BEFORE THE NATIONAL GREEN TRIBUNAL SOUTH ZONE AT CHENNAI

MEMORANDUM OF APPEAL

(Under Sections 16(h) read with 18(1) of the National Green Tribunal Act, 2010)

Appeal No. 34 of 2020

G. Praveena & another ....Appellants

Vs.

The Union of India & Ors … Respondents

FILE - B

Part - II

INDEX

Through

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ENVIRONMENTAL IMPACT ASSESSMENT
ENVIRONMENTAL MANAGEMENT PLAN

MANALLUR INDUSTRIAL PARK
Gummidipoondi Taluk, Thiruvallure District

PROJECT PROPONENT

STATE INDUSTRIES PROMOTION CORPORATION OF TAMILNADU LIMITED

(A GOVERNMENT OF TAMILNADU UNDERTAKING)

CHENNAI - 600 008

EIA Consultants

CENTRE FOR ENVIRONMENT, HEALTH & SAFETY

ANNAMALAI UNIVERSITY, ANNAMALAI NAGAR - 608 002

ITCOT CONSULTANCY AND SERVICES LIMITED

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Centre for Environment, Health & Safety
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.....NABET/QCI accredited EIA Consultancy Organization for MoEF&CC/GoI

UNDERTAKING

In line with MoEF OM no. J – 11013/41/2006-IA.II (I) dated 4th Aug. 2009. We hereby confirm that all Terms of Reference issued by MoEF & CC, Government of India vide Letter No. 21-59/2015 - IA.III dated 22nd July, 2015 and was valid for a period of three years i.e. up to 21st July, 2018, for preparation EIA/EMP report submitted for EC of Manallur SIPCOT Industrial Park over an area of 286.065 Ha. at Manallur village, Tehsil – Gummidipoondi, District – Thiruvallur, Tamilnadu for production of Synthetic Organic Chemicals and Integrated Paint Industries has been complied with and data provided in the EIA/EMP report is factually correct.

The EIA/EMP report has been vetted by M/s Centre for Environment, Health and Safety, Annamalai University, Annamalai Nagar. Centre for Environment, Health and Safety, is a NABET accredited consultant for preparation of EIA/EMP report of Industrial Estates/Parks/Complexes (Sector 31) in the List of Accredited Consultant Organizations/Rev. 19, January, 2019.

For M/s Centre for Environment, Health and Safety

Dr.Nehru Kumar Vaithilingam
Director & EIA Coordinator

EIA CONSULTANTS

CENTRE FOR ENVIRONMENT, HEALTH AND SAFETY
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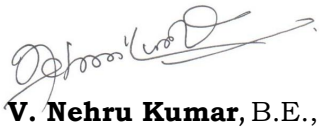

Dr. V. Nehru Kumar, B.E., M.E., Ph.D

Professor & Director,
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FUNCTIONAL AREA EXPERTS

Water	:	**Dr. S. Poongothai, B.E., M.E., Ph.D.,** Professor of Civil Engineering
Wastewater	:	**Dr.B. Asha, B.E., M.E., Ph.D.,** Associate Professor of Environmental Engineering
Air Pollution Control	:	**Dr.V.Nehru Kumar, B.E., M.E., Ph.D.,** Professor & Director of Centre for Environment, Health and Safety
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Solidwaste	:	**Dr. V.Nehru Kumar, B.E., M.E., Ph.D.,** Professor & Director of Centre for Environment, Health and Safety
Risk Assessment	:	**Dr. K. Saravannan, B.E., M.E., Ph.D.,** Professor of Chemical Engineering
Land Use and SolidWaste	:	**Dr. K. Balaji, B.E., M.E., Ph.D.,** Associate Professor of Environmental Engineering
Soil and Geological Survey	:	**Dr. G.R. Senthil Kumar, M.Sc., M.Phil., Ph.D.,** Associate Professor of Earth Sciences
Biological Survey	:	**Dr. M. Gomathinayagam, M.Sc., M.Phil., Ph.D.,** Associate Professor of Botany
Ecology	:	**Dr. C.Elanchezhiayan, M.Sc., M.Phil., Ph.D.,** Associate Professor of Zoology **Dr. V. Imayavaramban, B.Sc., M.Sc., Ph.D.,** Professor of Agriculture
Socio –Economic Survey	:	**Dr. B. Mathavan, M.A., M.Phil., Ph.D.,** Professor of Economics
Environmental Survey	:	**Vimta Labs Limited** Hyderabad

FOR VIMTA LABS LIMITED

AUTHORISED SIGNATORY

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Executive Summary

EXECUTIVE SUMMARY

1.1. GENERAL

Industrial development is the key for the inclusive growth of our country and ensuring its environmental compatibility is must to sustain such development. Major Synthetic Organic chemical Industries like Pharma suffer, technologies for effective use of raw materials, machineries for minimizing the residues and strategies for residue management. In Tamilnadu, the number of such, synthetic organic industries is swelling in the recent past and an orderly development has become necessary. There is a growing demand for surface finishing chemicals like paints with unprecedented infrastructural development.

The present proposal of Industrial Park (IP) at Manallur near Chennai, Government of Tamilnadu is precisely to address this pressing demand to sustain and ensure sustainable development of Synthetic Organic Chemicals and Integrated Paint industries.

Industries Promotion Corporation of Tamilnadu Limited (SIPCOT) is the nodal agency of Government of Tamilnadu for the industrial promotion in the state. The proposed **Manallur Industrial Park** (IP) by SIPCOT will ensure the development of an exclusive IP for **Synthetic Organic Chemicals** (category **5(f)**) and **Integrated Paint Industries** (category, **5(h)**).

The proposed Manallur Industrial Park (IP) will be first of its kind for the state of Tamilnadu where the activities of synthetic organic chemical Processing Industries will be regulated for effective resources and residue management with all implements to ensure sustainable development of the project location. The IP is envisaged to have the least pollution foot print with more strategies for residue management.

Principally, the proposed IP will be having the member industries in cluster format with **Zero Liquid Discharge systems** and each member industrywill be having their independent **Effluent Treatment Plant (ETP)** towards reclamation of water from effluent and systems for its recycle/reuse.

The proposed Manallur IP will be established in **286.065 ha** of land in the revenue limits of Manallur Village, Gummidipoondi Taluk, Thiruvallur district, which is by 47.5 Km North West of Chennai.The proposed IP is in the adjoining location of another operating industrial Park called

Gummidipoondi Industrial Park, also run by the SIPCOT, and well connected by National and State Highways.

The Key Map showing the location and approach for the proposed IP project is presented in **Fig.1.**

The land will be developed with infrastructures like roads, water, drainage and electrical connectivity by SIPCOT and the developed land divided into Industrial Plots and will be assigned to prosperous industrial houses.

SIPCOT is intended to obtain **Environmental Clearance** for the proposed IP under Sector **7C (A)** in compliance with EIA Notification, 2006. SIPCOT have already obtained Terms of Reference (ToR) approval from Ministry of Environment, Forests and Climate Change (MoEF&CC) and the same is presented as **ANNEXURE-I**. As there was a delay in getting the land allocation, SIPCOT applied and obtained the extended validity for ToR from MoEF&CC and the same is presented as **ANNEXURE-II.**

The EIA studies and this report was made in compliance to all additional ToR as mandated in **ANNEXURE-I&II** and as well, in line with the generic Guidelines of MoEF&CC for Industrial Estates.

1.2. PROJECT

The proposed **Manallur Industrial Park** is exclusively for **Synthetic Organic Chemicals and Integrated Paint Industries** and will be integrated with the primary environmental infrastructures like common water supply, power and road connectivity.

SIPCOT have got allocation of land for **286.065 ha** in Manallur, Thiruvallur district for the establishment of the Park. The geographical coordinates of the project location is $13^0$26' 48.15" to 13^0 27' 15.37" N Latitude and $80^0$01' 21.79" to $80^0$01' 56.24" E Longitude.

A copy of the G.O on delineation of the land for the proposed IP is attached as **ANNEXURE-III**.

The Google imagery of 10Km radius around the project location is presented in **Fig 2.**

SIPCOT will promote the land mass as industrial plots of desired size to suit the requirement of industrial type and production size. Each plot will be provided with common access, waterline, power line and these services will remain common and they will be operated and maintained in association with representative Organizations of member industries by SIPCOT.

SIPCOT will allot the developed plots to the potential industries based on the comprehensive assessment of Investment, technology, employment, expert and its compliance strategy to environmental regulations.

1.3. PROJECT PROPONENTS

Industries Promotion Corporation of Tamilnadu Limited (SIPCOT) is the proponent of the proposed IP as an Industrial Complex exclusively to promote Synthetic Organic Chemical Industries 5 (f) and Integrated Paint industries 5(h) in the cluster format.

SIPCOT is the nodal agency of Government of Tamilnadu to ensure sustainable development of industries, exclusively in developed land banks in cluster format and was stated functioning since 1971. The objective of SIPCOT is to establish, develop, maintain and manage industrial complexes, parks and Growth Centres at various places across the State of Tamil Nadu.

SIPCOT has so far developed 23 Industrial Complexes in 12 districts and 7 Sector Specific Special Economic Zones (SEZs) across Tamil Nadu. SIPCOT is the Nodal Agency for Government of Tamil Nadu to sanction and for the disbursement of Structured Package of Financial Assistance to large industrial units.

The role of SIPCOT in the industrialization of the State is not only quantitative but also qualitative. Instead of just accelerating the pace of industrial growth, SIPCOT strives to ensure that disbursal of financial incentives, which resulted in the growth of industries in backward and hitherto under developed areas.

SIPCOT has its administrative office at state level at19/A, Rukmani Lakshmipathy Road, Egmore, Chennai. SIPCOT is now being headed by **Mr.K.Srinivasan, IAS** as its **Managing Director**.

The email is sipcot@md3.vsnl.net.in. The contact numbers are 044-28554787 and 044-28513978 (Fax).

