங்கம்
Government of India

இந்திய தனிப்பட்ட அடையாள அமைப்பு
Unique Identification Authority of India

பதிவு எண் / Enrolment No.: 2726/12126/58265

To
வெங்கடேசன் பி
Rajendran P
S/O Patturaja R
No 15A
Semmankuppam
Cuddalore Tamil Nadu - 607005
9994949773

Validly unknown



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6379 1503 2398
VID : 9178 3491 3348 4250

எனது ஆதார், எனது அடையாளம்

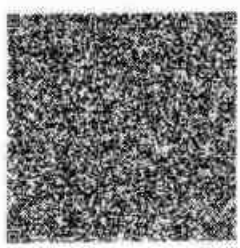
இந்திய அரசாங்கம்
Government of India

இந்திய தனிப்பட்ட அடையாள அமைப்பு
Unique Identification Authority of India

பதிவு எண் / Enrolment No.: 2726/12126/58265

To
வெங்கடேசன் பி
Rajendran P
பிறந்த நாள் / DOB: 10/01/1973
ஆண் / MALE

Validly unknown



உங்கள் ஆதார் எண் / Your Aadhaar No. :
6379 1503 2398
VID : 9178 3491 3348 4250

எனது ஆதார், எனது அடையாளம்

P Rajendran

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Registering Officer.



UNION OF INDIA Driving Licence (Tamil Nadu)

DL No. TN07 19980006668

Date of Issue: 27-10-1998

Valid Till: 30-11-2029

Date of Birth: 15-04-1950

Name: MURUGAN S

Son/Daughter/Wife of: SADAIYAN

Vehicle Category: LMV

Valid Till: 27-10-1998

Address: OLD 60, NEW 142, ASIRVADHAM 13TH LNE, CHENNAI CHENNAI 600001

Signature of Issuing Authority: TN04 CHENNAI EAST RTO

TND00010433

TN07 19980006668

Vehicle Category: LMV

Valid Till: 27-10-1998

Address: OLD 60, NEW 142, ASIRVADHAM 13TH LNE, CHENNAI CHENNAI 600001

Signature of Issuing Authority: TN04 CHENNAI EAST RTO

S. madagan

Document No. 92 of 2023 of Book

1 contains 60 Sheets 39 sheet

Registering Officer.




இந்திய அரசாங்கம்
Government of India

மோகன் மா
Mohan M
பிறந்த நாள் / DOB : 05/12/1986
ஆண்பால் / Male

7545 1352 7994
எனது ஆதார், எனது அடையாளம்


ஆதார்
முகவரி
S/O மாதவன், 34, ராமானுஜம்
கூடம் தெரு, பூந்தமல்லி
திருவள்ளூர், பூந்தமல்லி தமிழ்
நாடு, 600056
Address:
S/O Madhavan, 34, ramanujam
koodam street, Poonthamallee,
Tiruvallur, Poonthamallee, Tamil
Nadu, 600056
7545 1352 7994
 1947
 uaid@nic.gov.in
 www.uaid.gov.in

M. Mohan

Document No. 92 of 2023 of Book
1 contains 60 Sheets 40 Sheet
 Registering Officer.





SIPCOT

1

P-III/SIP-Eraiur/Phoneix Kothari/2022

DATE: 25.11.2022

ALLOTMENT ORDER FOR PLOTS

M/s.Phoenix Kothari Footwear Ltd.,
Kothari Building, 114, 4th Floor,
MG Salai, Nungambakkam,
Chennai - 600 034.

D
25/11/22 / BY RPAD / MAIL /
PO

Dear Sir(s),

Sub : SIPCOT Industrial Park, Eraiur (C District) - Allotment of Plot No.A-1
measuring 233.49 acres - Orders - Issued.

Ref : 1. This Office "In-principle" approval dt.18.10.2022
2. Your application dated 25.11.2022

&&&&&&

1

1.1 The following plot in SIPCOT Industrial Park, Eraiur (C District) at Perambalur is allotted on lease for a period of ninety-nine years for setting up an industrial unit for the manufacture of **Footwear, Footwear Components and allied products.**

S.No.	Description	Particulars
a)	Plot No.	A-1
b)	Total Extent of the Plot (in Acres)	233.49 acres (including 1.77 acre of vandipathai)
c)	Water Quantity (in KLD)	4,000 KL

1.2 The extent mentioned above is subject to such modification as may be necessary with reference to the measurements made at the time of handing over the site. The total amount payable will also stand accordingly modified.

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<u>1</u> contains <u>60</u> Sheets <u>41</u> Sheet
Registering Officer.



State Industries Promotion Corporation of Tamil Nadu Limited

(A Government of Tamil Nadu Undertaking)

CIN : U74999TN1971SGC005967

Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No. 7223, Egmore, Chennai - 600 008.
Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in



SIPCOT

2

2

Sl. No.	Description	Amount (in Rs.)
A.	Plot cost	
(i)	Amount towards plot extent allotted @ Rs.17.25 Lakhs per acre (after adjustment of land cost incentive @ 25% of plot allotment rate per acre extended by SIPCOT) 233.49 x 17,25,000	Rs.26,85,13,500/-
(ii)	Frontage Charges	Rs.40,27,70,250/- NIL
(iii)	50% Capital Cost on Water supply for the allocated quantity (Quantity x Rate per KL), if applicable	NIL
	Total (i+ii+iii)	Rs.40,27,70,250/-
(iv)	Less: 25% Government subsidy for extent allotted [1/3 of above]	Rs.13,42,56,750/- Rs.26,85,13,500/-
B.	Less: Initial Deposit	
C.	Balance amount payable (A - B)	Rs.1,16,74,500/-
D.	Caution Deposit (@ 5 % on A above)	Rs.25,68,39,000/-
E.	Lease Rent in Advance	Rs.1,34,25,675/-
F.	Total amount Payable (C+D+E)	Rs.100/- Rs.27,02,64,775/-

(Rupees Twenty seven crores two lakhs sixty four thousand seven hundred and seventy five only)

2.1 The Allottee shall pay caution deposit which shall be interest free and refunded if the Allottee implements the project within the stipulated time as per the Allotment Order/Lease Deed.

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Registering Officer.

State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)
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SIPCOT

- 2.2 The Allottee shall pay a sum of Rs.100/- (Rupees One hundred only) towards 100% of the annual lease rent in advance. The annual lease rent is computed at Re. One per year for 98 years and Rs.2/- for the 99th year.
- 2.3 The Allottee shall execute an agreement for water supply at the time of taking possession of the plot and comply with all terms and conditions of the agreement. The Allottee shall pay water charges at the rate fixed by SIPCOT from time to time abiding by the terms of water supply agreement executed.
- 2.4 The Allottee shall pay the charges towards the cost of trees, wells and structures, if any, in the allotted plot as prescribed by SIPCOT.
- 2.5 In the event of SIPCOT taking up any additional development facilities and/or in case of escalation in cost of development works in future, SIPCOT shall apportion such expenses among the Allottees of the Industrial Park on pro-rata basis. In such an event SIPCOT reserves the right to claim such apportioned expenses and the Allottee shall pay the same without any demur, within thirty (30) days from the date of issue of demand notice by SIPCOT.
- 2.6 Annual maintenance charges for the common amenities and facilities like roads, street lighting, sanitation, drainage, common buildings, avenue plants, parks etc., will from time to time be apportioned among the Allottees in the Industrial Park as per the prevailing policy. The Allottee shall pay the same without any demur within the period prescribed. Non-payment on due date will automatically entail an interest of 12% per annum or such other rate as may be prescribed from time to time.
- 2.7 The Participatory Infrastructure Development Programme is a scheme for upgradation of existing infrastructure and provision of support infrastructure facilities for the respective Industrial Park at the request of the Allottees/Association of Allottee in the Industrial Park. In the event of taking up of any such project under PIDP scheme by SIPCOT, the Allottee shall pay proportionate amount of 50% of the project cost as per the prevailing policy.

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State Industries Promotion Corporation of Tamil Nadu Limited

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Phone : 45261777. Fax : 45261796 Website : www.sipcot.tn.gov.in





SIPCOT

- 2.8 The Allottee shall pay all existing and future rates and taxes, charges, claims and assessments, chargeable against the Allottee or arising out of the acts of the Allottee in usage of the allotted plot and any building erected thereon and/or services received.
- 2.9 The Allottee shall bear all expenses in connection with the drawing of power from the main lines to the plot for the supply of electricity and/or any other support infrastructure facilities.
- 2.10 The Allottee shall not raise any claim or seek refund of any of the above charges except for the caution deposit as mentioned in Condition 2.1.

3

- 3.1 The Allottee shall comply with the conditions stipulated in col. (2) of the table within the period prescribed in col.(3) as under :

S.No. (1)	Condition (2)	Time Period (3)
a)	Communicate the acceptance of this allotment order in the duplicate copy of this allotment order.	Within 7 days (Due Date: 01.12.2022) from the date of this order, the Allottee shall submit the acceptance copy of the allotment order along with the declaration that the prevailing office orders/circulars related to allotment as published in the SIPCOT website, have been read with and are accepted. In case it is not received by SIPCOT within the stipulated time, the allotment shall stand automatically cancelled and initial deposit paid for the extent allotted shall be forfeited.

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State Industries Promotion Corporation of Tamil Nadu Limited
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Phone : 45261777, Fax : 45261796 Website : www.sipcot.tn.gov.in



SIPCOT

b)	Pay 100% of the amount payable as 2 [F]	Within 30 days (Due Date: 24.12.2022) from the date of this order failing which the allotment shall stand automatically cancelled and the initial deposit paid for the extent allotted shall be forfeited.
c)	Execute the lease deed in the prescribed format with the concerned Project Officer and register the same.	Within 45 days from the date of payment of amount as in 2[F]. If the Allottee fails to execute the Lease deed within the stipulated time, a penalty of 0.5% of the prevailing plot cost shall be levied for every 30 days beyond the stipulated time.
d)	Take over the possession of the plot in 'as is where is' condition from the Project Officer concerned.	Within 15 days from the date of execution/registration of lease deed. Failure to do so will entitle SIPCOT to cancel the allotment and execute the cancellation deed.
e)	Implementation of the project.	Within 36 months from the date of this allotment order. Failure will entail cancellation of allotment and resumption of the plot as per the Condition 10 of this allotment order, unless otherwise an extension of time is granted with penalty as per the prevailing policy of SIPCOT.

4

- 4.1 The Allottee shall construct all the buildings in the allotted plot, in conformity with the bye-laws of the local body and/or development and control regulations, building regulations in force from time to time, environmental laws, as well as any other laws, rules and regulations in force relating to the construction and use of premises.

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Registering Officer.

State Industries Promotion Corporation of Tamil Nadu Limited

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SIPCOT

- 4.2 The allottee shall have to commence construction of buildings within six months and complete within 30 months from the date of allotment order.
- 4.3 No temporary or semi-permanent structure shall be built on the plot except during the period of construction or reconstruction in future.
- 4.4 No construction with Katcha or inflammable materials will be permitted on the site allotted.
- 4.5 A setback of not less than 5 metres shall be left open to the sky, within the periphery of the plot on all sides.
- 4.6 The provision of any culvert across common drains must be got approved by SIPCOT
- 4.7 The Allottee should make its own arrangements to drain the rainwater from its plot into the common road drain provided by SIPCOT
- 4.8 Water lines should be designed in such a way that they are connected to the common lines of the SIPCOT which will serve the plot.
- 4.9 The Allottee shall not sink any well, bore well or tube well within the site allotted except with the prior permission of SIPCOT, subject to the conditions as applicable. If any such well exists already in the plot it shall be closed when SIPCOT supplies water from a common source. If any bore well exists already it shall be kept under the control of SIPCOT.
- 4.10 The Allottee shall not draw water from their own Borewell/open wells/tube wells sunk in private lands adjacent to SIPCOT Industrial Park, through pipeline unauthorizedly trespassing into SIPCOT premises. If at any time, such trespass is found by SIPCOT, penalty shall be levied as per the prevailing policy of SIPCOT and such trespassed water line shall be severed by SIPCOT and the same shall be removed by the Allottee.

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State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)

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SIPCOT

4.11 The Allottee shall preserve the manholes constructed if any in the 5 metre corridor and raise the same at least 45 cm above the formation level in case the natural ground level is raised by the formation at their own cost with prior intimation and approval from SIPCOT.

5

- 5.1 SIPCOT or persons authorized by it shall have the right to enter upon and inspect the allotted plot during the currency of the lease at all times.
- 5.2 SIPCOT shall have the right to lay pipelines, sink bore wells or put up any facilities for common use within a strip of 5 meters left open on all sides within the periphery of the allotted plot without payment of any compensation or rental etc, to the Allottee.
- 5.3 With the consent of the Allottee, SIPCOT shall have the right of access into and utilising any portion of the allotted plot, as required at all times, for the purpose of laying pipelines, cables, underground drainages, channels, or providing such other common facility. SIPCOT shall have further right within the area of the allotted plot including the building standing thereon as and when felt necessary by SIPCOT, to lay down, place, maintain, alter, remove or repair any pipes, pipe lines, conduits for service lines, posts, or other appliances or apparatus in, on, under, over, along or across the plot in such area for the purposes of providing any common amenities or services for the Industrial Park and the same may be done either directly by any person either generally or specially authorised by SIPCOT in this behalf and the Allottee agrees for the same.
- 5.4 SIPCOT reserves the right to impose any further conditions and stipulations, or alterations in the regulations which are reasonable, justified and necessary at any time for the establishment of Industrial Park and for the benefit of the Industrial Park as a whole by way of policy decisions and office orders/circulars which shall be published as and when imposed, and such applicable office orders/circulars shall be binding on the Allottee.