The time schedule of project execution, of land development and getting the IE commissioned, is proposed for **2 years,** from the date of obtaining **Environmental Clearance**. The IP, then is scheduled to get established with Consent Orders from State Pollution Control Board, firstly for **Establishment** and eventually on establishment for **Operation**.

The budgetary estimate of the project is assessed for **INR 250 Crores**.

1.4. EIA CONSULTANTS

Annamalai University is a State University. **Centre for Environment, Health & Safety (CEHS)** is a wholesome, multi- disciplinary Environmental Organization of Annamalai University and an accredited **EIA Consulting Organization** under National Accreditation Board for Education and Training (NABET) by **Quality Council of India** (QCI) for undertaking EIA studies for Seven Sectors for **MoEF&CC.** Industrial Estate/Parks is one of the sectors for which CEHS has been accredited.

CEHS has been contracted for EIA consultancy by **SIPCOT** through **ITCOT Consultancy and Services Limited,** Chennai towards getting **Environmental Clearances** under EIA Notification, 2006.

MoEF&CC and as well QCI/NABET updates the list of accredited EIA Consulting Organization on every month and keep posting it in their official web of MoEF&CC and as well QCI/NABET.

For further details, please visit www.envfor.nic.in, www.qcin.org.

The part of the List as posted in the web of MoEF&CC is presented as **ANNEXURE-IV.**

1.5. EIA FRAME WORK

EIA study was initiated with **Environmental survey** in the project area, considering **10 km radius from the location as Impact area**, for evaluating the **Due-diligence** of the Environmental status. The Survey for field observations was run to generate primary data on **Micrometeorology, Air Quality, Water, Noise, Soil/Sediment, Socio Economics and Biological environment** (Flora& Fauna)

The Impact Assessment studies were carried out and reporting was done in line with Generic guidelines of MoEF&CC for Industrial Estates. Specific and additional Terms of Reference (ToR) was obtained from MoEF&CC vide **F. No21-59/2015-IA.III**dated **22/07/2015**.A copy of the ToR for EIA studies is presented in **ANNEXURE-I.**

The validity of the ToR has been extended up to 21/07/2019 by MoEF&CC vide letter F.No.21-59/2015-IA.III (Pt) dated 13/11/2018 in **ANNEXURE-II.**

The proposed industrial activities with respective infrastructures including Zero Liquid Discharge plants for effluent management were given specific analysis and studies were completed for the Environmental Impact Assessment.

A Comprehensive **Environmental Management Plan** was devised and provided for implementation in all three phases of the project viz., Planning & Designing, Establishment & Construction and Operation & Maintenance.

The EMP was framed with protocols and procedures for monitoring and control of residual streams of pollutants from the proposed industrial activities. The Common infrastructures like Roads, water supply lines, Power lines, Drainage lines, Storm water collection systems, Green belt development, Rain Water Harvesting Structures, etc. were given a detailed implementation schedule with capital investment and budgetary requirements for maintenance.

A compliance report for the approved ToR in preparing this draft EIA report is presented as **ANNEXURE-V.**

1.6. MANALLUR INDUSTRIAL PARK

The proposed Manallur IP is exclusively to promote Synthetic Organic chemical processing industries and Integrated Paint Industries with all required infrastructures as developed industrial plots.

The proposed land of **286.065 ha** will be strategically divided into industrial plots with all required infrastructures like Water, Power, Drainage, Roads, Green Belt Development, Rain water structures. The proposed IP will be integrated with Zero Liquid Discharge.

The proposed member industrial category of **Synthetic organic chemicals industry, 5(f)** is very broad to have a **large range of processing and production activities for Polymer, Dyes &Dye intermediates, Drugs & intermediates, Pesticide, Synthetic rubbers, basic organic chemicals, other synthetic organic chemicals & chemical intermediates**, as classified in **EIA Notification, 2006**. They are principally notified A category industry for the requirement of Environmental Clearance.

The proposed land use pattern of the Industrial Park is presented in **Table. 1.**

The conceptual layout of the proposed Manallur Industries Park is presented in **Fig 3.**

The another category of proposed member industries is **Integrated Paint Industries, 5(h)** which includes all industries manufacturing **surface finishing chemicals that covers Varnishes, Thinners, Exteriors and Interior paints**.

TABLE: 1. LAND USE PATTERN - IP

Manallur Industrial Park	Hectare	Area Coverage
TOTAL AREA	**286.065**	
ALLOTTABLE AREA – INDUSTRIAL PLOTS	**200.00**	**69.91%**
Road, Water Supply & Storm Water Drain /Rain Water Harvesting Structures	30.00	10.49%
Common Amenities like EB, Administrative Block, etc.	10.00	3.50%
Solid Waste Management	10.00	5% of allottable area
OSR	28.61	10.00%
Green Belt along roadside/periphery	7.46	2.61%
Area under Green Belt Development		
Green Belt in OSR	28.61	
Green Belt along roadside/periphery	7.46	
Green Belt by Member Industries (Mandate by SIPCOT for the allocation of land)	66.00	33% of Member Industries
TOTAL LAND FOR GREEN BELT	**102.07**	**35.68%**

Synthetic Organic chemical Industries are largely water intensive and with the varied types of auxiliary chemicals and these industries generate complex effluent streams which requires specific systems to handle, treat, reuse/recycle and dispose the final residue.

At present, Synthetic Organic chemical and Integrated Paint Industries are predominantly in few districts like Cuddalore in Tamilnadu. The major environmental issue is the disposal issues for treated effluent and or its reuse/recycle.

Any Synthetic Organic Chemical industry will have the option of processing varying raw materials/chemicals into varied products with limitation to use installed reactors and only for the consented net quantity of production and permitted quantity of pollution load.

They will be normally limited to reactors and specified products. Very few industries are processing Synthetic Organic Chemicals for the entire range of processing them to varied finished product. In such typical cases, the basic organic (usually aromatic) raw materials are processed through various chemical procedures (unit processes). The choice of physical procedures, which are applied, is also not limited in a similar way (unit operations).

However, in a typical- case study of a synthetic organic chemical production, the major unit processes are:

- Acetylation
- Acylation
- Addition
- Alkylation
- Amination
- Bromination
- Carboxylation
- Carboxymethylation
- Chlorination
- Condensation
- Coupling
- Diazotisation
- Diazotisation and modification of the diazo group
- Esterification

- Sulphonation
- Fusion
- Halogenation
- Hydrochlorination
- Hydrolysis
- Kalization
- Neutralisation
- Nitration
- Oxidation
- Phosgenation
- Rearrangements
- Reduction
- Substitution
- Sulphation
- Sulphitation
- Thionation

The proposed member industries under the category of **Integrated Paint Industries** are classified in **5(f)** category in **EIA Notification, 2006**. They are principally notified B category industry for the requirement of Environmental Clearance

In typical cases of the integrated paint industries, Varnishes, Thinners and Interior and Exterior paints are included. The manufactures processes include dry and wet operations. The manufacturing processes typically have the following operations;

- Mixing, settling, straining or centrifugation
- Lacquer manufacturing (warming and mixing)
- Distemper manufacturing (Pug mill)
- Manufacture of resins and emulsions
- Bituminous paint

The nature of activities as could be seen in the lists are generic in nature and every industry will have its own intended- more specific processes and unit operations of production or manufacturing and hence, assessment of resource requirement and waste management is

elusive. Every industry will have its own specific production scenario, raw materials, water requirements, unit operations, and residue or effluent streams and for a comprehensive environmental assessment, study is required case-to-case basis.

1.6.1. WATER BALANCE

The water requirement for the entire activities of the member industries in the proposed IP is assessed for **1 MGD**. Rather, the member industries will be chosen on the basis of water requirement and allotment will be made to manage with limited -available water supply.

This required quantity of water will be vailed from the existing supply lines of Metro Water and through an exclusive arrangement between SIPCOT and Metro Water. The water supply arrangement is being facilitated by Government of Tamilnadu.

The water will be sourced from the Water Reclamation Plant, named as TTRO (Tertiary Treated Reverse Osmosis Plant) for treated the treated sewage of Chennai Municipal Corporation.

The exclusive agreement to ensure the required water supply with Metro Water is presented in **ANNEXURE-VI.**

The systems towards source development, treatment, storage and distribution network of water supply for all member industries, for both industrial and drinking requirements, shall be operated and maintained by SIPCOT.

Member industries shall pay, separately on annual basis and on the basis of consumption rate, to SIPCOT for proper operation & maintenance. Member industries will also pay TNPCB, the chess fee under different categories of water use, as per Water Act 1974.

The Effluent Treatment Plant (ETP) will be mandated to have Water Treatment Plant (WTP) to reclaim water by processing treated effluent. The Zero Waste initiatives will be mandated for all member industries in their Corporate Responsibility of Environmental Protection (CREP).

Any residual liquid waste shall be treated to have zero disposals. The entire treated effluent shall be reused in their utilities and green belt development.

The solid waste stream will be sent to CPCB approved recyclers or to MoEF&CC approved TSDF for proper and ultimate disposal.

1.6.2. EFFLUENT MANAGEMENT

The effluent treatment will be the responsibility of individual industry and they will be committed to operate as Zero Liquid Disposal facility with reclamation of water at not less than 70% from the process effluent. SIPCOT will mandate every applicant industry to submit a

"**Zero Disposal**" Scheme on a detailed effluent management plan. The effluent must be collected, treated, and reused by recycling. Any residues out of solids-separation (sludge) will be disposed through approved TSDF. The applicant industries will be screened on the basis of an appraisal report on effluent management by any MoEF & CC approved Environmental organization. This will remain as pre-requite document for applying for land allotment by SIPCOT.

SIPCOT will initiate a joint monitoring preparation of "Zero Waste" from all member industries through a Joint Action Committee, comprising SIPCOT ,member industries and a third part scientific organization.

1.7. PROJECT LOCATION

The proposed location of IP is in the Thiruvallur District in an environmentally compatible condition with readily available road access. The proposed project is to promote **286.065 ha** of land as developed land mass for facilitating establishment of industries.

The geographical coordinates of the project location is 13^0 26' 48.15" to 13^0 27' 15.37" N Latitude and 80^0 01' 21.79" to 80^0 01' 56.24" E Longitude.

The location is largely a plain terrain in its topographical characteristics. The project area is barren land **without any notified water courses, river or lake**. The lack of dependable water courses, naturally, keeps the area away from intensive agricultural activities.

The location is essentially get surrounded by many industries in the recent part. The Thervoykandigai and as well Gummidipoondi Industrial Estates are available within 10km radius.

The location is largely in industrialized location with significant population. However, the agricultural activities are limited.

There is no notified Forest within the impact area of the proposed IP in the 10 Km radius. However, the location is inter-state boundary and close to Tamilnadu – Andhra Pradesh State boundary by 5 Km.

The location is well connected by roads as NH-5 runs close to project location. It is also served by a Railway Station at Gummidipoondi by 12 Km and the nearest airport is at Chennai by 55 Km.

The Ennore Port is available 41 Km from the project location, is a very important and provide advantage to the industrial growth. The location is semi-rural with more industrial labor which is inclined to welcome such industries in the project location for ensuring overall socio-economic growth of the location.

1.8. DUE DILIGENCE SURVEY

The project location was characterized for a detailed environmental survey on all its attributes for 10km radius of the project location as Impact area.

The Project Impact Area for 10Km radius is shown in **Fig.4.** The study was completed with field laboratory, observatory and sampling stations in the Impact area for all attributes, using standard Protocols and Procedures.

1.8.1 Micrometeorology

A Micrometeorological station was established and meteorological parameters were studied during **February- April, 2018**. The parameters observe were

- ✓ Temperature (Maximum, Minimum)
- ✓ Wind Speed & Direction
- ✓ Relative Humidity
- ✓ Rain Fall

A comprehensive meteorological condition of the project location was evaluated for Impact Prediction studies and preparation Mitigation Plans.

1.8.2. Air Environment

Ambient Air Quality (AAQ) survey program was run for a month with **Ten Monitoring stations**, spanning in 10 km radius of impact area of the project. The Sampling Stations were strategically selected on the basis of Wind Direction and Topography of the project location with reference to proposed project activities.

The samples were analyzed for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO and correlated with NAAQ Standards of MoEF&CC/GoI.

1.8.3. Water Environment

Fivenumbers of Under Ground Water samples were also collected in five different locations and analyzed. Five Ground Water samples were also collected in five different locations and analyzed.

All the water samples were characterized using standard protocols and parameters.

1.8.4. Soil Environment

Soil samples were drawn from five locations and analyzed for standard characteristics.

1.8.5. Terrestrial Environment

Terrestrial Flora and fauna also were evaluated in the due diligence survey in the Impact area.

There is no endangered species of flora and fauna in the project location.

The proposed project activities in the synthetic organic chemicals and integrated paint manufacturing processes do not have any interface or interaction with the terrestrial environment.

1.8.6. Socio- Economics

The demographic and stakeholders of the proposed IP were surveyed and studied for their response to the proposed project.

A field survey clearly indicated that the local peoples are predominantly in favor of the project although few are opposing to setting up an IP in this location.

1.9. IMPACT ASSESSMENT STUDIES

The water use pattern, effluent sources and characterization the critical parameters of impacts as water is the most vulnerable attribute to the synthetic organic industries. The effluent characterization, treatment strategies and reuse/recycle options were discussed to minimize the likely impact on the land and water resources.

The industrial solid waste streams were also considered for safe transfer, treatment & disposal in the offsite facilities.

The proposed IP for Synthetic Organic Chemical and Integrated Paint Industries will have Emission Stacks from Processing reactors, Storage & Transfer lines for chemicals.

The storage and transfer systems for Solvents and bulk liquids are the sources of Volatile Organic Carbons (VOCs) in the ambient atmosphere. The secondary stacks from Boilers, Air Heaters, etc., will also significantly high in these types of member industries. All such point sources of pollution were studied and evaluated for the environmental impacts.

The construction of buildings involves insignificant account of transfer of construction materials by vehicles as most of them will be Pre-Engineered fabricated structures.

The movement of few vehicles and foundation works would result in fugitive dust emission which can be kept under control through well laid roads and water spraying in the locations of dust, periodically.

1.10. ENVIRONMENTAL MANAGEMENT PLAN

An exclusive **Environmental Management Plan (EMP)** is envisaged with a comprehensive framework of action plan for implementing the proposed IP to ensure the operations and performance of the proposed member industries and activities will conserve the resources and prevent pollution in the project location.

The effluent management as water reclamation plant and its operation as Zero Liquid Discharge (ZLDP) plants is the most critical point of concern in devising the EMP. The member industries will be mandated for ZLDP while the allocation of lands by SIPCOT. The water and wastewater infrastructures do require monitoring and maintenance for the required Environmental Performance.

The **EMP** for the proposed **IP** will specifically address Monitoring systems for all following attributes;

- Manufacturing Processes; Effluent Generation, Characteristics
- Water Use Pattern of Member industries
- Effluent Treatment & Water Reclamation
- Continuous Air Quality Monitoring
- Solid waste Management; Off-site
- Roads
- Power lines & Distribution Networks
- Rain water Harvesting Structures
- Green Belt Development

An exclusive set up of executives and a team of skilled peoples will be formed as core active group as **Environmental Cell.** The cell will evaluate the **EMP** on annual basis and will envisage a budgetary allocation to implement from the **SIPCOT**.

The EMP will have exclusive plans for Storm water drainage, rain water harvesting and ground water recharge systems in the project location.

The Green belt development and its continual maintenance will have its exclusive plan and budget, on annual basis.

The Budget of the EMP is envisaged for INR 2 Crores. There will also a recurring cost for O&M for Rs.0.5 Crore, annually. This may be revisited on commissioning the IP.

1.11. SOCIAL IMPACT ASSESSMENT

The identified and proposed land mass has no human settlement or any agricultural activity. Hence, proposed establishment of IP does not require any displacement of human settlement. Also, the entire implementation of IP is uninhabited and without any social or reserve forests cover. Hence, there is no requirement for Resettlement and Rehabilitation (R&R) plans.

SIPCOT is committed to develop buffer zones all around the proposed area and on its four sides. Hence there will not be any interference with the prevailing environment all around the project location. SIPCOT will ensure development of natural species of trees in the buffer Zone.

The health of the workers will be continuously monitored by an exclusive Health Surveillance Plan (HSP), implemented by member industries with the coordination of SIPCOT, TNPCB and State Health Department.

The cultural and religious activities of the people around the project site will never be intervened by any of the activities of member industries of IP or by SIPCOT; rather they will get support through employment (both direct & indirect), sponsorship and donations for continual updation of their socio-economic development.

1.12. RISK AND DISASTER MANAGEMENT PLAN

There are hazardous or toxic chemical storages or gas usage in the proposed IP of SIPCOT. The storage and transfer lines several synthetic organic chemicals and paint solvents and thinners

are the most vulnerable sources which has probability for workers to suffer skin and respiratory diseases.

The member industries are envisaged with state of art mechanical systems with instruments for auto and semi-auto operations of the storage and transfer lines for chemicals and gases and in the manufacturing processing operations which will minimize the human exposure and less reside disposal, either as solid or liquid.

Requisite account of *Emergency Management Plans*, *on-site* and as well for *off-site*, will be prepared and kept under surveillance by SIPCOT administration, to meet any situations of emergency due to fire or any accident.

The project location has been surveyed for no natural calamity. Even Tsunami-2004 has not learnt to cause any severe physical damage in the specified project location. Storm of any devastating nature have never been recorded in this location. SIPCOT will maintain an exclusive wing of fire brigades and will function with specific coordination with the state Fire Service Department and with required physical systems like equipment, chemicals, transportation etc. to manage any likely accident or fire.

Industry- specific Risk Analysis and Chemical Disaster Management Plan will be prepared and in place for implementation during any accidents and such requirements will be the responsibility of the respective industries.

1.13. INTERNAL ROADS AND TRAFFIC

All internal roads within the SIPCOT will be laid as follows:

Main Roads : 9 m width along with 1.5 m green belt on both sides

The approach road will be improved with tar felt and the concept of Bio-Fencing will be implemented with specified species of vegetation to prevent trespassing and avoid any interference to vehicular movements.

1.14. STORM WATER DRAINAGE

SIPCOT will ensure engineered structures viz., closed conduits for collection and transportation of storm water to drain away the storm water from all building tops and paved roads and floors, inline to the existing contour and topography of the project location.

The SIPCOT Administration and also all member industries will attach utmost importance for storm water collection, without any pollution so that it can be used for ground water recharging and green belt development.

1.15. RAIN WATER HARVESTING STRUCTURES

SIPCOT will put up Rain Water Harvesting structures (RWHS) within the boundary limits of the proposed IP. The RWHS be established as per the standard practices as percolation pits and as per the guidelines of Tamilnadu Water Supply and Drainage Board (TWAD). SIPCOT will continuously monitor such RWHS for preventing any contamination due to chemicals and effluent spillages and over flows.

1.16. GREEN BELT DEVELOPMENT

The proposed IP will have buffer zones along the boundary lines, abetting the Back water/ Estuaries and it will be protected by SIPCOT with local species of trees and vegetation.

SIPCOT Administration along with Member Industries will commit to create and maintain a "green corridor" in the buffer zones all around the boundary, with compatible species of trees and plantation to suit the prevailing coastal environment. It is also committed to develop green belt all along their inner roads and open spaces. SIPCOT will promote green belt to cover the boundary lines of all the open spaces for raw material and product handling and vehicle parking, strategically through a green belt with local species of vegetation.

The development of green belt will cover by more than **35.68**% and will ensure the adherence to any directions or consent conditions of EC and TNPCB, with respect to green belt development.

1.17. ENVIRONMENTAL CELL

The Environmental Cell with exclusive team of engineers and managers with required number of skilled and trained man power will be will be put in place to operate and maintain the proposed IP by SIPCOT.

SIPCOT is committed to create the Environmental Cell under its Vice- Chairman and supported principally by IP Manager. The Cell will have authority to ensure sustainability in the implementation of projects.