Document No. <u>97</u> of <u>2013</u> of Book
<u>1</u> contains <u>60</u> Sheets <u>47</u> Sheet
Registering Officer

State Industries Promotion Corporation of Tamil Nadu Limited

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Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in





SIPCOT

6

6.1 The allotment order is issued to the Company / Firm / Proprietary concern consisting of the following Directors / Partners / Proprietor / Shareholders :

List of Directors (Tvl.):

J Rafiq Ahmed
Basheera
Munusamy

List of Shareholders:

<u>Shareholders</u>	<u>Percentage %</u>
Thiru. J Rafiq Ahmed	99.00%
Tmt. Basheera	0.50%
Thiru. Munusamy	0.10%
M/s.Kothari Industrial Corporation Ltd.	0.10%
M/s.Gemin Iron and Steel Pvt. Ltd.	0.10%
M/s.Kothari Madras International Ltd.	0.10%
M/s.Parveen Roadways Pvt. Ltd.	0.10%

6.2 The Allottee shall obtain prior approval from SIPCOT in the following aspects and shall pay applicable charges as per the prevailing policy of SIPCOT:

- Change in Constitution of the Allottee
- Change in Management of the Allottee
- Transfer of Leasehold rights either in whole or in part

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State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)
CIN : U74999TN1971SGC005967

Regd. Office : 19-A, Rukmani Lakshminipathy Road, Post Box No. 7223, Egmore, Chennai - 600 006.
Phone : 4526 1777, Fax : 4526 1736 Website : www.sipcot.tn.gov.in





SIPCOT

6.3 The Allottee shall intimate SIPCOT within 30 days in respect of the change in the following aspects and obtain acknowledgement:

- Any change in the address of the Registered Office or Administrative Office of the Allottee
- Any change in the name of the Allottee
- Any change in the directors/partners/shareholders of the Allottee, which does not result in Change in Management

6.4 The Allottee can sublease its built up area and shall pay the applicable sub-leasing charges as per the prevailing policy of SIPCOT.

7 The Allottee has to obtain No objection letter from SIPCOT to mortgage the lease hold rights of the allotted plot for availing financial assistance after getting sanction letter from Bank / Financial Institution and the same will be considered subject to conditions as applicable.

8

8.1 The allottee has to make its own arrangements to treat the effluents solid / liquid to the required standards of the competent authorities and to regulate emissions and prevent fire hazards and comply with all the regulations in this regard.

8.2 The allottee shall not dump debris or any waste harmful or harmless materials within SIPCOT's premises.

8.3 The Allottee shall install a sewage and waste water treatment and recycling plant and take steps to recover and recycle the waste water thereby achieve zero discharge as stipulated by TNPCC, besides adopting suitable measures for rain water harvesting.

8.4 The Allottee shall carry out and comply with all conditions stipulated in the statutory approvals/clearances/NOCs obtained from the competent authorities from time to time. In case of non-compliance of the Allottee to such conditions, the same shall be communicated to the competent authorities to take remedial action.

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<u>1</u> contains <u>60</u> Sheets <u>49</u> Sheet
Registering Officer

State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)
CIN : U74999TN1971SGC005967

Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No. 7223, Egmore, Chennai - 600 008
Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in





SIPCOT¹⁰

8.5 The Allottee shall furnish a copy of TNPCB approval and other statutory clearances / approvals for the proposed project before commencement of construction/production.

8.6 The Allottee shall furnish the copy of Udyog Aadhaar Memorandum for the proposed project after commencement of production.

9

9.1 The Allottee may surrender the allotted plot or part thereof by executing/registering the surrender deed in favour of SIPCOT. On such a surrender, the SIPCOT shall make a payment computed as per the prevailing surrender policy. No compensation for improvement of building or other structures erected in the plot shall be made by SIPCOT.

10

10.1 SIPCOT reserves the right to serve 90-days show cause notice for cancellation of the allotment and forfeiting the amount remitted for the plot allotted, if it is found that the Allottee has not put to use the plot for the purpose for which it was allotted and is in non-compliance of the terms and conditions of the allotment order including non-implementation of the project and/or having unutilized extent of the allotted plot and/or non-payment of dues.

10.2 Unless it is rectified by the Allottee within a period of ninety (90) days from the date of show cause notice issued by SIPCOT, SIPCOT reserves the right to cancel the allotment and initiate proceedings for resumption of the plot or part thereof under the provisions of the Tamil Nadu Public Premises (Eviction of Unauthorised Occupants) Act, 1975 or under any Statute for the time being in force for eviction against the Allottee as well as for any other mode of recovery in force at that point of time as prescribed by law. In such an event, the Allottee shall not be entitled for any compensation including plot cost, annual lease rent, interest and enhanced interest, compensation for any of the structures on the allotted plot or any refund of any amount that might have been paid by the Allottee to SIPCOT.

Document No. <u>97</u>	of <u>2023</u> of Book
<u>1</u>	contains <u>60</u> Sheets <u>50</u> Sheet
Registering Officer.	

State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)

CIN : U74999TN1971SGC005967
Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No. 7223, Egmore, Chennai - 600 008.
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SIPCOT

11

10.3 In such case of resumption of the allotted plot or part thereof, the Allottee shall remove the factory buildings, structures and fixtures located on the same, within the stipulated period as per the Acts and Statutes mentioned in Condition 10.2, failing which SIPCOT has the right to take possession of the same without paying any compensation for any of the factory buildings, structures and fixtures on the allotted plot or part thereof.

11

11.1 The allottee is committed to bring the Eligible Fixed Assets(EFA) - (a) Land (233.49 acres) - Rs.2,685.13 lakhs (b) Buildings- Rs.50,000 lakhs (c) Plant & Machinery (New / second hand) - Rs.1,50,000 lakhs (d) Total EFA - Rs.2,02,685.13 lakhs and provide minimum employment of 50 persons within the investment period of four years. In this regard, the allottee shall furnish an undertaking before execution of lease deed in the format annexed. After completion of stipulated investment period, the allottee shall furnish a certificate for the EFA created, employment generated as defined in Tamil Nadu Industrial Policy 2021 during the said investment period and the Land Cost Subsidy availed is not beyond 20% of EFA duly certified by Statutory Auditors in case of companies and Tax Auditors in case of other legal entities for the land cost incentive availed as mentioned above. If not complied with the conditions for the land cost incentive availed, the allottee has to repay the land cost incentives availed with interest fixed by SIPCOT, otherwise necessary action will be taken by SIPCOT to recover the incentive / subsidy amount extended with interest as fixed by SIPCOT / Government from time to time.

11.2 The allottee shall furnish the list of directors, shareholders with shareholding pattern of the company, upto individual level, as on date duly certified by a CA before execution of lease deed.

Document No. <u>97</u> of <u>2023</u> of Book
<u>1</u> contains <u>60</u> Sheets <u>51</u> Sheet
Registering Officer.

State Industries Promotion Corporation of Tamil Nadu Limited

(A Government of Tamil Nadu Undertaking)

CIN : U74999TN1971SGC005967

Regd. Office : 19-A, Rukmani Lakshmi Pathy Road, Post Box No. 7223, Egmore, Chennai - 600 088

Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in





SIPCOT

12

11.3 The allottee shall furnish an undertaking on Rs.100/- non-judicial stamp paper for creation of Eligible Fixed Assets and employment generation, as per annexure enclosed, before execution of lease deed.

11.4 The vandipathai (1.77 acres) in the plot should be maintained in "as is where is" condition.

11.5 The allottee shall obtain Environmental Clearance (if required) from MoEF&CC / SEIAA before commencement of construction activity.

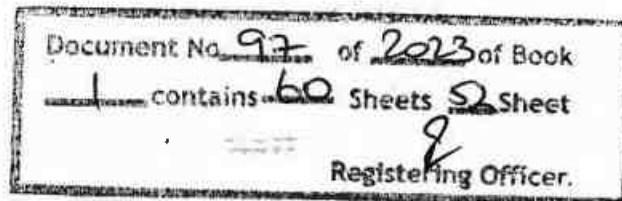
11.6 The allottee shall remit 50% capital cost on water supply system in addition to the plot cost as and when the external water supply scheme is funded by SIPCOT

11.7 The allottee shall remit the cost of acquisition of land required for forming of 24 mtr wide external approach road in addition to the plot cost.

11.8 The allottee shall remit the enhanced alienation cost after completion of all Land Acquisition proceedings, if any, in addition to the plot cost.

12

12.1 All payments shall be made ONLY through SIPCOT online portal and website: www.sipcot.tn.gov.in payments made directly into SIPCOT - Project Office/Head Office's Bank Account will not be considered as payment and will not be matched with the outstanding receivable from the Allottee.



State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)

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Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in





SIPCOT

13

13

13.1 SIPCOT at the request and cost of the Allottee at the end of the 99 years term, shall execute a new lease deed for a similar period of 99 years on such terms and conditions as may be mutually agreed to or as per the prevailing policy.

Yours faithfully,
Sd/--

MANAGING DIRECTOR

Encl: as above

Copy to :

1. The Project Officer, i/c
SIPCOT Industrial Park,
Eraiyur.
2. Finance Dept.
3. Allotment Cell

/ BY MAIL /

/ FORWARDED BY ORDER /


ASST. GENERAL MANAGER (P-III)

Document No. <u>97</u> of <u>2023</u> of Book
<u>1</u> contains <u>60</u> Sheets <u>53</u> Sheet
Registering Officer.



State Industries Promotion Corporation of Tamil Nadu Limited

(A Government of Tamil Nadu Undertaking)

CIN : U74999TN1971SGC005967

Regd. Office : 19-A, Rukmani Lakshmi Pathy Road, Post Box No.7223, Egmore, Chennai - 600 008.

Phone : 45261777, Fax : 45261796 Website : www.sipcot.tn.gov.in



SIPCOT

P-III/SIP-Eraiyr/Phoenix Kothari/2022

Dated: 05 .01.2023

M/s. Phoenix Kothari Footwear Ltd.,
Kothari Building, 114, 4th Floor,
MG Salai, Nungambakkam,
Chennai - 600 034.

/ BY RPAD / MAIL /

Dear Sir(s),

Sub : SIPCOT Industrial Park, Eraiyr - Amendment to allotment - Orders - Issued.

- Ref :** 1. This Office Allotment Order dated 25.11.2022
2. Your letter & emails dt. 17.12.2022, 19.12.2022 , 02.01.2023 & 03.01.2023
3. Minutes of the Board meeting held on 20.12.2022

&&&&&

Further to the Allotment order 1st cited, we hereby issue amendment to condition Nos. 1.1, 2, 6.1 & 11.1 , 11.4, 11.7 along with addition of condition no. 11.9.

- 1.1 The following plot in SIPCOT Industrial Park, Eraiyr (C District) at Perambalur is allotted on lease for a period of ninety-nine years for setting up an industrial unit for the manufacture of **Footwear, Footwear Components and allied products.**

S.No.	Description	Particulars
a)	Plot No.	A-1
b)	Total Extent of the Plot (in Acres)	182.09 acres (Including 0.49 acre of vandipathai)
c)	Water Quantity (in KLD)	4000 KL



State Industries Promotion Corporation of Tamil Nadu Limited
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Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in
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Registering Officer.



SIPCOT

2.

Sl. No.	Description	Amount (in Rs.)
A.	Plot cost	Rs. 20,94,03,500/-
(i)	Amount towards plot extent allotted @ Rs.17.25 Lakhs per acre (after adjustment of land cost incentive @ 25% of plot allotment rate per acre extended by SIPCOT)	
	182.09 x 17,25,000	Rs.31,41,05,250/-
(ii)	Frontage Charges	NIL
(iii)	50% Capital Cost on Water supply for the allocated quantity (Quantity x Rate per KL),if applicable	NIL
	Total (i+ii+iii)	Rs. 31,41,05,250/-
(iv)	Less: 25% Government subsidy for extent allotted [1/3 of above]	Rs.10,47,01,750/-
		Rs.20,94,03,500/-
B.	Initial Deposit	Rs.1,16,74,500/-
C.	Balance amount payable (A - B)	Rs.19,77,29,000/-
D.	Caution Deposit (@ 5 % on A above)	Rs.1,04,70,175/-
E.	Lease Rent in Advance	Rs.100/-
F.	Total amount Payable (C+D+E)	Rs.20,81,99,275/-
G.	Less: Amount remitted	Rs.27,02,64,775/-
H.	Balance amount to be adjusted towards the allotment to be made to the JV company i.e. M/s.JR One Kothari Footwear Pvt. Ltd.	Rs.6,20,65,500/-

(Rupees Six crores twenty lakhs sixty five thousand five hundred only)

State Industries Promotion Corporation of Tamil Nadu Limited

(A Government of Tamil Nadu Undertaking)

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Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in



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Registering Officer.



SIPCOT

-3-

6.1 The allotment order is issued to the Company consisting of the following Directors / Shareholders :

List of Directors (Tvl.):

1. Jinnah Moideen Ahmed Rafiq, Chariman
2. Chang, Rong-Wu, Managing Director
3. Chang, Chi-Chin, Director
4. Lin, Hual-Te, Director
5. Avinash Bidani, Director
6. Muthu Mohan, Director

List of Shareholders:

Shareholders

Percentage %

Thiru. Jinnah Moideen Ahmed Rafiq

30.00%

M/.Phoenix Power (Singapore) Pte Ltd.

70.00%

11.1 The allottee is committed to bring the Eligible Fixed Assets(EFA) - (a) Land (182.09 acres) - Rs.2,094.03 lakhs (b) Buildings- Rs.50,000 lakhs (c) Plant & Machinery (New / second hand) - Rs.1,50,000 lakhs (d) Total EFA - Rs.2,02,094.03 lakhs and provide minimum employment of 50 persons within the investment period of four years. In this regard, the allottee shall furnish an undertaking before execution of lease deed in the format annexed. After completion of stipulated investment period, the allottee shall furnish a certificate for the EFA created, employment generated as defined in Tamil Nadu Industrial Policy 2021 during the said investment period and the Land Cost Subsidy availed is not beyond 20% of EFA duly certified by Statutory Auditors in case of companies and Tax Auditors in case of other legal entities for the land cost incentive availed as mentioned above. If not complied with

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Registering Officer.

State Industries Promotion Corporation of Tamil Nadu Limited

(A Government of Tamil Nadu Undertaking)

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SIPCOT

-4-

the conditions for the land cost incentive availed, the allottee has to repay the land cost incentives availed with interest fixed by SIPCOT, otherwise necessary action will be taken by SIPCOT to recover the incentive / subsidy amount extended with interest as fixed by SIPCOT / Government from time to time.

11.4 The vandipathai (0.49 acres) in the plot should be maintained in "as is where is" condition.

11.7 The allottee shall remit the proportionate cost of acquisition of land required for forming of 24 mtr wide external approach road in addition to the plot cost for the extent allotted.

11.9 The Allottee shall furnish the revised Memorandum of Association and Articles of Association of M/s.Phoenix Kothari Footwear Ltd.

The other terms and conditions mentioned in the allotment order 1st cited remains unaltered.

You are requested to return the duplicate copy of this letter duly signed and dated as token of your acceptance.

Yours faithfully,

Sd/--

MANAGING DIRECTOR

Copy to:

1. The Project Officer, Cuddalore I/c
SIPCOT Industrial Park,
Eraiyur.

2. Allotment Cell

3. Finance Cell

/ BY MAIL /

Document No. 97 of 223 of Book
1 contains 60 Sheets 57 sheet

/ FORWARDED BY ORDER /

Registering Officer.

✓
ASST.GENERAL MANAGER (P-III)

State Industries Promotion Corporation of Tamil Nadu Limited
(A Government of Tamil Nadu Undertaking)

CIN : U74999TN1971SGC005967

Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No. 7223, Egmore, Chennai - 600 008.
Phone : 4526 1777, Fax : 4526 1796 Website : www.sipcot.tn.gov.in





ABSTRACT

Registration Department - The Tamil Nadu Industrial Policy, 2021 -
Concession of stamp duty - Orders - Issued.

COMMERCIAL TAXES AND REGISTRATION (J1) DEPARTMENT

G.O. (Ms.) No.167

Dated : 27.11.2021

பிலவ, கார்த்திகை - 11

திருவள்ளூர் ஆண்டு - 2052

Read:

1. Guidance, Tamil Nadu e-mail dated 29.3.2021
2. G.O.(Ms)No.74, Industries(MIB.1) Department, dated 11.02.2021.

ORDER:

In the reference first read above, the Guidance, Tamil Nadu has categorised the districts as follows and requested to issue orders for various industrial policies:-

<u>Category</u>	<u>Districts</u>
A	Chengalpattu, Chennai, Kancheepuram and Tiruvallur.
B	Coimbatore, Erode, Karur, Krishnagiri, Namakkal, The Nilgiris, Ranipet, Salem, Tiruchirappalli, Tirupattur, Tiruppur and Vellore.
C	Ariyalur, Cuddalore, Dharmapuri, Dindigul, Kallakurichi, Kanniyakumari, Madurai, Mayiladuthurai, Nagapattinam, Perambalur, Pudukkottai, Ramanathapuram, Sivagangai, Tenkasi, Thanjavur, Theni, Thiruvarur, Thoothukudi, Tirunelveli, Tiruvannamalai, Villupuram and Virudhunagar.

2. In accordance with the guidelines issued by the Guidance, Tamil Nadu in the reference first read above, the Industries Department had issued Executive orders in the reference second read above granting concession of 100% and 50% stamp duty as defined in the Tamil Nadu Industrial Policy, 2021.

3. Based on the orders issued in the Government order second read above, the Government grant concession of stamp duty in respect of Tamil Nadu Industrial Policy, 2021 as follows,-

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Registering Officer.



- I. 100% stamp duty exemption in respect of
 - (i) Large, Mega and Ultra-Mega projects in SIPCOT/SIPCOT JV/SIDCO Industrial Parks in "C" Category districts;
 - (ii) Mega and Ultra-Mega projects in sunrise sectors in SIPCOT Industrial Parks in "A" Category districts;
 - (iii) Large, Mega and Ultra-Mega projects in sunrise sectors in SIPCOT Industrial Parks in "B" & "C" category districts;
 - (iv) R&D Projects in SIPCOT/SIPCOT JV/SIDCO Industrial Parks in "C" Category districts;
 - (v) R&D Projects in sunrise sectors in SIPCOT Industrial Parks in all ("A", "B" or "C" category) districts;
 - (vi) Mega and Ultra-Mega FDI projects in SIPCOT/SIPCOT JV/SIDCO Industrial Parks in "C" category districts;
 - (vii) Mega and Ultra-Mega FDI projects in sunrise sectors in SIPCOT Industrial Parks in all ("A", "B" or "C" category) districts as defined in the Tamil Nadu Industrial Policy, 2021.

II. 50% stamp duty exemption in respect of,-

- (i) Large, Mega and Ultra-Mega projects in SIPCOT Industrial Parks in "A" & "B" category districts;
- (ii) R&D Projects in SIPCOT Industrial Parks in "A" & "B" category districts;
- (iii) Mega and Ultra-Mega FDI projects in SIPCOT Industrial Parks in "A" & "B" category districts;
- (iv) Sub-Large projects in SIPCOT/ SIDCO Industrial Parks in all ("A", "B" or "C" category) districts as defined in the Tamil Nadu Industrial Policy, 2021.

4. Accordingly, the Government direct that the Notifications appended to this order will be published in the next issue of the Tamil Nadu Government Gazette and the Works Manager, Government Central Press is requested to send five copies of the Gazette in which the Notifications are published to the Government.

(BY ORDER OF THE GOVERNOR)

B. JOTHI NIRMALASAMY
SECRETARY TO GOVERNMENT

To

The Inspector General of Registration, Chennai-28.

The Works Manager, Government Central Press, Chennai-79.

The Industries Department, Chennai-9.

Copy to:

The Special Personal Assistant to the Minister (Commercial Taxes and Registration), Chennai-9.

✓ The Private Secretary to Secretary to Government, Commercial Taxes and Registration Department, Secretariat, Chennai-9.

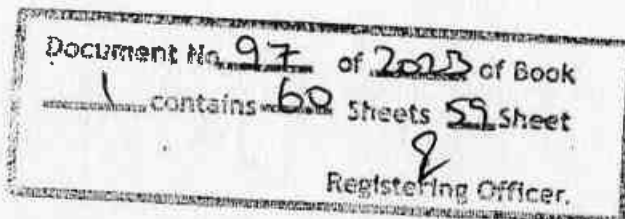
The Law Department, Secretariat, Chennai-9.

Stock file / Spare copies.

// FORWARDED / BY ORDER//


SECTION OFFICER 27/11/21

27/11/2021



APPENDIX
NOTIFICATION-I.

In exercise of the powers conferred by clause (a) of sub-section (1) of section 9 of the Indian Stamp Act, 1899 (Central Act II of 1899), the Governor of Tamil Nadu hereby remits the duty chargeable under the Act in respect of instruments of sale or lease or lease-cum-sale executed in respect of,-

- (i) Large, Mega and Ultra-Mega projects in SIPCOT/SIPCOT JV/SIDCO Industrial Parks in "C" Category districts;
- (ii) Mega and Ultra-Mega projects in sunrise sectors in SIPCOT Industrial Parks in "A" Category districts;
- (iii) Large, Mega and Ultra-Mega projects in sunrise sectors in SIPCOT Industrial Parks in "B" & "C" category districts;
- (iv) R&D Projects in SIPCOT/SIPCOT JV/SIDCO Industrial Parks in "C" Category districts;
- (v) R&D Projects in sunrise sectors in SIPCOT Industrial Parks in all ("A", "B" or "C" category) districts;
- (vi) Mega and Ultra-Mega FDI projects in SIPCOT/SIPCOT JV/ SIDCO Industrial Parks in "C" category districts;
- (vii) Mega and Ultra-Mega FDI projects in sunrise sectors in SIPCOT Industrial Parks in all ("A", "B" or "C" category) districts as defined in the Tamil Nadu Industrial Policy, 2021.

2. The Notification hereby made shall be deemed to have come into force on and from the 1st January 2021.

NOTIFICATION-II.

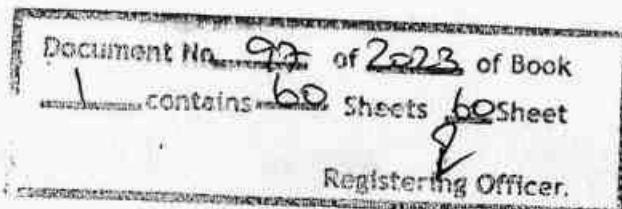
In exercise of the powers conferred by clause (a) of sub-section (1) of section 9 of the Indian Stamp Act, 1899 (Central Act II of 1899), the Governor of Tamil Nadu hereby remits 50% of the duty chargeable under the Act in respect of instruments of sale or lease or lease-cum-sale executed in respect of,-

- (i) Large, Mega and Ultra-Mega projects in SIPCOT Industrial Parks in "A" & "B" category districts;
- (ii) R&D Projects in SIPCOT Industrial Parks in "A" & "B" category districts;
- (iii) Mega and Ultra-Mega FDI projects in SIPCOT Industrial Parks in "A" & "B" category districts;
- (iv) Sub-Large projects in SIPCOT/ SIDCO Industrial Parks in all ("A", "B" or "C" category) districts as defined in the Tamil Nadu Industrial Policy, 2021.

2. The Notification hereby made shall be deemed to have come into force on and from the 1st January 2021.

B. JOTHI NIRMALASAMY
SECRETARY TO GOVERNMENT

// True copy //



[Signature]
SECTION OFFICER

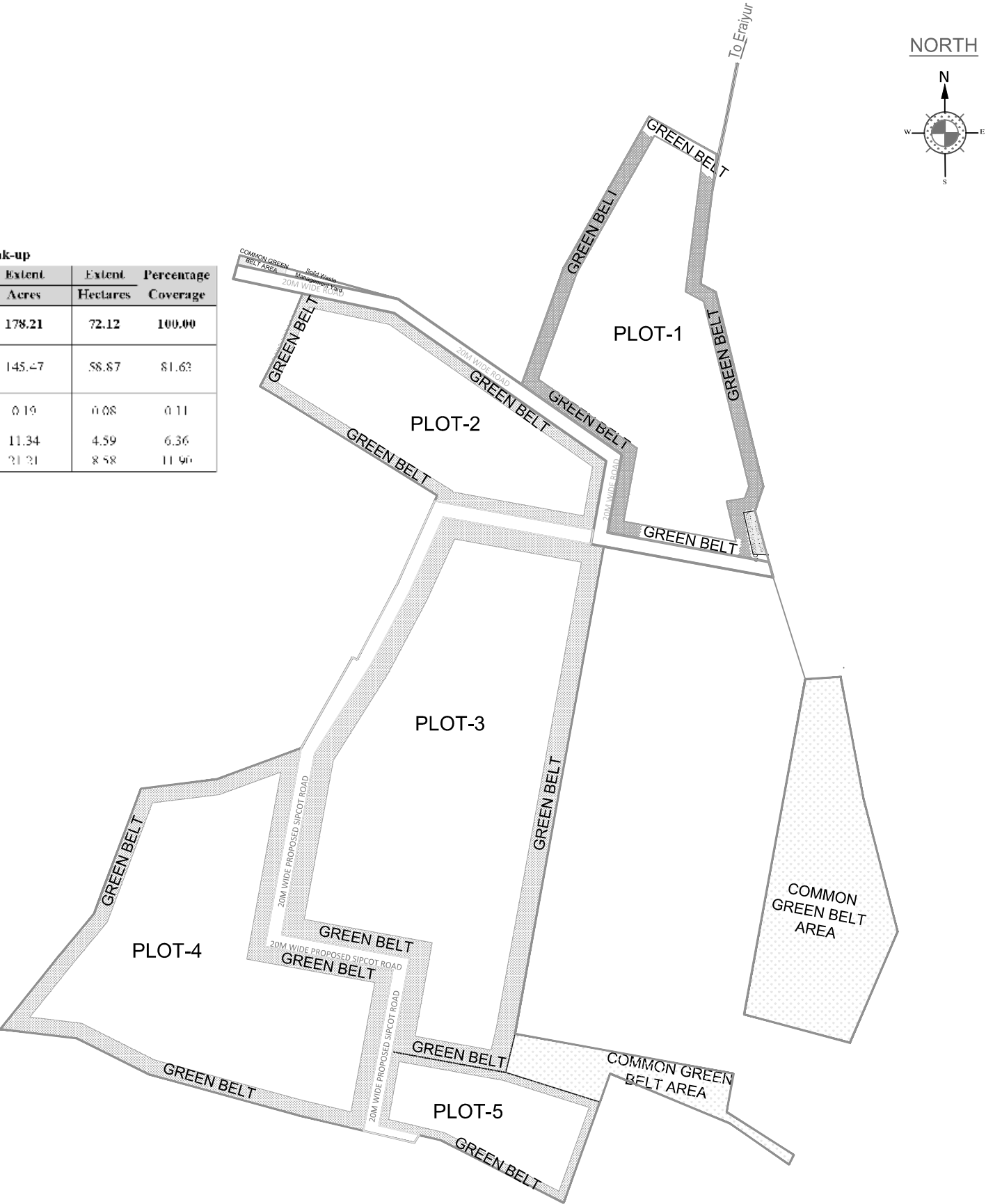
27/11/2024



Annexure – II
Master Plan Layout

LAYOUT SHOWING THE MASTER PLAN OF PROPOSED INDUSTRIAL ESTATE AT ERAIYUR VILLAGE, VEPPANTHATTAI TALUK,
PERAMBALUR DISTRICT BY M/s. PHOENIX KOTHARI FOOTWEAR LIMITED

Land area break-up				
S.No	Description	Extent	Extent	Percentage Coverage
		Acres	Hectares	
1	Industrial Estate Area (a+b+c+d+e)	178.21	72.12	100.00
2	Industrial Plot area including Green Belt Area	145.47	58.87	81.63
3	Common Amenities (Solid Waste Management Yard)	0.19	0.08	0.11
4	Road Area	11.34	4.59	6.36
5	Common Green Belt Area	21.21	8.58	11.90



Annexure – III
Project Cost Certificate

Date: 26-06-2025

Gross Fixed Asset Certificate

To Whomsoever It May Concern

This is to certify that the Gross Fixed Asset (GFA) value of the Proposed Industrial Estate at Plot A1 of Eraiyur SIPCOT, Eraiyur Village, Veppanthattai Taluk and Perambalur District by **M/s. Phoenix Kothari Footwear Limited** as on 26/06/2025 is as follows