The Cell has financial allocation from the regular annual budget of the SIPCOT Administration

to implement the devised EMP and also to address any specific or general conditions for project implementation by MoEF&CC and also by TNPCB.

Executives from member industries and local NGOs will be accommodated in the Consultative Committee of the Cell. The Cell can also be extended, if need be with laboratory and training facilities, to enable the SIPCOT Administration for ensuring better environmental management.

The protocol of the Environmental Cell is presented in **Fig.5**.

1.18. CONCLUSION

The Industrial Park is envisaged for promoting the following category Industries, primarily:

1. Synthetic Organic Chemicals -**5(f)**
2. Integrated Paint Industry-**5(h)**

However, the IP will also any other industries which do not attract any provisions of EIA Notification, 2006 and does not require Environmental Clearance. Such engineering manufacturing and services industries will make the operation of the proposed IP with more compliances to Environmental Standards.

The proposed IP will have area of less than 500 Ha (**286.065 ha**) and will house the listed only classified industries. Hence, as per the EIA Notification of 2006, SIPCOT prefer to get Environmental Clearance under **7(c)** and as **A** Category.

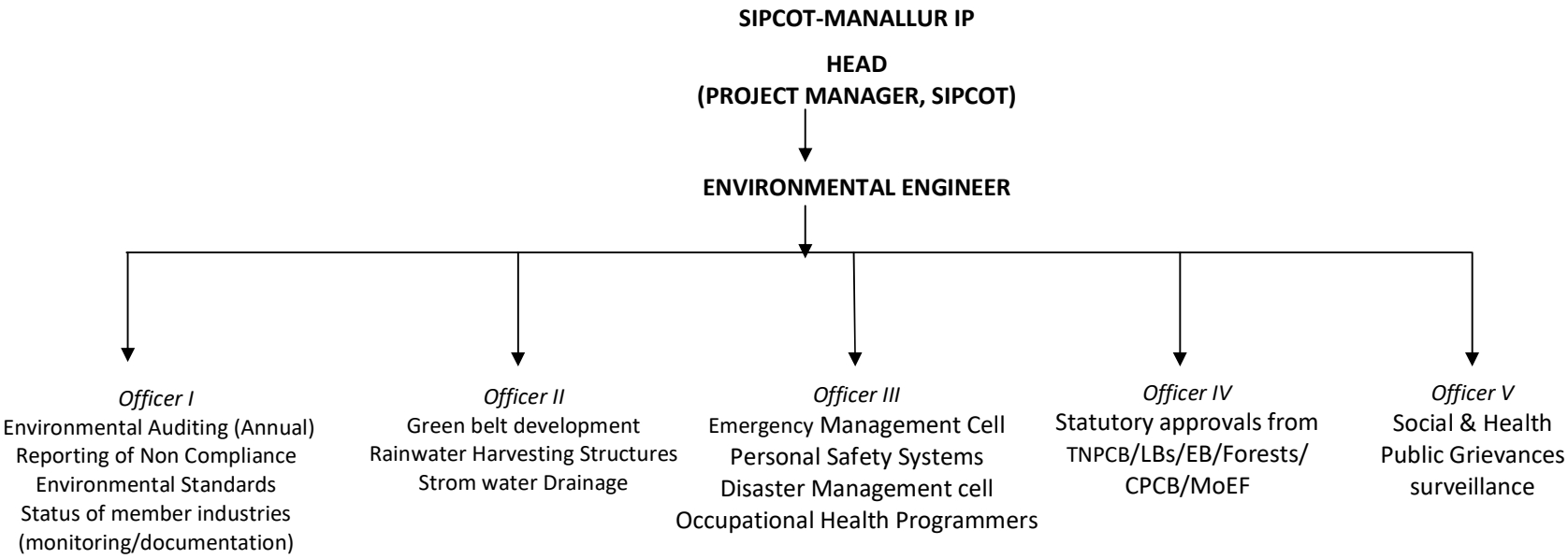
The water and wastewater attribute is the most important value environmental attribute and hence SIPCOT will ensure the incorporation of "Zero Discharge" concept and deploy the best practices for water resource management and pollution control. SIPCOT will have continuous air quality monitoring systems with independent stack monitoring systems, supported by respective member industries.

The solid waste will be transferred and disposed safely, as per the statues in any approved TSDF, in consultation with TNPCB.

SIPCOT is committed with well devised plans and programs, supported by Member Industries through required budgetary allocation, to promote, develop and maintain the proposed IP to ensure its environmental components, pollution free and clean.

The proposed IP will eventually result in significant overall development of the socio economic status of the state, precisely the district of Thiruvallur.

Fig. 5. PROTOCOL OF ENVIRONMENTAL CELL



CHAPTER-I

Introduction

I. INTRODUCTION

1.1 PROJECT PROPONENT

Government of Tamilnadu (GoTN) has implemented several special drives for attracting private investments to promote industries and conducted successfully a Global Investors Meet (GIM) during 2015 and the next GIM is scheduled in the first financial quarter of 2019. Many International and National Corporate and industrial houses have expressed their interest to start new industries in Tamilnadu and many of them have already signed Memorandum of Understanding (MoU) with GoTN and SIPCOT. Nonetheless, several initiatives and incentives have been announced subsequently by GoTN to sustain such initiatives to ensure further industrial growth in Tamilnadu.

The strategy of **industries- in- cluster** is highly tenable and environmentally compatible with inherent feature of several common facilities for optimal use of resources like land, water, manpower, power, transports, etc., **State Industries Promotion Corporation of Tamilnadu (SIPCOT)** is the nodal implementing agency of **Government of Tamilnadu** (GoTN) for promoting industrial infrastructures in the state. SIPCOT is the proponent of the proposed Industrial Park, named as **Manallur Industrial Park**.

SIPCOT is a wholly owned Undertaking of GoTN which was incorporated as a Public Limited company in the year 1971 with the objective of playing catalytic role in the promotion and development of medium and major industries and to hasten the industrial dispersal in the backward and under developed areas of the state.

SIPCOT has been creating industrial complexes, parks, growth centers in various strategically located places to ensure a good impact with available limited resources, which occupy a place of pride in the Industrial Map of Tamilnadu.

Due to the proactive Industrial policy of the State Government and ever continuing positive role by SIPCOT, several big industrial houses like **Ford**, **Hyundai, Saint Goblin, Dell, Yamaha, Michelin, Aditya Birla, Ashok Leyland, Videocon, Renault-Nissan, TVS, Apollo, Dell, Samsung,**

Motorola, Adani, Vedanta, etc., are in operation in the state. The adjoining Industrial Estates of SIPCOT at Gummidipoondi and another at Thervoykandigai have changed the socio

economic status of the population in the last two decades with huge employment potential and alternative income sources. Instead of just accelerating the pace of industrial growth in already developed and densely populated areas, SIPCOT, as a nodal agency, strives to ensure that disbursal of financial incentives result in spurt of industrial growth in backward and hither to under developed areas.

SIPCOT so far established **10 Industrial Complexes** at Ranipet, Hosur, Manamadurai, Pudukottai, Cuddalore, Gummidipoondi (including EPIP), Thoothukudi, Bargur, Nilakottai and Cheyyar, **11 Industrial parks** at Irungattukottai, Sriperumpudur, Siruseri, Pillaipakkam, Thervoykandigai, Mappedu, Vallam-Vadagal, Vaipur-Mathur, Vallam Aerospace and Cheyyar and **3 Industrial Growth Centres** at Perundurai, Oragadam and Gangaikondan over an area totaling 31,010 acres of land in all. SIPCOT has so far formed **seven sector specific SEZs** within these Industrial Parks/ Growth Centres / Complexes. SIPCOT so far allotted industrial sites to an extent of 25000 acres of land, paving way for direct employment to nearly 2.5 lakh peoples in the state of Tamilnadu.

The proposal of this new stand alone IP in Manallur by SIPCOT is essentially need based as there are several Industrial Houses are in line to establish new industries as the location has become compatible for industrial growth and has sea route access and a major Port.

1.2. NAME AND CONTACT ADDRESS

SIPCOT has its corporate office at Chennai and has well manned project offices in all its established IPs, Growth Centres, SEZs and Complexes. The Corporate office is located as follows;

19-A, Rukmani Lakshmipathy Road,
Egmore,
Chennai -600 008

SIPCOT is presently headed by **Shri.K.Srinivasan IAS** as its **Managing Director**.

Phones:	044-28554787/28513978
Fax:	044-28513978
Email:	sipcot@md3.vsnl.net.in
Website:	www.sipcot.com

1.3. IMPLEMENTING ORGANIZATION

SIPCOT is a well experienced organization and have proven track record of having established tens of Industrial Parks. The proposed IP will be implemented by SIPCOT as a flagship IP to showcase the strength and industrial climate of Tamilnadu in the forthcoming GIM, during the first quarter of 2019.

Government of Tamilnadu accorded Administrative approval for the setting up of Industrial Park involving an area of **286.065 Ha** vide G.O.Ms.No.285 dated 3.08.2018. A copy of the Administration sanction is attached as **ANNEXURE-III**.

The project is scheduled for implementation in TWO YEARS of time from the date of getting Environmental Clearance from MoEF&CC, GoI.

1.4. ORGANIZATIONAL CHART

Presently, SIPCOT is headed by its Managing Director. The board of SIPCOT comprises of senior IAS officers with extensive administrative experience. SIPCOT has well qualified and experienced team of professionals with Engineering, Environment, Finance, HRD and Legal backgrounds.

Each project office at the IP/IE/SEZ has a project Manager with team of officials.

The functioning of organization is presented in **Fig.1.1**

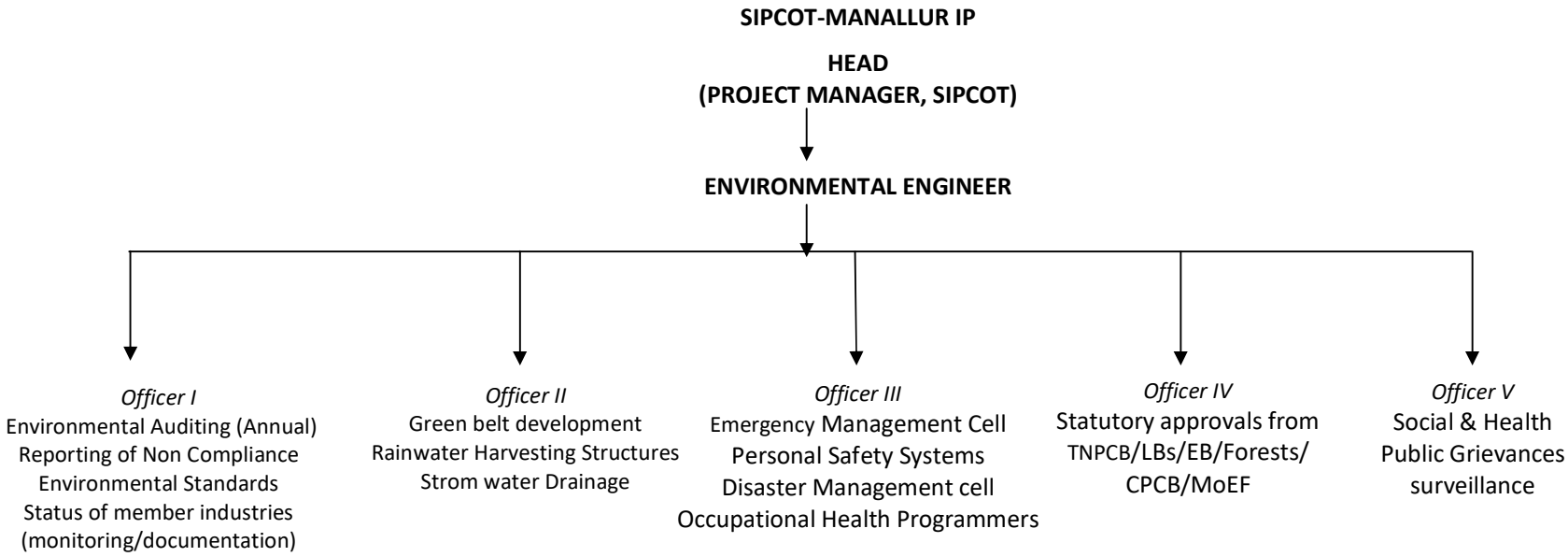
1.5. PROJECT CONSULTANTS

The EIA study has been carried out by **Centre for Environment, Health & Safety** (CEHS), **Annamalai University**. The information and technical brief on the member industries were surveyed and provided by ITCOT Consultancy & Services Limited, Chennai (ITCOT).

Centre for Environment, Health & Safety

CEHS is a wholesome, multi-disciplinary Environmental Organization of Annamalai University, which has been accredited as **EIA Consulting Organization** by National Accreditation Board for Education and Training (NABET) by **Quality Council of India** (QCI) for undertaking EIA studies for all category of industrial estates/parks/complexes/areas. CEHS has experience of completing EIA study for five “A” category IP and five “B’’ Categories of IPs, since the EIA Notification of 2006.

Fig. 1.1. PROTOCOL OF ENVIRONMENTAL CELL



CEHS has conducted the due diligence study on the project location and prepared the Environmental Impact Assessment report and Environmental Management Plan as per the requirements of approved ToR from SEIAA and Guidance Document of MoEF&CC.

The updated accreditation status of CEHS as available in the web of MoEF&CC is presented as **ANNEXURE-IV.**

The List of accredited EIA Coordinator and Functional Area Experts is provided in **ANNEXURE-VI.**

ITCOT Consultancy & Services Limited

ITCOT is a State run Consultancy Organization for Tamilnadu with financial contribution and management by lead banks and financial institutions. The company is registered under Companies Act, 1956 on 17th July 1979. ITCOT is promoted by All India financial institutions (ICICI, SIDBI, IFCI), State Development Agencies and Commercial Banks (SBI, Canara Bank, IOB, Indian Bank, Central Bank of India, Bank of Baroda, Union Bank of India etc.,). The Registered Office of the company is located at **50-A, Greams Road, Chennai, Tamilnadu - 600 006.**

ITCOT has 37 years of track record in offering various industrial and technical consultancy services to Govt. departments, Banks, Financial Institutions, Corporate, SME, etc.

ITCOT is known for impartial and client neutral approach. ITCOT is an approved consultancy agency for the provision of various consultancy services such as preparation of Techno-Economic Feasibility Report, Techno-Economic Appraisal Report, Detailed Project Report, Project Appraisals, Project Management Consultancy, Lender's Engineers, Owner's Engineer, Environment Impact Assessment, etc., for Government Departments, Financial Institutions, Banks, Industrial Development agencies, MNCs etc.

CEHS is collaborating with ITCOT for the purpose of local officiating of the representations at Chennai with Client and other offices of government.

1.6. LAND DESCRIPTION

The proposed Industrial Park is a **standalone project** for providing industrial infrastructures at Manallur in the Tamilnadu, exclusively to promote synthetic organic and integrated paint industries and will be complimented by the nearby Ports from the project location.

The proposed location of the industrial park is falling under the revenue villages of **Manallur** and **Soorapoondi in Gummidipoondi Taluk.** The total land area of the Industrial Park would be **286.065 Ha.** The entire land mass falls within the revenue limits of **Thiruvallur District**.

The geographical location is **13^0 26 '48.15"N to 13^0 27'15.37" N** Latitude and **80^0 01' 21.79"E to 80^0 01' 56.24"E** Longitude. The Survey Numbers of the lands that are proposed for this project for a net extent of **286.065 Ha** is presented in **ANNEXURE-III.**

The site is geologically a plain terrain with clayey soil with coarse sand, having a natural gentle slope for drainage. The soil offers a Safe Bearing Capacity of 5-10 Tonne/Sq.m, which requires keen attention to have proper design for foundations.

The location is barren land **without any notified water courses, river or lake**. The lack of dependable water courses, naturally, keeps the area away from intensive agricultural activities.

The location is essentially get surrounded by many industries in the recent part. Thervoykandigai and as well as Gummidipoondi Industrial Estates are available within 10 Km radius.

The Mean Sea Level is **+13.0 m.**

The proposed location for the IP was chosen as it enjoys the following environmental advantages:

- Availability of lands which are mostly dry and also not under cultivation and rather remaining as unutilized
- Proximity to nearby industrial infrastructures, especially power
- Water availability from the approved sources
- Does not involve displacement of habitations
- Connectivity to Port/Harbor, Airport, Railway line, Major Highways, etc.,

1.7. REGULATIONS AND STANDARDS

EIA Notification, 2006 brought the projects of establishing Industrial Estates/ Parks in clusters under its purview and mandates Prior Environmental Clearance, before the start of any physical activity at the project location. The Industrial Estates/ Parks are classified as 7(c). There are specific and general conditions, based on which the proposal can be categorized as A and B.

However, certain amendments were made in the Notification; vide Notification dated 01/12/2009 in the proposals of Industrial Estates and Parks.

7(c) was re-categorized subjected to certain specific conditions and as well general conditions.

The General conditions while remain status quo, the specific conditions were laid for categorization of the IP as follows;

1. Industrial Estate of area below 500 Ha and not housing any industry of category 'A' or 'B' does not require Clearance.
2. If the area is less than 500 Ha but contains building and construction projects > 20,000 Sq.m and or development area more than 50 Ha, it will be treated as activity listed at serial no 8(a) or 8(b) in the Schedule, as the case may be.

The industries to be established as members in the proposed IP are:

- ✓ Synthetic Organic Chemicals -5(f)
- ✓ Integrated Paint Industry-5(h)

These industries are classified as indicated against each, as per the said EIA Notification. As all these proposed activities fall either A or B category, the proposal of Manallur SIPCOT IP is classified as A Category activity that requires EC from EAC/MoEF&CC.

The **ToR** was obtained vide **F. No21-59/2015-IA.III.** dated **22/07/2015** was then validated by ToR Extension vide F.No.21-59/2015-IA. III (Pt) dated 13/11/2018. A copy of ToR is presented in **ANNEXURE-I** and ToR extension is presented in **ANNEXURE-II.**

1.8. LITIGATIONS PENDING

SIPCOT has Administrative Approval/sanction from Government of Tamilnadu for promoting the said Industrial Park in the proposed location for a total extent of 654.087 Ha. Government of Tamilnadu accorded Administrative approval for the setting up of Industrial Park involving

an area of **286.065 Ha** vide G.O.Ms.No.285 dated 3.08.2018. A copy of the Administration sanction is presented in **ANNEXURE-III**.

SIPCOT is committed to allocate land only on getting legal clearance. However, there is no cases pending on the project in any court. The land mass which has legally clear title will only be allocated by SIPCOT for the promotion of the proposed IP at Manallur.

CHAPTER – II

Project Feasibility

II. PROJECT FEASIBILITY

2.1. GENERAL

In the recent past, one of the burgeoning classifications of Industry is Synthetic Organic Chemicals in Tamilnadu. The requirement for paints and surface coating primers and varnishes is also growing with their demand as Infrastructure is the rapidly growing sector in last five years. There is dearth need and requirement to support the growth of these industries in the environmentally compatible dimension.

The Synthetic Organic Chemicals have a varied chemicals under its purview which falls broadly under these types of chemicals; though even this list is far from exhaustive:

- Basic organic chemicals
- Dyes and dye intermediates
- Bulk drugs and intermediates
- Synthetic rubbers
- Synthetic organic chemicals and chemical intermediates

These chemicals are widely in use in different types of industries which include Polymer, Dyes & Intermediates, Pharma, and Pesticides.

In general, paint manufacturing involves weighing of dry pigments, mixing and feeding through hoppers or chutes into mills where they are dispersed in an appropriate resin vehicle. The milled pigment is transferred to a mixer where thinners, drying agents, *etc.,* may be added to adjust consistency, viscosity, colour and drying time. When mixing is complete, the paint is filtered through filter cloth and packed into containers.