Gross Fixed Assets	Estimated Value INR (in Crores)
Leasehold Land Cost (at Book Value)	20.94 Crores
Industrial Estate Development Cost (Estimated per acre 50lakhs * 182.09 acres)	91.05 Crores
Other Utilities Cost (Solid Waste Management Yard etc.) (Estimated)	5.00 Crores
Total	116.99 Crores

Place: Chennai
Date: 26-06-2025

V.Swaminathan & Co
Chartered Accountants
FRN: 12008S

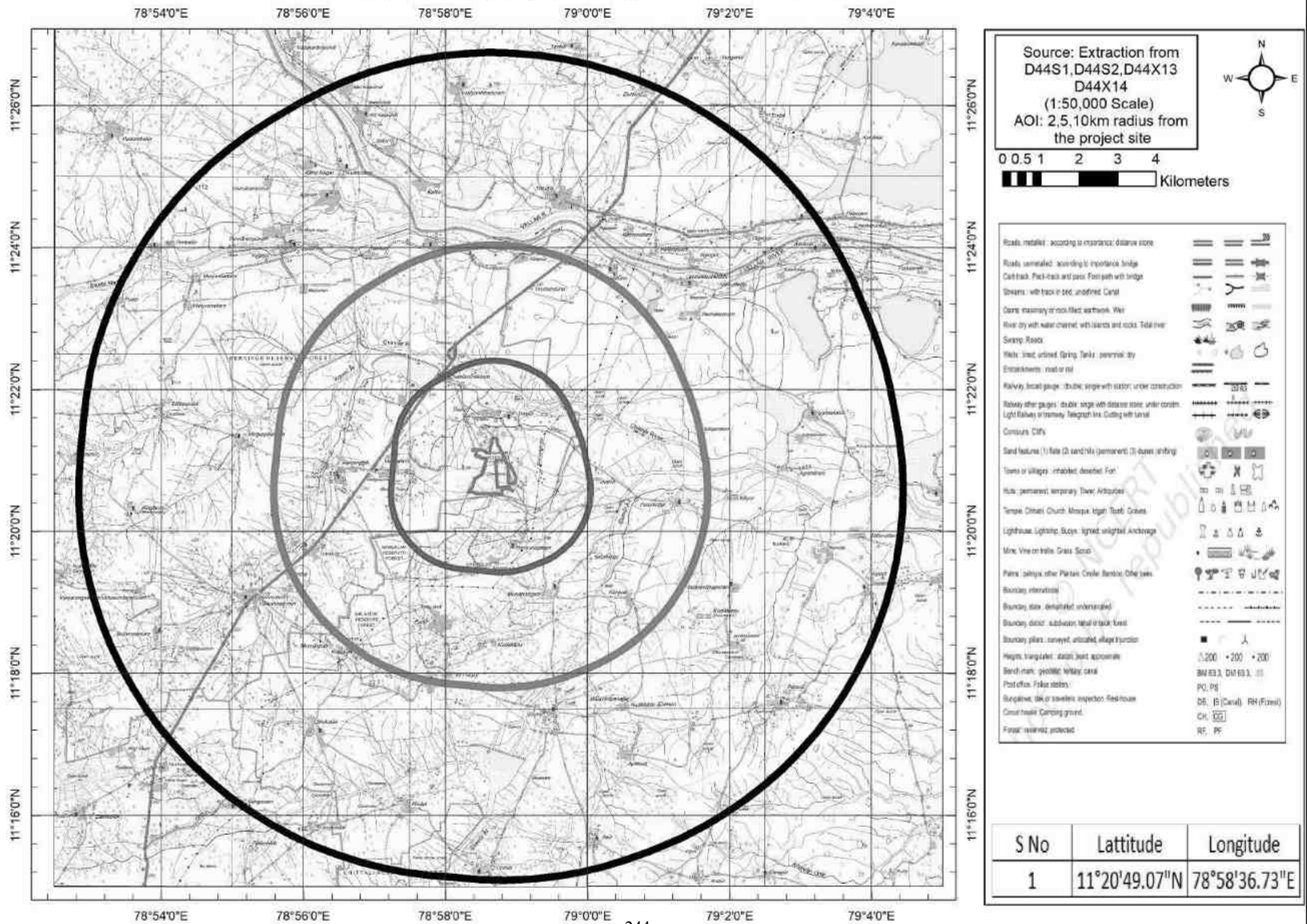



V.Swaminathan
Proprietor
M.No: 021119

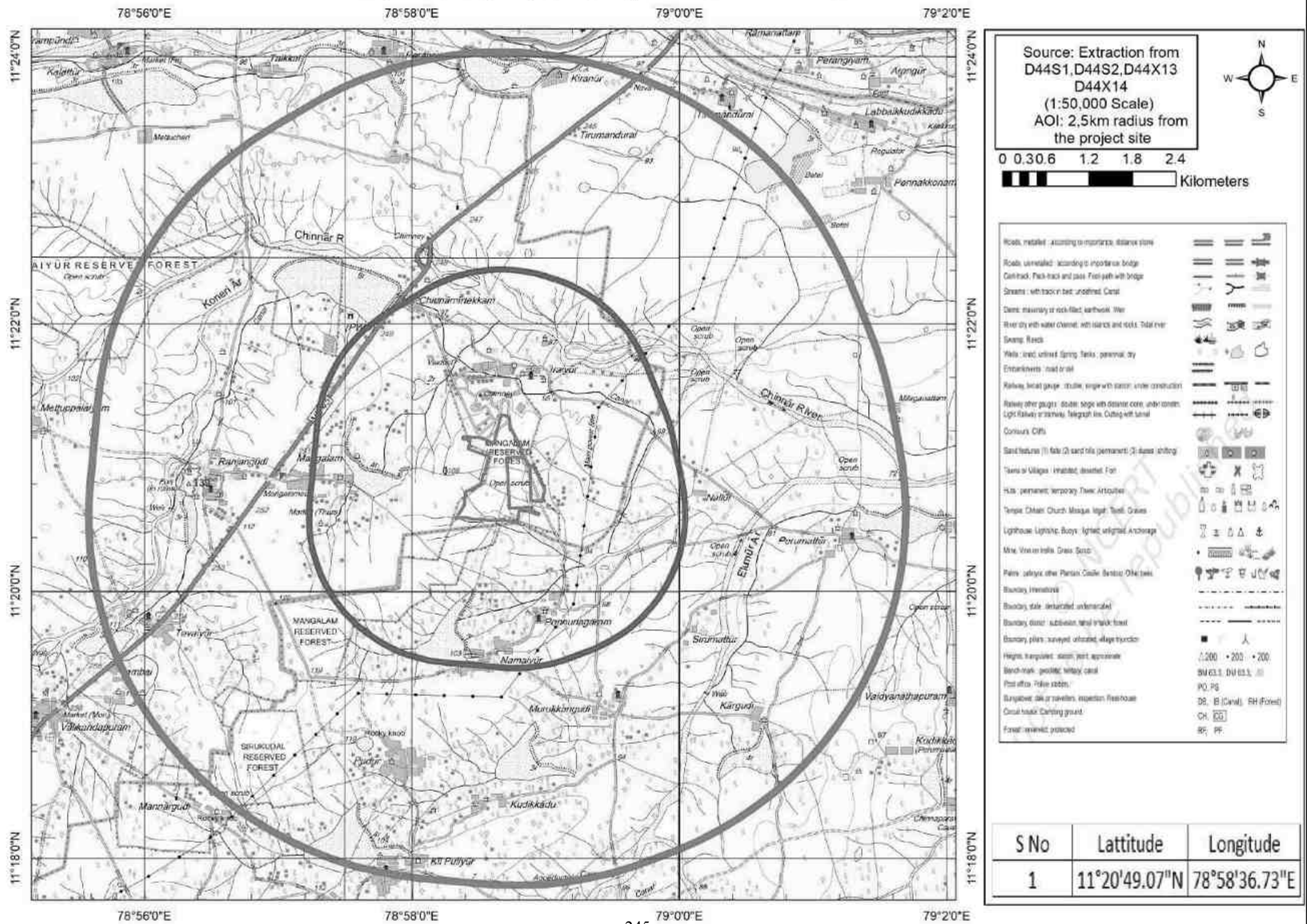
UDIN: 25021119BMIYHV9664

Annexure – IV
Topo Map of the Project Site and its Study Area – 2km, 5km and 10 km

Site location with 2,5,10km Radius on Survey of India Topomap - M/s. Phoenix Kothari Footwear Limited Plot A1 of SIPCOT,
Eraiyr comprising Eraiyr Village Veppanthattai Taluk Perambalur District



Site location with 2,5 km Radius on Survey of India Topomap - M/s. Phoenix Kothari Footwear Limited Plot A1 of SIPCOT, Eraiyr comprising Eraiyr Village Veppanthattai Taluk Perambalur District



Annexure – V
Site Photographs

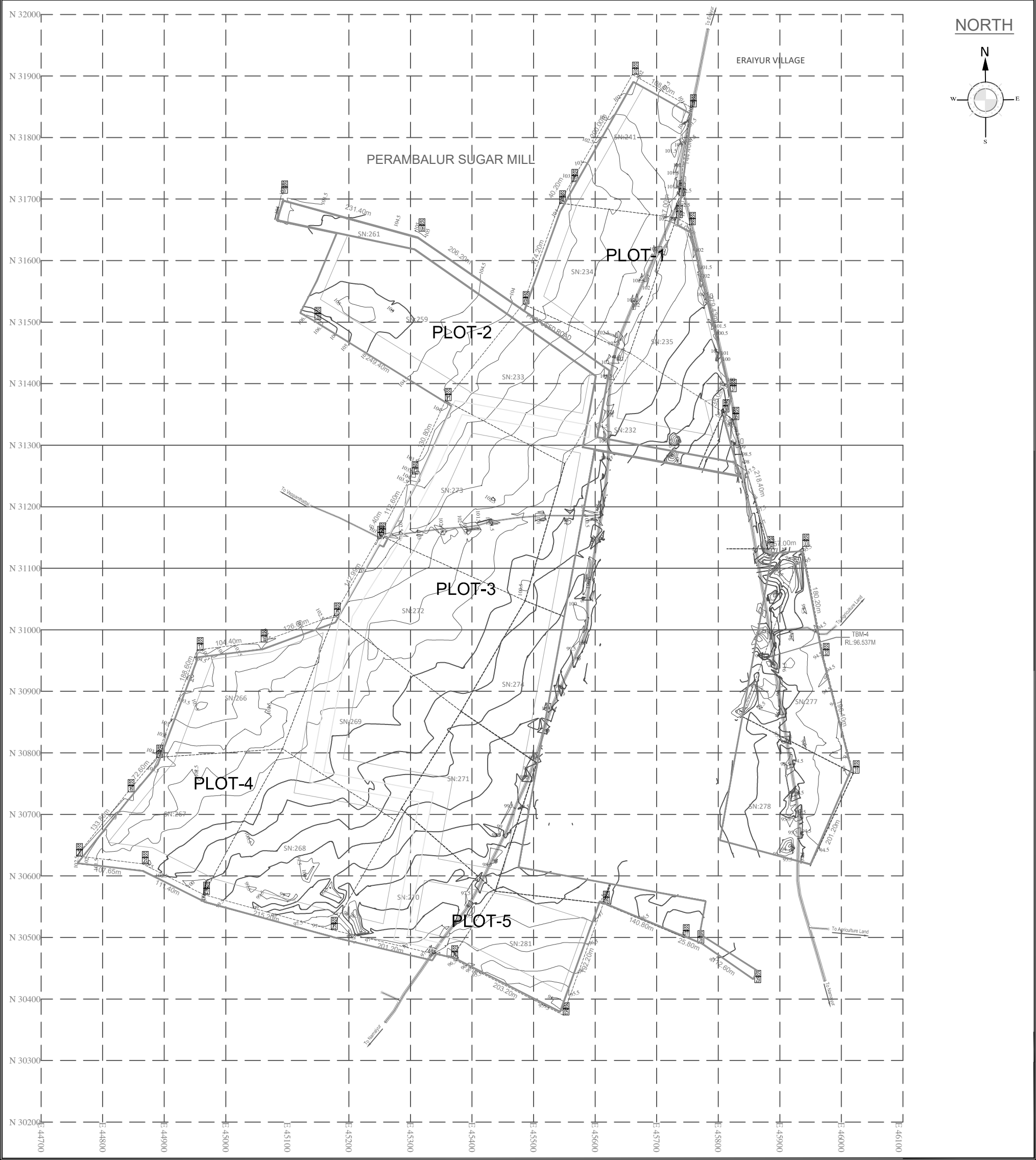
Site Photographs –

Proposed Industrial Estate at Plot A1 of SIPCOT, Eraiur comprising Survey Nos. 231pt, 232pt, 233, 234, 235pt, 241pt, 259, 261 pt, 266, 267, 268, 269, 270 pt, 271pt, 272, 273pt, 274pt, 275pt, 276 pt, 277pt, 278, 279 pt, 280pt, 281, 282pt, 283pt, of Eraiur Village, Veppanthattai Taluk and Perambalur District by M/s. Phoenix Kothari Footwear Limited