The sustenance and continuation of the presently operating Synthetic Organic Chemical and Integrated Paint processing industries are dwindling for poor management of their water and wastewater and the difficulties to meet the Conditions of Consent Orders or the mandates of Environmental Clearance.

The growth potential for Synthetic Organic Chemical and Integrated Paint processing industries is very bright as there is a huge market in export of finished Organic Chemical and

Paints to Europe and USA. Chennai is one of the forerunners in the export market, competing with Haryana and Maharashtra in doing huge export marketing of Synthetic Organic Chemicals and Paint products.

Synthetic Organic Chemical manufacturing is water intensive whereas Paint manufacturing does not. Water has already become a commodity in Tamilnadu and there is a third water project is functioning to supply water at a price of more than INR 80 per Cubic meter. Still more serious issue, is the treatment and disposal of effluent.

Government of Tamilnadu is under pressure to address this issue to harness the potential for the growth and development of Synthetic Organic Chemical and Integrated Paint processing industries at state level.

Such an environmentally compatible land mass with direct access to roads, Ports and railways for the development of Synthetic Organic Chemical and Integrated Paint processing industries are the reasons for the choice of project at Manallur.

This IP is proposed by exclusively for **Synthetic Organic Chemicals** and **Integrated Paint processing industries.**

2.2. MANALLUR INDUSTRIAL PARK

The proposed Manallur Industrial Park (IP) is to promote Synthetic Organic chemical processing industries and Integrated Paint Industries in a cluster format with all required infrastructures as developed industrial plots.

The proposed land of **286.065 ha** will be strategically divided into industrial plots with all required infrastructures like Water, Power, Drainage, Roads, Green Belt Development, Rain water structures. The proposed IP will be integrated with Zero Liquid Discharge from the respective member industries.

The type of industries and nature of activities planned within the park as member industries will be processing of; Synthetic Organic chemical 5(f) and Integrated Paint Industries 5(h).

The proposed land use pattern of the Industrial Park is presented in **Table. 2.1.**

TABLE: 2.1. LAND USE PATTERN - IP

Manallur Industrial Park	Hectare	Area Coverage
TOTAL AREA	**286.065**	
ALLOTTABLE AREA – INDUSTRIAL PLOTS	**200.00**	**69.91%**
Road, Water Supply & Storm Water Drain /Rain Water Harvesting Structures	30.00	10.49%
Common Amenities like EB, Administrative Block, etc.	10.00	3.50%
Solid Waste Management	10.00	5% of allottable area
OSR	28.61	10.00%
Green Belt along roadside/periphery	7.46	2.61%

The manufacturing processes of Synthetic Organic chemical are largely water intensive, with the varied types of auxiliary chemicals. These industries generate complex effluent streams which are difficult to handle, treat, reuse/recycle and dispose the final residue. At present, disposal of final treated residue and reject streams from RO from such Pharma units is continued to remain a problem unresolved.

Typical Synthetic Organic Chemical industry can adopt the entire range of processing of raw material or part of them to finished product. It may start from the basic organic (usually aromatic) raw materials by various chemical procedures (unit processes) to semi-finished or finished products. The choice of physical procedures, which are applied, is limited in a similar way (unit operations). The typical unit processes and operations are:

- Acetylation
- Acylation
- Addition
- Alkylation
- Amination
- Bromination
- Carboxylation
- Carboxymethylation

- Chlorination
- Condensation
- Coupling
- Diazotization
- Diazotization and modification of the diazo group
- Esterification
- Sulphonation
- Fusion
- Halogenation
- Hydro chlorination
- Hydrolysis
- Kalization
- Neutralization
- Nitration
- Oxidation
- Phosgenation
- Rearrangements
- Reduction
- Substitution
- Sulphation
- Sulphitation
- Thionation

The integrated paint industries having different manufactures process these are Paint manufacturing process are;

- ❖ dry pigments (mixing and feeding)
- ❖ Varnish manufacturing (settling, straining or centrifugation)
- ❖ Lacquer manufacturing (warming and mixing)
- ❖ Distemper manufacturing (Pug mill)
- ❖ Manufacture of resins and emulsions
- ❖ Bituminous paint

SIPCOT is committed to develop the land as Industrial plots with infrastructures for water and power supplies.

SIOCOT will allocate the land, the extent and location, by evaluating the type and nature of products and size of the proposed member unit. The prime condition of SIPCOT for land allocation to applicant industries will be to ensure the incorporation of "Zero Discharge" concept and deploy the best practices for resource management and pollution control.

2.3. NEED FOR IP

There is no exclusive industrial Park for Synthetic Organic Chemicals except the one in Cuddalore by 180Km and another in Chennai at Alathur Industrial Estate (SIDCO), by 40 Km from the capital of Tamilnadu. However, the growth and requirement based on the import/export of fine chemicals, dyes and pharma products, there is an immediate requirement to support and regulate the growth of the synthetic organic industries. Several

Pharma giants like **Clariant, Orchid Healthcare, etc.,** Pesticide manufacturers **Du Pont**, **Bayer**, etc., Polymer industrial houses like **Reliance, Omcar, LG, Finolex** etc., Dyes & Dye Intermediates manufacturers like **Zenith, Kewin, Songwon, etc**., have inclined to establish and or expand their activities in Tamilnadu.

As the infrastructure is major sector that keep growing as an index of the general growth, the requirement surface coating or finishing whether its metallic or non-metallic ,the requirement surface finishing chemicals like varnishes, thinners and paints are growing. The international players like **Asian Paints, Pidilite, Shalimar, Berger,** etc., have already inclined to expand their manufacturing activities in Tamilnadu.

The scope for the growth of Synthetic Organic Chemical and Integrated Paint processing industries to meet the domestic and export demand and requirements is phenomenal ,today. There also a domestic compulsion has become evident to support sectors like Pharma, Infrastructure, Farming and Food, etc.

The Synthetic Organic Chemicals are normally to have operations at corporate level which has job potential for youth of this country and Tamilnadu require this kind of industrial development.

The proposed IP will stimulate and catalyze the growth of Synthetic Organic Chemical and Integrated Paint processing industries in the state which in turn to bring a significant foreign exchange and offer huge employment potential.

SIPCOT is committed to meet the requirements in a very compatible format with the prevailing environmental conditions of the project location and in full complement to Environmental standards.

2.4. MANALLUR– IP COMPONENTS

The proposed IP is in the adjoining location of two other operating Industrial Park called also run by SIPCOT. Hence, the overall ambience of the project location is industry oriented, still having the CEPI within the permitted levels. The access to roads, Ports, railways and airports is making the choice of location as very opt and the present proposal of SIPCOT has become feasible.

The Industrial Park envisaged for the following category Industries:

- Synthetic Organic Chemicals -**5(f)**
- Integrated Paint Industry-**5(h)**

SIPCOT will allocate developed industrial plots and also to any other industries which do not attract any provisions of EIA Notification 2006 and does not require Environmental Clearance. However, SIPCOT will provide allotment to such industries which are ancillary and required to support the growth of these two classified industries.

The proposed IP will have area of less than 500 Ha (**286.065 ha**) and will house only the listed classified industries. As the listed classified industries are falling A category as per the EIA Notification of 2006, SIPCOT prefer to get Environmental Clearance under **7(c)** and as **A** Category.

The proposed lay out of the IP is presented in **Fig.2.1.**

The proposed IP will promote industries in cluster, of Synthetic Organic Chemical and Integrated Paint processing categories, with all basic requirements of notified land, water, power, roads and the like.

2.4.1. Project Size and Type

The proposed project is an IP to promote exclusively Synthetic Organic Chemical and Integrated Paint processing industries in **286.065 ha** of land.

SIPCOT will restrict the member industry that falls under these two listed categories of industries and those small scale industries which do not require EC and to complement the activities of these two industries.

2.4.2. Location of the Project

The site is located on the Northern part of the Tamilnadu, The location of the IP is within the revenue limits of **Manallur and Soorapoondi Villages** in the **Gummidipoondi Taluk, Thiruvallur district.**

The location of the proposed Manallur IP on Satellite imagery (LISS-III) is presented in **Fig.2.2.**

The geographical coordinates of the project location is 13^0 26' 48.15" to 13^0 27' 15.37" N Latitude and 80^0 01' 21.79" to 80^0 01' 56.24" E Longitude.

2.4.3. IP Components

The Manallur IP is proposed exclusively to promote Synthetic Organic Chemical and Integrated Paint processing industries with all required infrastructures as developed industrial plots.

The proposed land of **286.065 ha** will be strategically divided into industrial plots with all required infrastructures like Water, Power, Drainage, Roads, Green Belt Development, Rain water structures.

The proposed land use pattern of the project location is as follows;

Manallur Industrial Park	Hectare	Area Coverage
TOTAL AREA	**286.065**	
ALLOTTABLE AREA – INDUSTRIAL PLOTS	**200.00**	**69.91%**
Road, Water Supply & Storm Water Drain /Rain Water Harvesting Structures	30.00	10.49%
Common Amenities like EB, Administrative Block, etc.	10.00	3.50%
Solid Waste Management	10.00	5% of allottable area
OSR	28.61	10.00%
Green Belt along roadside/periphery	7.46	2.61%
Area under Green Belt Development		
Green Belt in OSR	28.61	
Green Belt along roadside/periphery	7.46	
Green Belt by Member Industries (Mandate by SIPCOT for the allocation of land)	66.00	33% of Member Industries
TOTAL LAND FOR GREEN BELT	**102.07**	**35.68%**

All member industries have to mange effluent through collection and transfer system to the **Effluent Treatment Plant (ETP)**. The treated effluent will have objectionable concentration of TDS for a maximum of 5000 ppm. This will be treated further through a train of Micron Filtration (MF), Ultra Filtration (UF) and Sea Water membrane based Reverse Osmosis (RO) to reclaim water for a maximum of 50%. Hence, the ETP will be operated to generate product water which will have a maximum TDS of 500 ppm. This product water will be sent back through exclusive RO Product waterline for reuse. The reject from RO which will have objectionable TDS will be managed in Multiple Effect Evaporators. In due course of time, the member industries can also opt for Marine disposal of the final high TDS reject as Sea is available at 35 Km.

2.5. MATERIAL BALANCE

SIPCOT as only infrastructure provider for the development of the proposed IP is not involving in any material handling, processing and management. SIPCOT on commissioning with member units will ensure optimal use of materials by member industries in compliance with conditions of TNPCB.

SIPCOT is the infrastructure provider and the member industries will have the material balance in order.

While Material Balance is industry specific, the water Balance will be comprehensive and one for whole of IP. This will enable SIPCOT to practice ecologically sound management of resources and environmentally intelligent products will be advised for all proposed industries.

2.6. RESOURCE OPTIMIZATION

The land mass of **286.065 ha** is planned for its use pattern judiciously and in compatible to environmental conditions of the project location.

The raw material and chemicals for Synthetic Organic Chemical and Integrated Paint processing industries shall be mandated with the respective member industry for proper utilization. All Synthetic Organics falling under **Polymers, Dyes, Pharma, Pesticides**, etc., and also **paint pigments** and **solvents** for integrated paint industries are comparatively costlier, although dealt as bulk chemicals. Hence, optimization is important not only to reduce the residues; but also maximize the products.

The locally resourced raw materials with biodegradable characteristics which are environmentally sustainable will be given priority among the available options.

Reduce, Reuse and Recycle (3R) principle will be advised for adherence by the member industries. The Concept of Zero Waste will be advised for adoption by member industries.

Resource Conservation and Recycle will be made as basis for Environmental Policy for all member industries and they will be mandated to submit annual plan for Environmental Management with specific allocation of budget.

2.6.1. Land

The available land is very precious as such strategically placed lands are not available in general and not available for industrial development, in particular. Hence, the optimum use is very important. The extent of **286.065 ha** in the project location is planned for its land use pattern in environmentally justifiable pattern.

However, to ensure the environmental requirements, the IP is planned to have buffer areas around its boundaries for native species of trees and plantation so that they will continue to have its prevailing life forms intact.

2.6.2. Water

Water is the most crucial resource for the proposed IP. The total water requirement for the proposed processing capacity is estimated at **1 MGD**, including Domestic consumption. The water is envisaged to avail from taken Metro Water. Perhaps, pipelines are available to the nearby Industrial Complex which is around 10Km east. Hence, the existing pipelines can be extended.

It is also envisaged that 55% of the water would be met from recycled water from ETPs.

2.6.3. Power

The net power requirement is assessed for 100 MW. The load requirement will be met through TANGEDCO through exclusive supply and distribution lines.

2.7. WASTE TREATMENT & DISPOSAL

Effluent treatment and Reuse of treated effluent to offset the virgin water requirements is the key for sustainable operations of the member industries. SIPCOT will supply water as common facility whereas the respective industries are responsible for providing treatment for their effluent on the basis of Reclamation of water from effluent, using zero-Liquid Discharge Plants.

2.7.1. Effluent Treatment Plant

Industries of Synthetic Organic Chemicals are generally water-intensive. The requirement of water widely vary with respect to number of unit operations that are intended. Synthetic Organic Chemicals are generally bulk production which vary between industries to industry.

The quality requirement of water is also vary from preparation of solutions Mix to just washing of reactors.

There is a scope to reclaim water from treating the effluent and the reclaimed water also can be used extensively in operations like washing which will significantly reduce the requirement of virgin waster. Hence, Zero Waste initiatives will be mandated for all member industries in

their Corporate Responsibility of Environmental Protection (CREP). This will ensure optimal use of the precious raw materials and will reduce the residues, both solid and liquid streams.

Any residual liquid waste shall be treated to have zero disposals. The entire treated effluent shall be reused in their utilities and green belt development. The solid waste stream will be sent to CPCB approved recyclers or to MoEF approved TSDF for proper and ultimate disposal.

Member industries will be mandated to submit a "**Zero Disposal**" Scheme on a detailed effluent management plan.

The characteristics of the effluent from any industry depend on manufacturing processes, plant and machinery, etc., which in general vary from industry to industry. Hence, the treatment methods for effluent streams, eventually, industry-specific. The schematics of the ETP and treatment processes and unit operation are effluent-specific and the establishment and operation of ETP is the responsibility of the individual member industry. Nevertheless, the ETP will have invariably an effective biochemical process that followed by Membrane based systems to reclaim water.

In the case of paint industries, the effluent stream is only from preparing the surfaces which has become dry through advanced technologies, if not such effluents are largely reduced by advanced technologies. Invariably, the ETPs will have physico-chemical processes that followed by Membrane based systems to reclaim water. However, the effluent from paint industry is hazardous and will generate side stream waste streams from the respective ETPs as Chemical sludge.

The member industries shall submit an appraisal report on effluent management by any MoEF&CC approved Environmental organization. This will remain a pre-requite document for applying for land allotment by SIPCOT.

SIPCOT will initiate a joint monitoring preparation of "Zero Waste" from all member industries through a Joint Action Committee of SIPCOT and member industries.

2.7.2. Emission

As there will be significant number of process emission from manufacturing of any Synthetic Organic Chemical which is process specific. The processes stacks will be incorporated with pollutant-specific Emission Cleaning systems like Cyclone or Bag Filter and Wet Scrubbers.

However, Volatile Organic Carbon (VOC) in the ambience of such industries will be very significant in view of the chemical storage and transfer activities.

Significant number of Boilers will be there with oil combustion and they shall be installed with Emission Cleaning Systems in compliance to MoEF&CC Standards and will not have any impact on the ambient air shed.

2.7.3. Solid Waste

Solid waste generated from the member industries will be handled by respective industries and they will be managed in compliance to Hazardous Solid Waste Management Rules, 2016.

They will be collected, stored temporarily, transferred and will be treated and disposed in any approved offsite TSDF. Tamilnadu has two approved TSDFs and hence industries can have their choice depending upon its characteristics and with permission from TNPCB.

The Solid waste streams from both the industries are highly hazardous by their characteristics.

This general solid waste from gardens and street sweepings is assessed for 10 TPD and will be disposed through facilities of local bodies. If none is available, during the time of project commissioning, SIPCOT is committed to develop its own facility, on site for management of general waste in compliance to MSW Management Rules, 2016.

Specifically to address the Solid Waste Management, the proposed IP will have designated space of 10 Ha to encourage any private players to provide the Solid Waste Management Facility.

2.8. LAND SURVEY

The proposed land 286.065 Ha is almost barren and flat, without much of undulations. The site does not have any sensitive features such as water bodies, creeks, backwaters, etc.

The proposed land is approved by government of Tamilnadu for the development of the proposed industrial estate. SIPCOT is intended to allocate only 69.91 % of the land into Industrial Plots.

Satellite Image in LISS III format of the project location as sourced from National Remote Sensing Agency (NRSA) for the project location is presented in **Fig.2.3**. LISS III format image has been processed for Contour and Topography using Image Processing Software, ERDAS.

The soil cover of the location is fine sand clayey and light reddish in colour. Further inland and along the creeks, the soil is mostly alluvial clay and with loamy patches. The soil is rich in minerals and humus, thus conducive to plantation. There is no specific biodiversity in the project location.

The Geomorphology of the project location, using Image processing software is presented in **Fig 2.4**.

2.9. TOPOGRAPHY

The Topography of the project site has been evaluated using Map info with the Maps of Survey of India. The Topography has been interpreted and the same is presented in Chapter-IV.

2.10. LAND USE PATTERN

The project location site is vacant but however surrounded by human settlement in the impact area of 10 km radius from the project location.

The land Use pattern based on LISS-III image is presented in **Fig 2.5**.

2.11. SOIL CLASSIFICATION

The soil is investigated as fine sand with patches of red gravely sand in the project location.

2.12. CLIMATE – METEOROLOGY

The climate of the Thiruvallur is hot and dry and the temperature ranges between a maximum and minimum of 31°C and 23°C respectively with April and May being the hottest months.

Rainfall is irregular and intermittent, with an average of approximately 85 cm per annum. The humidity is generally high throughout the year.

During monsoon months i.e. November to February, humidity ranges from 80% to 85%. During rest of the year, humidity varies from 72% to 77%. The average humidity observed over the year is 77%.

2.13. SOCIAL INFRASTRUCTURES

The Impact area is fully rural, however, it has turned out to provide industrial labour as there are two industrial estates nearby within 20Km radius.

Primary Schools and Primary Health Centres are available. There is no notified religious centre or temple in the project impact area.

2.14. PLANNING BRIEF

The proposed Synthetic Organic Chemical and Integrated Paint industrial Park by SIPCOT is a well thought out and planned proposal to support and supplement the Synthetic Organic Chemical and Integrated Paint growth in the proposed project location of the Gummidipoondi Taluk, Thiruvallur District.

The proposed Industrial Park will have **Dyes, Polymer, Pharma, Pesticides** and **Paint industries** at large and will also have industries which are not under the purview of Environmental Clearance.

This IP will be second of its kind in the state of Tamilnadu to have a great advantage as it has the advantage of Chennai by 50Km.

2.15. CONCEPTUAL PLANNING

The proposed IP is envisaged exclusively for the promotion of Synthetic Organic Chemical and Integrated Paint Industries with all required infrastructures including water, power and roads.

The Proposed Industrial Park will be integrated with an important environmental infrastructures for water supply system through **Metro Water for 1 MGD.**

The boundary lines of the project location will have buffer zones of green belt with native species of trees and plantation.

2.16. POPULATION PROJECTION

The proposed IP will have employment potential for more than 5,000 directly. Ancillary industrial units and required commercial and residential expansion will provide employment or other alternative source of income.

Occupational Health & Safety will be monitored with a common monitoring **Health Surveillance System** and it will be established with the involvement and support of District Health Department and TNPCB.

Member Industries will be mandated to provide special incentive coverage for health and life like **ESI, Insurance**, etc., for all workers population in the proposed IP and they will be rendered safe and risk-free in their work environment.