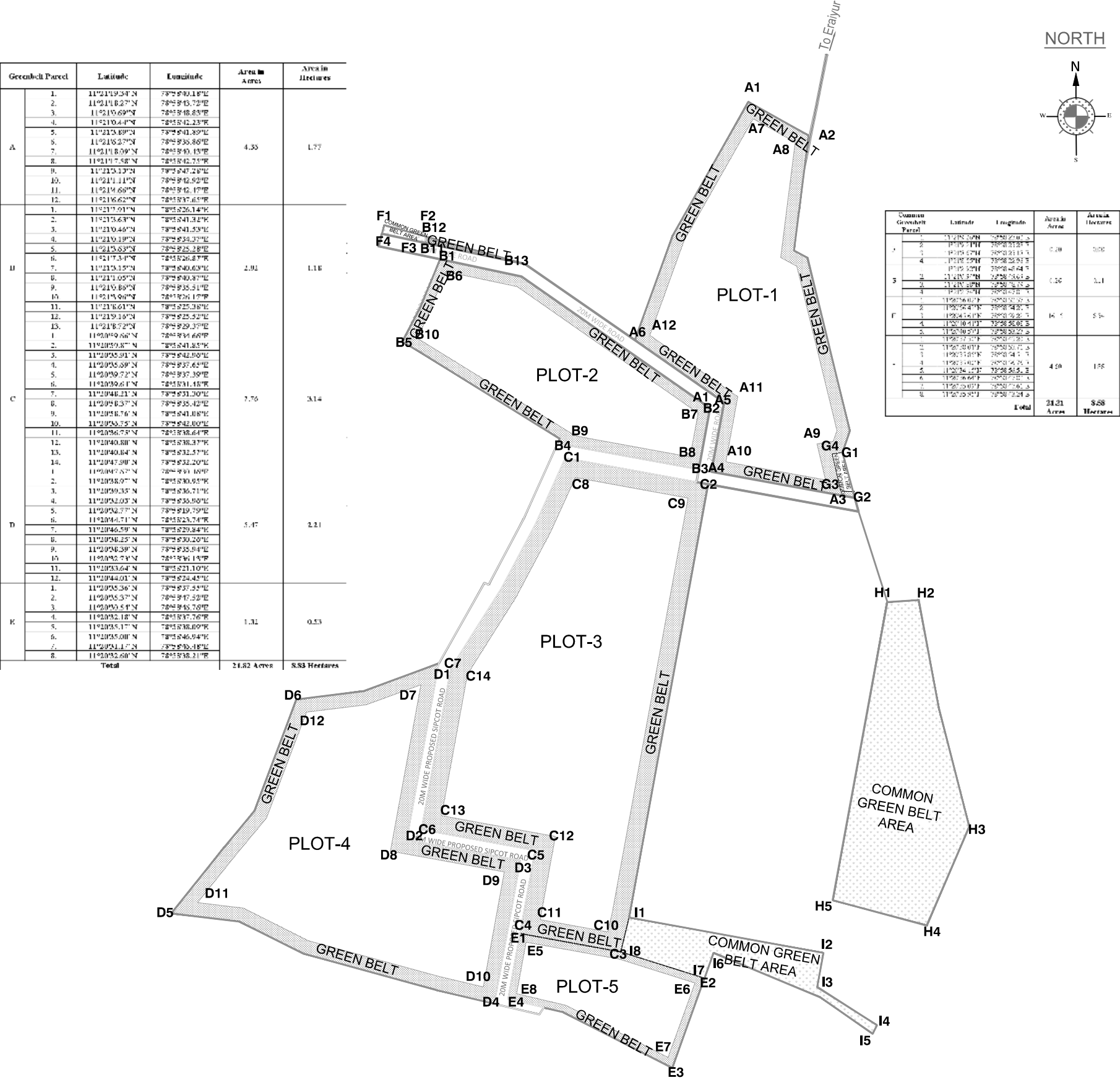
Annexure – VI
Contour Plan

LAYOUT SHOWING CONTOUR PLAN OF PROPOSED INDUSTRIAL ESTATE AT ERAIYUR VILLAGE, VEPPANTHATTAI TALUK,
PERAMBALUR DISTRICT BY M/s. PHOENIX KOTHARI FOOTWEAR LIMITED



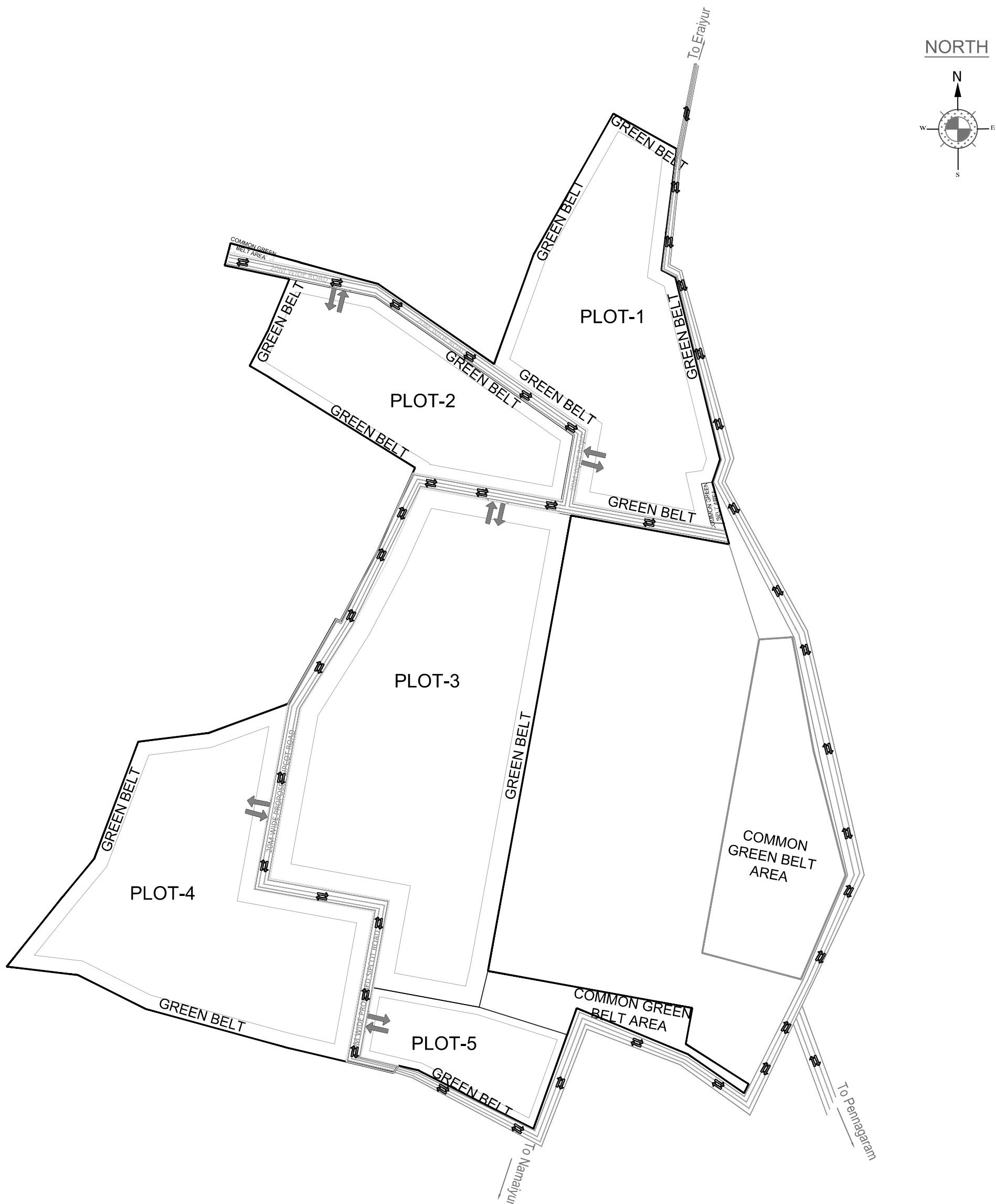
Annexure – VII
Green Belt Layout

LAYOUT SHOWING GREENBELT PLAN OF PROPOSED INDUSTRIAL ESTATE AT ERAIYUR VILLAGE,
VEPPANTHATTAI TALUK, PERAMBALUR DISTRICT BY M/s. PHOENIX KOTHARI FOOTWEAR LIMITED



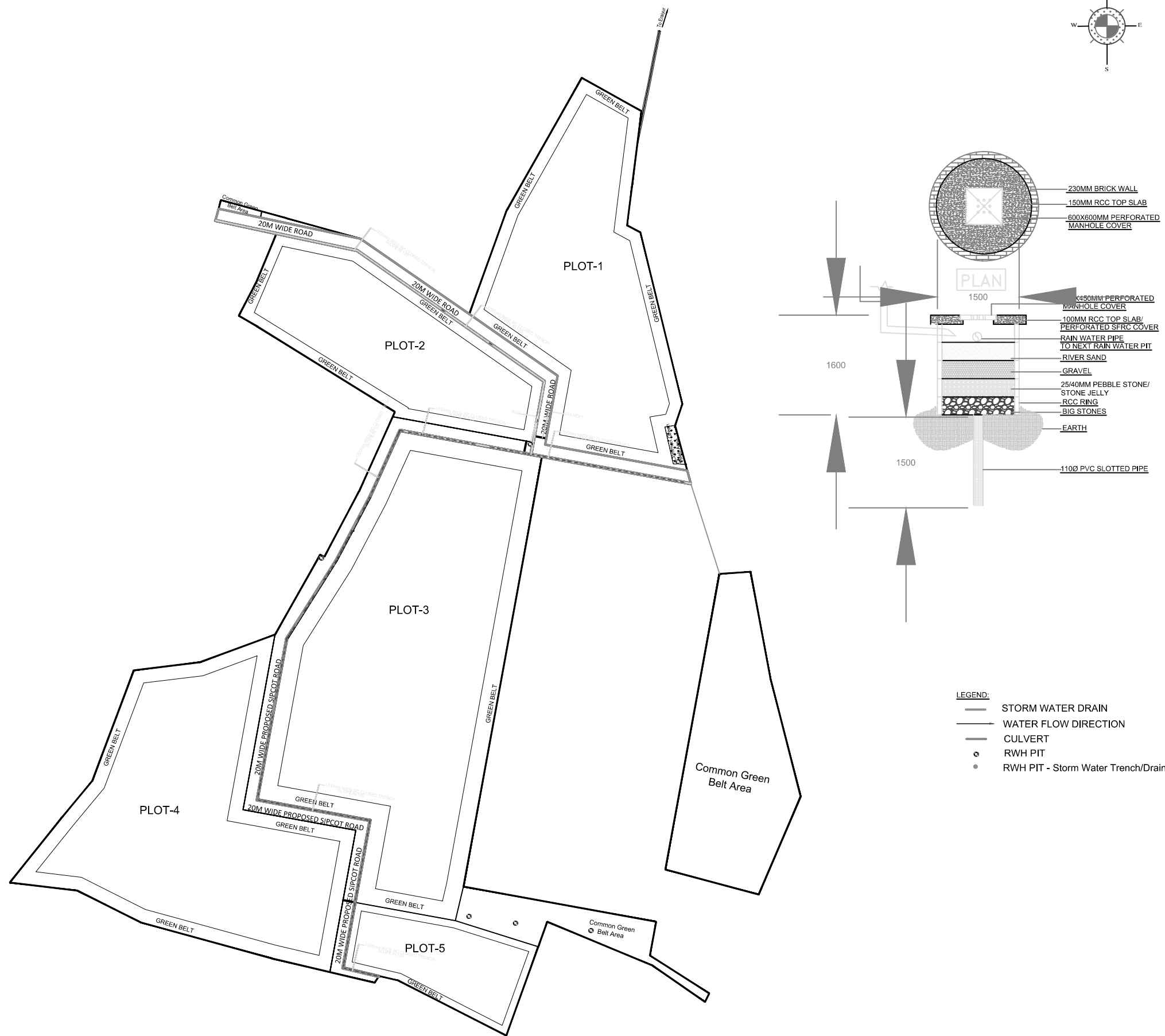
Annexure – VIII
Traffic Circulation Plan

**LAYOUT SHOWING THE TRAFFIC CIRCULATION PLAN OF PROPOSED INDUSTRIAL ESTATE AT
ERAIYUR VILLAGE, VEPPANTHATTAI TALUK, PERAMBALUR DISTRICT BY
M/s. PHOENIX KOTHARI FOOTWEAR LIMITED**



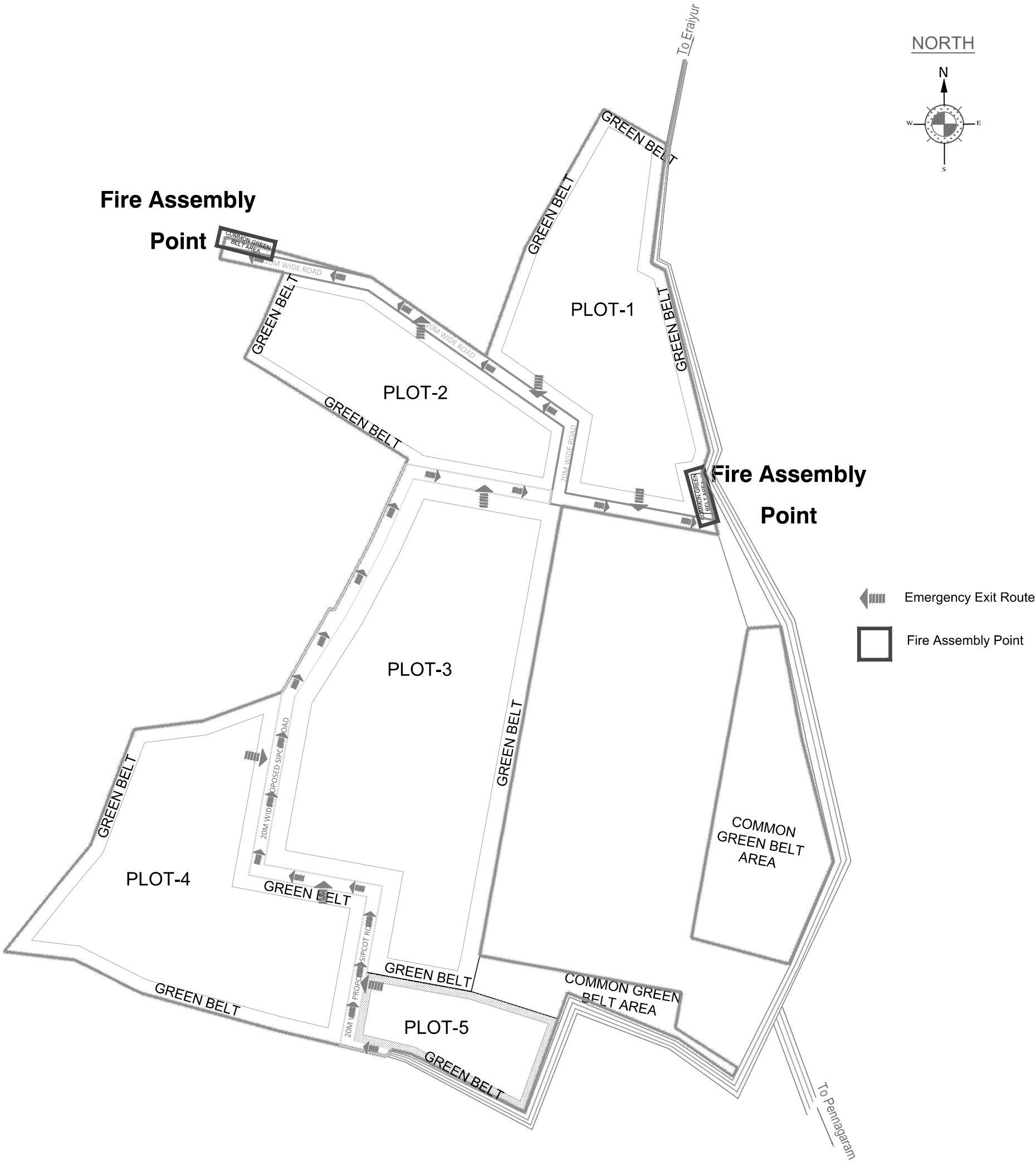
Annexure – IX
Storm Water Layout

**LAYOUT SHOWING STORM WATER DRAIN & RAIN WATER HARVETING PLAN OF PROPOSED INDUSTRIAL ESTATE AT ERAIYUR VILLAGE,
VEPPANTHATTAI TALUK AND PERAMBALUR DISTRICT BY M/s. PHOENIX KOTHARI FOOTWEAR LIMITED**



Annexure – X
Emergency Evacuation Plan

LAYOUT SHOWING THE EMERGENCY EVACUATION PLAN OF PROPOSED INDUSTRIAL ESTATE AT ERAIYUR VILLAGE,
VEPPANTHATTAI TALUK, PERAMBALUR DISTRICT BY M/s. PHOENIX KOTHARI FOOTWEAR LIMITED



Annexure – XI
Air Quality Modeling – Results and Interpretation

Proposed Industrial Estate

at Plot A1 of SIPCOT, Eraiyur, Eraiyur Village, Veppanthattai Taluk, Perambalur
District, Tamil Nadu

Air Quality Modeling – Results and Interpretation

1. Air Environment

The developer will not provide / install DG sets for standby power supply for common amenities, etc., Responsibility for air emission management will rest with individual industries. Individual industries will be mandate to install air pollution control systems in line with CPCB/TNPCB regulations. Baseline monitoring of ambient air quality shows that concentrations of PM₁₀, PM_{2.5}, SO₂, and NO₂ are within the National Ambient Air Quality Standards (NAAQS) applicable to industrial, residential, rural and other areas. With the commencement of proposed operations, the primary emissions expected include particulate matter, sulphur dioxide, nitrogen oxides and carbon monoxide.

2. Ground Level Concentration Increment

2.1 AERMET

The AERMET pre-processor (Version 8.0.5) has been used for processing the site-specific meteorological data required for AERMOD modeling. AERMET generates hourly surface and profile data files by incorporating information from on-site monitoring stations or IMD datasets, along with land use and land cover details such as albedo, Bowen ratio, and surface roughness. These inputs are transformed into model-ready meteorological files that represent the local atmospheric conditions, including wind speed, wind direction, temperature, stability class, and mixing height. The processed output provides the necessary boundary layer parameters, which are subsequently utilized in AERMOD to simulate pollutant dispersion and assess ground-level concentrations.

2.2 AERMOD

The AERMOD Software (Version 8.0.5) has been utilized to carry out air quality modeling for the proposed project. The model requires three primary inputs: emission source parameters, meteorological data, and terrain information. Emission details such as stack height, stack diameter, flue gas velocity, flue gas temperature, and pollutant emission rates were incorporated for each identified source. Meteorological inputs were processed using the AERMET preprocessor, which converts site-specific hourly weather data into a format compatible with AERMOD. Terrain elevations and hill features were derived using the AERMAP preprocessor based on Digital Elevation Model (DEM) data to account for terrain influences on dispersion. The model was then executed to predict the Ground Level Concentrations

(GLCs) of pollutants at selected receptor points and over a defined grid domain, considering both short-term (24-hour) and long-term (annual) averaging periods. The results were analyzed and compared with the National Ambient Air Quality Standards (NAAQ) to assess the potential impacts of the proposed project on the surrounding environment.

3. Point Source – Proposed Industry

The emission from the proposed stacks are estimated and used for air dispersion modeling are given in **Table 1**. The incremental values for the particulate matter, sulphur dioxide, nitrogen oxides and carbon monoxide as concentration contours shown in **Figure 1 to 4** and the maximum GLC's are given from the stack emission along with the baseline concentration is given in **Table 2**.

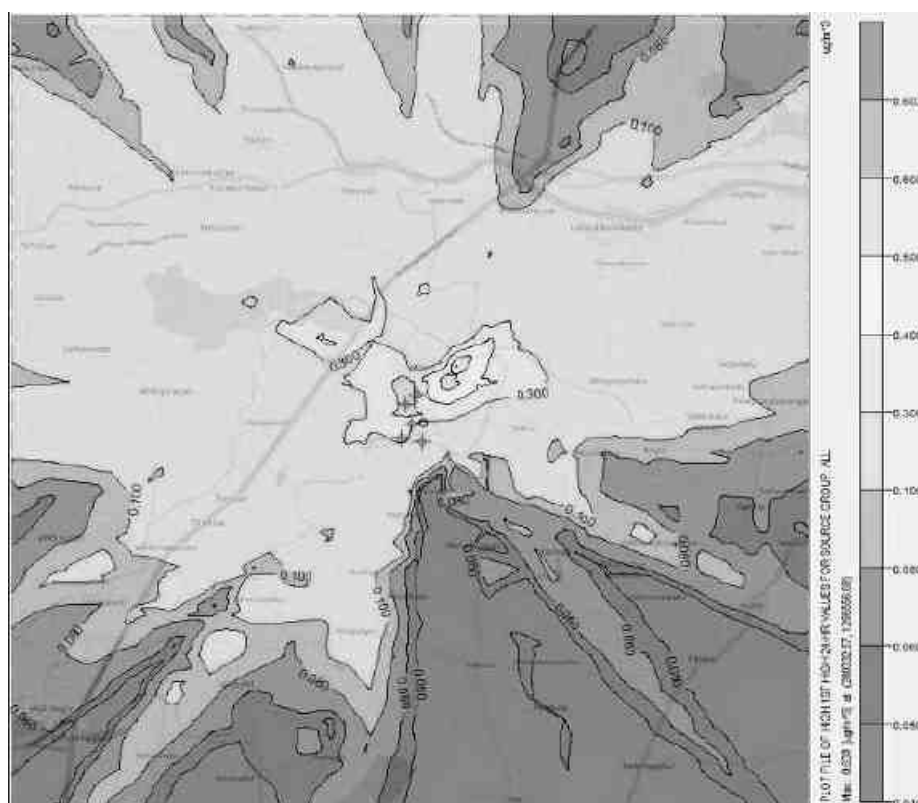


Figure 1 – 24-Hrs Predicated GLC's of PM within 10km Radius of the Study Area

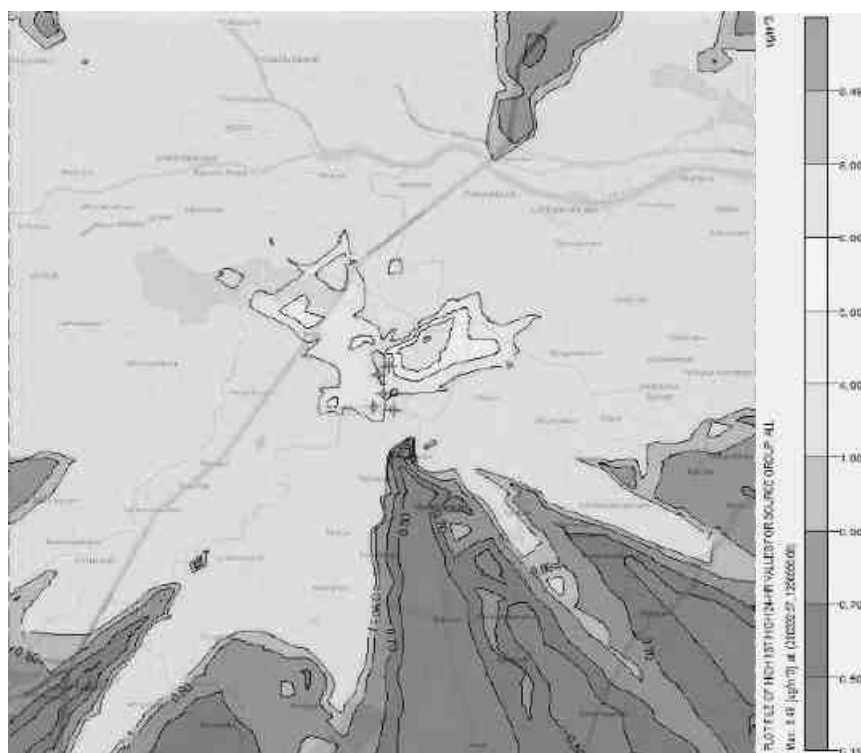
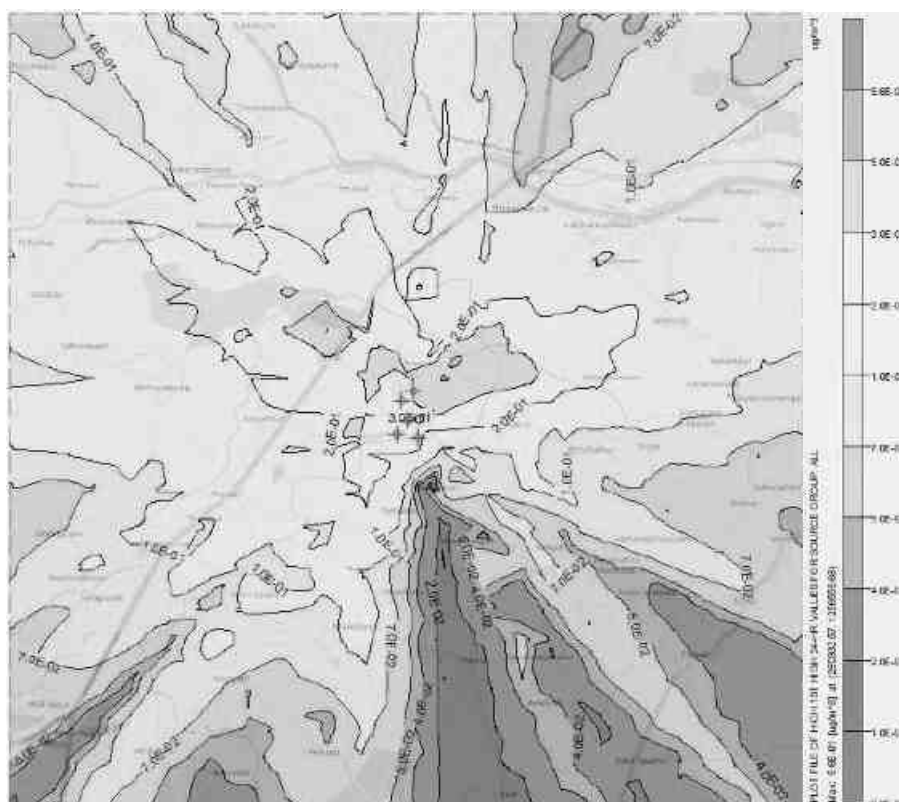
Table 1 - Proposed Stack Emission

Plot No	Plot Type	Industry Type	Utility Details	No of DG Sets	Capacity (in kVA)	Type of Fuel	Details of Stack					Emission (g/s)			
							No. of Stack	Height (m)	Dia (m)	Temp (°C)	Exit Velocity (m/s)	PM	SO2	NOX	CO
1	Industrial	EC Category	DG	1	400	HSD	1	10	0.2	310	8	4.96E-03	4.62E-03	6.98E-02	1.50E-02
2	Industrial	EC Category	DG	1	700	HSD	1	11	0.3	330	9	8.67E-03	8.08E-03	1.22E-01	2.63E-02
3	Industrial	Non EC Category	DG	1	1200	HSD	1	13	0.5	350	10	1.49E-02	1.39E-02	2.10E-01	4.51E-02
4	Industrial	Non EC Category	DG	1	1000	HSD	1	12	0.5	350	10	1.24E-02	1.15E-02	1.75E-01	3.76E-02
5	Industrial	Non EC Category	DG	1	1500	HSD	1	14	0.6	360	11	1.86E-02	1.73E-02	2.62E-01	5.64E-02
6	Industrial	Non EC Category	DG	1	1700	HSD	1	14	0.7	360	12	2.11E-02	1.96E-02	2.97E-01	6.40E-02
7	Industrial	Non EC Category	DG	1	700	HSD	1	11	0.3	330	9	8.67E-03	8.08E-03	1.22E-01	2.63E-02
8	Industrial	Non EC Category	DG	1	500	HSD	1	10	0.2	310	8	6.20E-03	5.77E-03	8.73E-02	1.88E-02
9	Industrial	Non EC Category	DG	1	500	HSD	1	10	0.2	310	8	6.20E-03	5.77E-03	8.73E-02	1.88E-02
10	Industrial	Non EC Category	DG	1	300	HSD	1	9	0.2	310	8	3.72E-03	3.46E-03	5.24E-02	1.13E-02
Total												1.05E-01	9.81E-02	1.48E+00	3.20E-01

Note:

- The DG sets are considered as the point source of the project.
- The capacity of the DG Sets of individual industries assumed based on the total power requirement of the Industrial Park.
- DG stack height is calculated based on the CPCB DG stack height calculation. The Height of the Industrial building will be 6m (min) and 18.50m (max). So the minimum height of the Industrial building is taken as height of the building for all the DG sets.

Source: Compilation of Air Emissions Factors, USA, 2025



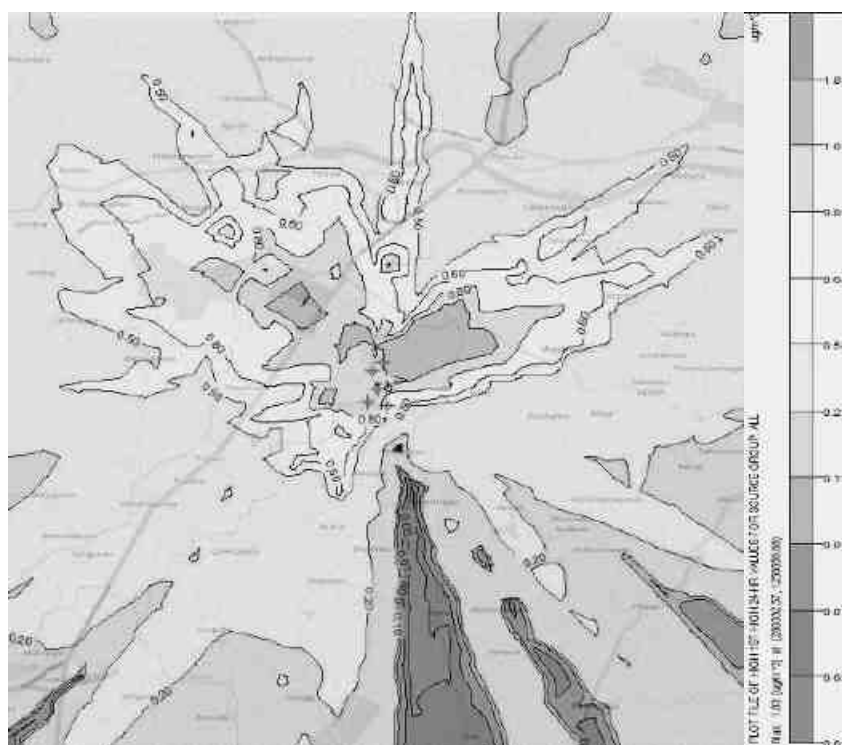


Figure 4 – 24-Hrs Predicated GLC's of CO within 10km Radius of the Study Area

Table 2 – Maximum GLC's from the Proposed Stack Emission

Pollutants	Baseline concentration Max. ($\mu\text{g}/\text{m}^3$)	Estimated Incremental Concentration ($\mu\text{g}/\text{m}^3$)	Total Concentration ($\mu\text{g}/\text{m}^3$)	NAAQ Standards ($\mu\text{g}/\text{m}^3$)
PM	65.0	0.60	65.60	100
SO ₂	4.7	0.56	5.26	80
NO _x	22.7	8.49	31.19	80
CO	BDL (DL:1.14)	1.83	1.83	2000

4. Point Source – Existing Industries

The emission from the Existing Industries stacks are estimated and used for air dispersion modeling are given in **Table 3**. The incremental values for the particulate matter, sulphur dioxide, nitrogen oxides and carbon monoxide as concentration contours shown in **Figure 5 to 8** and the maximum GLC's are given from the stack emission along with the baseline concentration is given in **Table 4**.

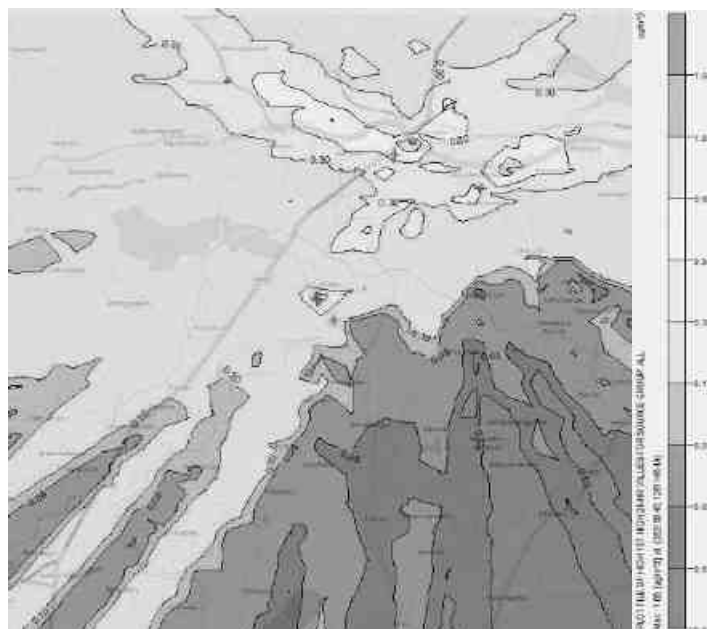


Figure 5 – 24-Hrs Predicated GLC's of PM within 10km Radius of the Study Area

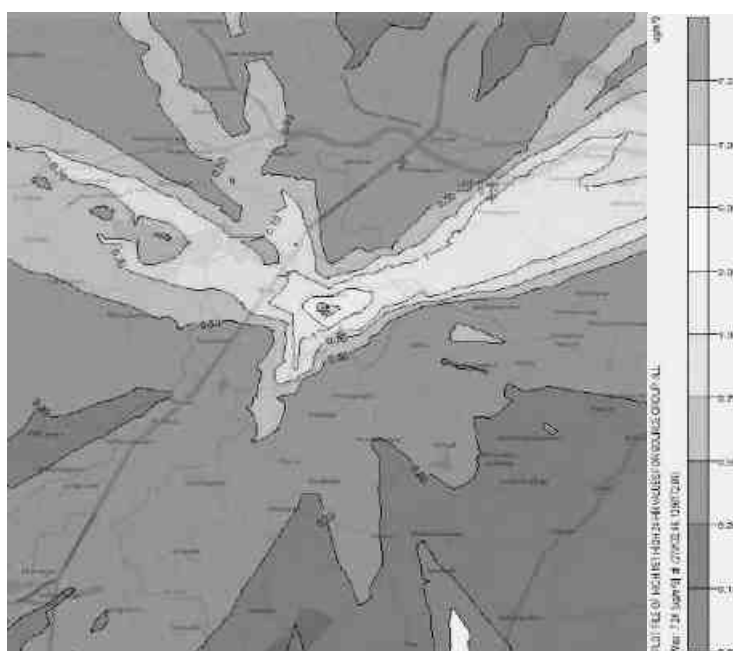


Figure 6 – 24-Hrs Predicated GLC's of SO₂ within 10km Radius of the Study Area

Table 3 – Existing Industries

S.No	Industries	Distance (km)	Direction	No of DG Sets	Capacity (in kVA)	Type of Fuel	Details of Stack					Emission (g/s)			
							No. of Stack	Height (m)	Dia (m)	Temp (°C)	Exit Velocity (m/s)	PM	SO2	NOX	CO
1.	JR One Kothari Foot Wear Pvt Ltd	Adjacent	NE	1	DG-1500	HSD	1	30	0.3	400	14	1.86E-02	1.73E-02	2.62E-01	5.64E-02
				1	DG-1500	HSD	1	30	0.3	400	14	1.86E-02	1.73E-02	2.62E-01	5.64E-02
				1	DG-250	HSD	1	30	0.3	320	12	3.10E-03	2.89E-03	4.36E-02	9.41E-03
				1	DG-250	HSD	1	30	0.3	320	12	3.10E-03	2.89E-03	4.36E-02	9.41E-03
2.	Perambalur Sugar Mills Limited	1.44	NW	1	Juice Sulphitor	-	1	26	0.3	120	12	2.54E-02	1.27E-01	4.24E-02	8.48E-02
				1	Syrup Sulphitor	-	1	26	0.3	120	12	3.39E-02	2.54E-01	5.08E-02	1.01E-01
3.	Power Plant Tneb	1.40	NW	1	DG-500	HSD	1	3.5	0.3	380	10	6.20E-03	5.77E-03	8.73E-02	1.88E-02
				1	Boiler 90T/Hr	-	1	60	1.5	140	12	4.50E-01	8.1	4.0	1.3
4.	The Best Stell Industries Stainless Steel Fabricators	6.30	NE	1	DG-750	HSD	1	15	0.3	340	9	9.29E-03	8.66E-03	1.31E-01	2.82E-02
5.	Aathil Industries	6.86	NE	1	DG-650	HSD	1	12	0.3	330	8	7.43E-03	6.93E-03	1.05E-01	2.26E-02
Total												5.76E-01	8.54E+00	5.03E+00	1.69E+00

Note:

- The DG capacity and stack height of each industry are taken from the respective Constent to Operate (CTO) available in OCMMS.

Source: Compilation of Air Emissions Factors, USA, 2025

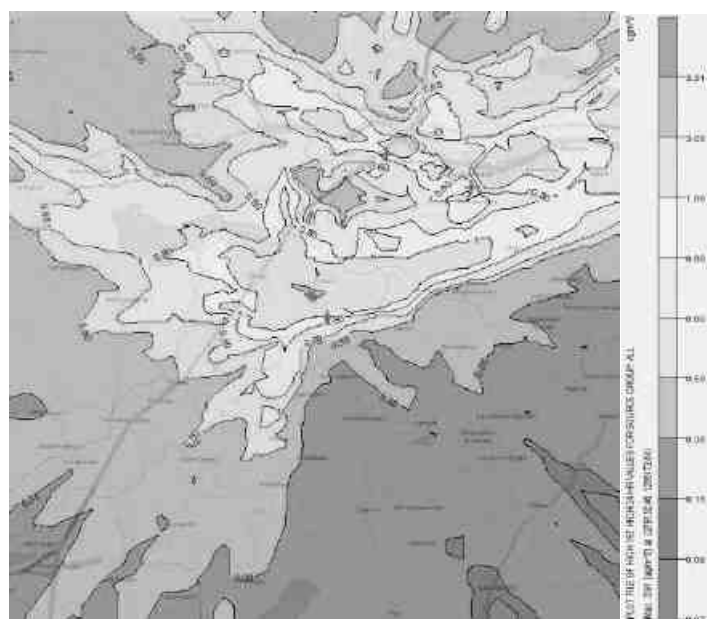


Figure 7 – 24-Hrs Predicated GLC's of NO_x within 10km Radius of the Study Area



Figure 8 – 24-Hrs Predicated GLC's of CO within 10km Radius of the Study Area

Table 4 – Maximum GLC's from the Existing Industries Stack Emission

Pollutants	Baseline concentration Max. (µg/m ³)	Estimated Incremental Concentration (µg/m ³)	Total Concentration (µg/m ³)	NAAQ Standards (µg/m ³)
PM	65.0	1.06	66.06	100
SO ₂	4.7	7.24	11.94	80
NO _x	22.7	3.91	26.61	80
CO	BDL (DL:1.14)	1.46	1.46	2000

5. Cumulative based on the Proposed and Existing Source

The emission from the Proposed Industries and Existing Industries stacks are estimated and used for air dispersion modeling are given in **Table 5**. The incremental values for the particulate matter, sulphur dioxide, nitrogen oxides and carbon monoxide as concentration contours shown in **Figure 9 to 12** and the maximum GLC's are given from the stack emission along with the baseline concentration is given in **Table 6**.



Figure 9 – 24-Hrs Predicated GLC's of PM within 10km Radius of the Study Area

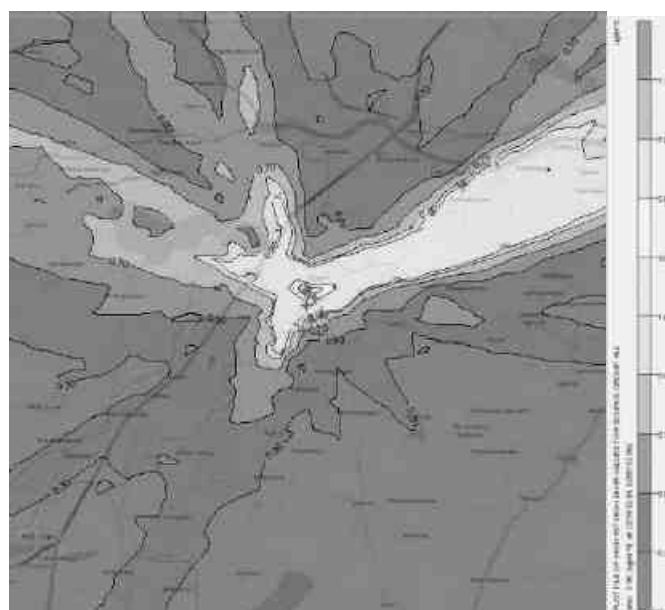


Figure 10 – 24-Hrs Predicated GLC's of SO₂ within 10km Radius of the Study Area

Table 5 - Details of Stack Emission of Proposed and Existing Industries

Plot No	Plot Type	Industry Type	Utility Details	No of DG Sets	Capacity (in kVA)	Type of Fuel	Details of Stack					Emission (g/s)			
							No. of Stack	Height (m)	Dia (m)	Temp (°C)	Exit Velocity (m/s)	PM	SO2	NOX	CO
1	Industrial	EC Category	DG	1	400	HSD	1	10	0.2	310	8	4.96E-03	4.62E-03	6.98E-02	1.50E-02
2	Industrial	EC Category	DG	1	700	HSD	1	11	0.3	330	9	8.67E-03	8.08E-03	1.22E-01	2.63E-02
3	Industrial	Non EC Category	DG	1	1200	HSD	1	13	0.5	350	10	1.49E-02	1.39E-02	2.10E-01	4.51E-02
4	Industrial	Non EC Category	DG	1	1000	HSD	1	12	0.5	350	10	1.24E-02	1.15E-02	1.75E-01	3.76E-02
5	Industrial	Non EC Category	DG	1	1500	HSD	1	14	0.6	360	11	1.86E-02	1.73E-02	2.62E-01	5.64E-02
6	Industrial	Non EC Category	DG	1	1700	HSD	1	14	0.7	360	12	2.11E-02	1.96E-02	2.97E-01	6.40E-02
7	Industrial	Non EC Category	DG	1	700	HSD	1	11	0.3	330	9	8.67E-03	8.08E-03	1.22E-01	2.63E-02
8	Industrial	Non EC Category	DG	1	500	HSD	1	10	0.2	310	8	6.20E-03	5.77E-03	8.73E-02	1.88E-02
9	Industrial	Non EC Category	DG	1	500	HSD	1	10	0.2	310	8	6.20E-03	5.77E-03	8.73E-02	1.88E-02
10	Industrial	Non EC Category	DG	1	300	HSD	1	9	0.2	310	8	3.72E-03	3.46E-03	5.24E-02	1.13E-02
Total												1.05E-01	9.81E-02	1.48E+00	3.20E-01

S.No	Industries	Distance (km)	Direction	No of DG Sets	Capacity (in kVA)	Type of Fuel	Details of Stack					Emission (g/s)			
							No. of Stack	Height (m)	Dia (m)	Temp (°C)	Exit Velocity (m/s)	PM	SO2	NOX	CO
1.	JR One Kothari Foot Wear Pvt Ltd	Adjacent	NE	1	DG-1500	HSD	1	30	0.3	400	14	1.86E-02	1.73E-02	2.62E-01	5.64E-02
				1	DG-1500	HSD	1	30	0.3	400	14	1.86E-02	1.73E-02	2.62E-01	5.64E-02
				1	DG-250	HSD	1	30	0.3	320	12	3.10E-03	2.89E-03	4.36E-02	9.41E-03
				1	DG-250	HSD	1	30	0.3	320	12	3.10E-03	2.89E-03	4.36E-02	9.41E-03
2.	Perambalur Sugar Mills Limited	1.44	NW	1	Juice Sulphitor	-	1	26	0.3	120	12	2.54E-02	1.27E-01	4.24E-02	8.48E-02
				1	Syrup Sulphitor	-	1	26	0.3	120	12	3.39E-02	2.54E-01	5.08E-02	1.01E-01
3.	Power Plant Tneb	1.40	NW	1	DG-500	HSD	1	3.5	0.3	380	10	6.20E-03	5.77E-03	8.73E-02	1.88E-02
				1	Boiler 90T/Hr	-	1	60	1.5	140	12	4.50E-01	8.1	4.0	1.3
4.	The Best Stell Industries Stainless Steel Fabricators	6.30	NE	1	DG-750	HSD	1	15	0.3	340	9	9.29E-03	8.66E-03	1.31E-01	2.82E-02

S.No	Industries	Distance (km)	Direction	No of DG Sets	Capacity (in kVA)	Type of Fuel	Details of Stack					Emission (g/s)			
							No. of Stack	Height (m)	Dia (m)	Temp (°C)	Exit Velocity (m/s)	PM	SO2	NOX	CO
5.	Aathil Industries	6.86	NE	1	DG-650	HSD	1	12	0.3	330	8	7.43E-03	6.93E-03	1.05E-01	2.26E-02
Total												5.76E-01	8.54E+00	5.03E+00	1.69E+00

Note:

- The DG sets are considered as the point source of the project.
- The capacity of the DG Sets of individual industries assumed based on the total power requirement of the Industrial Park.
- DG stack height is calculated based on the CPCB DG stack height calculation. The Height of the Industrial building will be 6m (min) and 18.50m (max). So the minimum height of the Industrial building is taken as height of the building for all the DG sets.
- The DG capacity and stack height of each industry are taken from the respective Constant to Operate (CTO) available in OCMMS.
- The DG capacity and stack height of each industry are taken from the respective Constant to Establishment (CTE) available in OCMMS.

Source: Compilation of Air Emissions Factors, USA, 2025

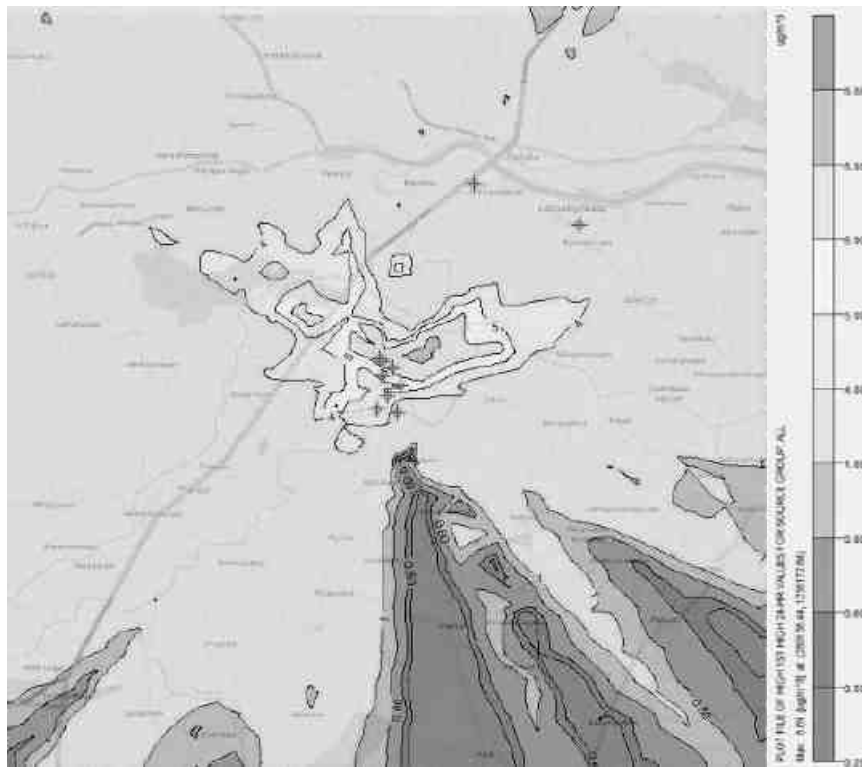


Figure 11 – 24-Hrs Predicated GLC's of NO_x within 10km Radius of the Study Area

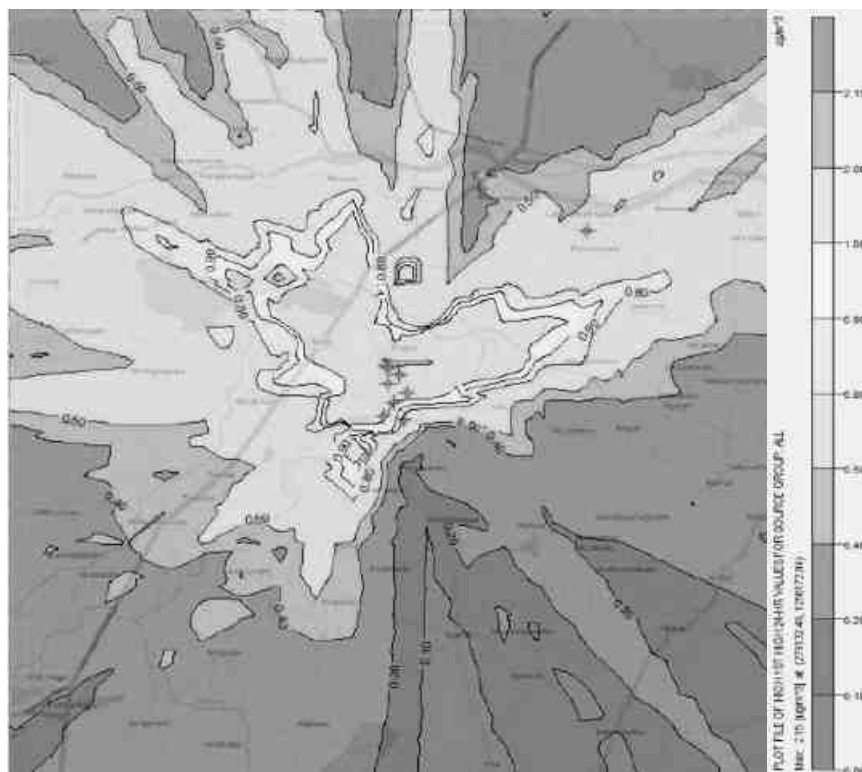


Figure 12 – 1-Hrs Predicated GLC's of CO within 10km Radius of the Study Area

**Table 6 – Maximum GLC's from the Proposed and Existing Industries
Stack Emission**

Pollutants	Baseline concentration Max. ($\mu\text{g}/\text{m}^3$)	Estimated Incremental Concentration ($\mu\text{g}/\text{m}^3$)	Total Concentration ($\mu\text{g}/\text{m}^3$)	NAAQ Standards ($\mu\text{g}/\text{m}^3$)
PM	65.0	1.07	66.07	100
SO ₂	4.7	7.36	12.06	80
NO _x	22.7	8.89	31.59	80
CO	BDL (DL:1.14)	2.15	2.15	2000

6. Mitigation Measures

Based on the results presented in the above table, it is observed that the total concentrations of PM, SO₂, NO_x, and CO from the uncontrolled emissions of the proposed project remain well within the National Ambient Air Quality Standards (NAAQS). Therefore, the proposed project is anticipated to have an insignificant impact on the surrounding environment and nearby habitations. Nevertheless, the following mitigation measures are recommended to further minimize potential impacts:

- All individual industries will be instructed to provided adequate stack height for the DG Sets in accordance with CPCB/TNPCB guidelines.
- Regular ambient air quality monitoring shall be conducted at identified locations to compare actual monitored values with the predicted concentrations.
- Any exceedance of NAAQ standards shall be thoroughly investigated and the efficiency of the Air Pollution Control systems shall be reviewed.
- Water sprinkling shall be implemented on internal roads to control dust generation.
- A greenbelt shall be developed to enhance air quality and provide a buffer against emissions.

Annexure – XII
Water Concurrence Letter



From
Er.K.Thangaraj .B.E.,
Executive Engineer(I/c),
TWAD Board,
RWS Division,
Perambalur

To
The Managing Director,
SIPCOT,
No 19-A, Rukmani Lakshmi Pathy Road,
Post Box No. - 7223,
Egmore,
Chennai - 600 008

Lr No. F. CWSS to Pblr Mpty/RWS Dn/Pblr/ JDO/ 2025/ dt.16.04.2025

Sir,

Sub : Combined Water Supply Scheme to Perambalur Municipality, Erailur and Padalur SIPCOT in Perambalur District - Work order issued - fund requested for remittance to Highways Dept and Work Bills to the contractor - requested - Reg

- Ref :
- 1) G.O.(MS) No. 149/ MA & WS (WS2) Dept Dated 23.10.2024 for 345.78 Crores.
 - 2) CE/TNJ/Lr.No.4225/F.Perambalur Mpty & SIPCOT/ SDO/CE-TNJ/2024/ dt.03.02.2025

I wish to inform that the Administrative Sanction for providing Combined Water Supply Scheme to Perambalur Municipality, Erailur and Padalur SIPCOT in Perambalur District was accorded vide ref. 1st cited and the work order was issued by the Chief Engineer, TWAD Board, Thanjavur on 03.02.2025 vide ref. 2nd cited. The work is under progress and the scheme is progressing ahead of program schedule.

In this regard, I wish to state that fund is required for payment towards the tender advertising charges, investigation charges, road cutting, road restoration charges to be paid to Highways Department and payment to the contractor.

I enclosed herewith the statement of Expenditure (SOE) up to 16.04.2025 in respect of CWSS to Perambalur Municipality, Erailur and Padalur SIPCOT in Perambalur District.

20/04/25
1156

T.M. Sankar
Pl. pay w/o on
file. (Expend)
20/04/25
Ch. K.

20/04/25

The details of current physical progress of the components in the scheme is mentioned below for reference.

Sl. No.	Name of Component	Current Status
	Headworks	
1	Collector Well	Side wall 2 nd lift concrete work completed.
2.1	Infiltration well - 1	Porous side wall 5 th lift concrete work completed.
2.2	Infiltration well - 2	Curb concrete work completed.
3	Collection Sump	Side wall 3 rd lift concrete work completed.
4	Foot Bridge	Well Foundation - 3 Nos Curb concrete work completed. Pile Foundation - 24 Nos of Pile concrete work completed.
	Thenur Booster Sump	
5	5.90 LL Sump	Earthwork completed.
	Pumping Main	
6.a	600 mm DI pipe	Supply - 26.70 Km, Laid - 15.40 Km
6.b	400 mm OPVC 12.5 KSC Pipe	Purchase Order placed. Pipe supply will be received at site by the end of this month.

The fund allotted under SIPCOT as per G.O. is mentioned below with weightage to the total estimate cost.

	TUFIDCO	GoTN	ULB (KNMT 2024- 25)	ULB (KNMT 2025- 26)	SIPCOT	Total
	190.00	26.00	23.19	26.3	80.29	345.78
Weightage per Head as per G.O.	0.55	0.08	0.07	0.08	0.23	1.00
	55.41	7.58	6.76	7.67	23.42	100.84

Expenditure for the scheme up to 16.04.2025	: Rs 100.84 Cr
Total fund allotted to SIPCOT as per G.O.	: Rs 80.29 Cr
Total funds received from SIPCOT	: Rs 23.84 Cr
Balance Fund to be received from SIPCOT	: Rs 56.45 Cr

The total fund allotted to SIPCOT as per G.O. is Rs. 80.29 Cr (Rupees Eighty Crores Twenty Nine Lakhs only), The current expenditure is Rs. 100.84 Cr which is around 30% of the total estimate cost of Rs. 345.78 Cr. The SIPCOT share is Rs. 23.42 Cr with respect to current expenditure of Rs. 100.84 Cr.

Hence I request that the balance fund of Rs. 56.45 Crores (Rupees Fifty Six Crores and Forty five Lakhs only) may please be released since the scheme is progressing ahead of the program schedule so as to remit for Road restoration charges to Highways Department and work bills to the contractor. The amount may please be remitted to Executive Engineer, TWAD Board, RWS Division, Perambalur so that the work will not held up for want of funds.

Encl:

- 1) Expenditure Details.

[Signature]
Executive Engineer(Vc), TWAD Board,
RWS Division, Perambalur.

[Signature]
16/4/25

CWSS TO PERAMBALUR MUNICIPALITY, ERAIYUR AND PADALUR SIPCOT INDUSTRIAL PARK IN PERAMBALUR DISTRICT				ESTIMATE COST : Rs. 345.78 crores		
DETAILS OF EXPENDITURE						
Sl. No.	Sl.No.	Description	Works outlay	Centage	Total	Remarks
		Expr during 2024-2025				
1		Investigation Charges	497.00	0.00	497.00	
2		Anticipated amount for Highways Road Restoration charges , tender advertising charges	1408.64	0.00	1408.64	
3		LS 1st and part Bill	1325.46	133.90	1459.36	
4		LS 2nd and part Bill	1534.67	153.47	1688.14	
5		LS 3rd and part Bill	1573.96	157.40	1731.36	
6		Anticipated Bill payment to the contractor (Supply of Materials and Civil work)	3000.00	300.00	3300.00	
		Expr during 2024-2025	9339.73	744.76	10084.49	

Executive Engineer (a/c),
RWS Division, Perambalur

Rm/25