2.17. LAND USE PLANNING

The entire plot of 286.065 Ha will be divided into Plots of desired numbers based on the final list of member units and their requirement and also on the basis of required area for common facilities provided by SIPCOT.

Only 69.91% of the total area i.e 200 Ha will be allotted for member industries.

2.18. INFRASTRUCTURE DEMAND

The proposed IP itself an infrastructure project to meet the demand for promoting Synthetic Organic Chemical and Integrated Paint processing industries in cluster format. The demand of infrastructure is assumed as the responsibility of SIPCOT, in the following requirements.

- Industrial plots (desired but varied sizes)
- Roads/Service roads
- Electrical Grid
- Telecommunication
- Water source, storage & supply

- Zero Liquid Discharge for Effluent Treatment
- Specific Area for Solid Waste Management
- Drainage lines
- Green Belt Development
- Buffer Zone Development

SIPCOT is also committed to provide certain other social infrastructure for generate goodwill among the workers and the population in the project impact area of 10 km radius, around the project site.

All facilities will be planned and designed to take accreditation with International Standards for IP and SIPCOT is committed to accredit for IS 9000 and IS 14000 series of Standards.

2.19. AMENITIES / FACILITIES

SIPCOT will provide the following common facilities for the sustainable operation of all member units.

- Water storage & supply

- Supply lines of treated effluent(Recycle Lines)
- Roads
- EB grid
- Area for Solid Waste Management
- Rain Water Harvesting Structures
- Green Belt in the Peripheral areas, all the road side and Central meridian
- Common Medical Dispensary
- SIPCOT Project office
- Training centre
- Testing centre
- Food court
- Fire Station, First aid, Security kiosk etc.

The following Organizational Set Ups will also be established by SIPCOT and continuously be run and monitored with the Association of Member Industries:

- ✓ Environmental Cell
- ✓ Emergency Management Cell
- ✓ Common Health Surveillance System

SIPCOT will also continue to commit to continue its coordination with Tamilnadu Pollution Control Board, District Health Department and District Administration for issues pertaining to overall Environmental Management and Sustainable Development of the Project location.

2.20. IP INFRASTRUCTURES

2.20.1. INDUSTRIAL AREA

Only **200 Ha** (69.91 % of the area 286.065 Ha) will be divided into industrial plots, to meet the requirements to have other infrastructures in the proposed IP.

The industrial plots may vary in size. However, they will be provided with direct access from the main road. On the basis of the need, in the case of large industries, service roads for suitable size and length adjoining the border of the respective industrial plot will be developed and maintained by SIPCOT.

2.20.2. RESIDENTIAL AREA

There is no area for **any exclusive residential area.** However, SIPCOT will provide Rest & play rooms for the workers.

2.20.3. GREEN BELT DEVELOPMENT

The entire periphery of the park will be provided with green belt for 20m width, all along. Precisely, a width of 20m as buffer zones with native species of trees and plantation will be developed.

SIPCOT will provide greenery with suitable tree and plantation along the sides of the roads and in the meridian of the roads. All member industries will also be mandated to have 30% of the plot area under green cover.

SIPCOT will have 35.38% of the total land cover under green belt on its establishment as IP.

2.20.4. SOCIAL INFRASTRUCTURE

Temple, Recreation club and play yards will be developed by SIPCOT for the use of workers.

Association of Member Industries will be encouraged by SIPCOT for continual upkeep of such facilities for the benefit of workforce and their dependents.

2.20.5. CONNECTIVITY

The proposed IP will be connected by main roads with state and National Highways. A railway station that can help the member industries for goods transport is available at Thiruvallur.

An elaborate Traffic and road plan will be developed for the use of member Industries and implemented by SIPCOT.

2.20.6. WATER MANAGEMENT

The water requirement for the entire activities of the member industries in the proposed IP is assessed for **1 MGD** including domestic consumptions. Rather, the member industries will be chosen on the basis of water requirement and allotment will be made, with the limitation of water supply.

SIPCOT is signing an agreement with Metro Water for availing 1MGD of water from their sources.

SIPCOT will mandate the member industries to offset their water requirement atleast by 50% through the reclaimed water from effluent by providing Zero Liquid discharge Plants.

2.20.7. SEWERAGE SYSTEM

SIPCOT will mandate the Member industries to have exclusive collection and treatment systems within their premises to manage the domestic wastewater streams.

2.20.8. INDUSTRIAL WASTE MANAGEMENT

The effluent will be treated and water will be reclaimed for reuse in the member industries. Reuse and Recycle is the basis for the Effluent Treatment Plant where it is envisaged to reclaim water

The solid waste will be managed in facilities to be established within the IP for which allocation of 10 Ha is already made.

2.20.9. EFFLUENT TREATMENT PLANT

Member industries will be mandated to submit a "**Zero Disposal**" Scheme through a detailed effluent management plan. This will be pre requisite for getting land allocation from SIPCOT.
The effluent must be collected, treated, and reused by recycling. Any residues out of the solids-separation (sludge) are disposed through approved TSDF.

SIPCOT will initiate a joint monitoring preparation of "Zero Waste" from all member industries through a Joint Action Committee of SIPCOT and member industries.

2.20.10. SOLID WASTE

The non-hazardous solid waste will be dealt independently by the member industries within their premises for composting. Or else, both Hazardous and non-hazardous solid waste streams will be managed in a common facility through a private agency with the approval of state PCB.

SIPCOT allotted 10 Ha of lands specifically for establishing facilities for solid waste management, to serve exclusively the member industrial activities.

The hazardous solid waste stream shall not be collected and periodically transferred to offsite TSDF, available in Gummidipoondi or Viruthunagar.

The member industries will be instructed to take authorization for storage of hazardous solid waste, if any, from TNPCB. The storage and handling will be as per the respective guidelines Hazardous Waste Management Rules, 2016.

2.20.11. POWER

Power requirement is assessed for around 50 MW and SIPCOT will facilitate power supply from TNGEDCO grid.

SIPCOT will develop a corporate policy for non-conventional energy systems in association with member industries to establish Wind Mills or any such Non-Conventional Energy farms to complement the power supply they avail from TANGEDCO.

Solar Panels will be mandated for all energy requirements of activities other than industrial uses such as street lighting, Guest houses, water heaters, etc.

2.21. REHABILITATION AND RESETTLEMENT (R & R) PLAN

There will not be any evacuation of peoples, as the site is fully devoid of any settlement or any activities. The land proposed for the project is fully owned by Government and necessary governmental approval has been already obtained by SIPCOT from Government of Tamilnadu.

2.22. PROJECT SCHEDULE & COST ESTIMATES

The time schedule for project execution with the land development as Industrial Plots with infrastructure like Water, Power, Roads, etc., is proposed for **2 years**.

The budgetary estimate of the project is assessed for **INR 250 Crores**.

2.23. CORPORATE RESPONSIBILITY PLAN

SIPCOT will have specific plans for developing their boundary lines with native species of trees and shrubs in order to promote more greenery around the IP. Social Responsibility of member industries will be stressed among them and in line with guidelines of MoEF & CC and CPCB, exclusive Plans will be drawn independently for all member Industries and its implementation will be ensured with the allocation of Annual Budgetary provisions.

ENVIRONMENTAL IMPACT ASSESSMENT

An exclusive Environment Cell comprises of SIPCOT administration and Association of Member Industries will monitor the environmental and social issues with specific protocols and procedures.

SIPCOT will coordinate with District Administration for implementation of National and State programs for Social development in the villages around 10km radius of the project location.

SIPCOT with the help of Association of member industries will run a periodical Health Camps in the surrounding areas, in coordination with the Collectorate of the District.

SIPCOT will develop an exclusive plan to ensure proper environmental management of the IP with monitoring programs for the listed pollutant concentrations in air, water, soil and noise, in the ambient environment of the assessed project impact area of 10 Km radius of the location.

Special Programs to support the socio economics of the surrounding population Implementation schedule will be stressed with each member industry.

SIPCOT will insist that all member industries shall accredit for International Standards of Quality ISO 9000 Series and for Environment, ISO 14000 Series.

CHAPTER – III

Analysis of Alternatives

III. ANALYSIS OF ALTERNATIVES

3.1. GENERAL

The proposed IP will house industries like Pharma, Dye Stuff, Drugs, Pesticides and alike which largely use Synthetic Organic Chemicals and also Integrated Paint processing Industries.

The industrial development and promotion of socio economics of the peoples in almost many districts of Tamilnadu is entirely depends on the Industries. The sustenance and continuation of the presently operating Synthetic Organic Chemical and Integrated Paint processing industries, especially Mixing, feeding, thinners and drying Paint and Chemical are dwindling for poor management of their water and wastewater and the difficulties to meet the Conditions of Consent Orders or the mandates of Environmental Clearance.

The growth potential for Synthetic Organic Chemical and Integrated Paint processing industries is very bright as there is a huge market in export of finished Organic Chemical and Paints to Europe and USA.

Government of Tamilnadu is under pressure to address the potential for the growth and development of Synthetic Organic Chemical and Integrated Paint processing industries at state level. SIPCOT identified three locations, considering demand to have access and a pre-set idea of establishing it near Chennai.

The environmental compatibility of the identified land mass is the key issue for the finalization of the particular location and extent of land for the proposed IP.

3.2. CHOICE OF ALTERNATIVE SITES

SIPCOT considered three alternative sites based on the need for promoting an Industrial Park in the proposed project location. However, the site in the Northern side are having Reserve Forest cover and on the eastern side human settlement is growing and there cannot be any new industrial development in this side.

Industrial growth, preciously, require good connectivity to the urban areas and other facilities like port, airports etc. Hence only, the present location is proposed.

The alternative sites considered are in the following village are:

1. Arur
2. Sanaputhur
3. Vaniyamalli

Arur is having a spread of Reserve Forest nearby in abundance. So also, the site which was identified near Vaniyamalli. The location near Sanaputhur has a un-notified stream nearby. Hence only, the present location is proposed.

The alternative sites with reference to the proposed project location is presented in **Fig: 3.1**

Detailed comparison was made among these candidate sites for the proposed IP. On the basis of these options and detailed ground truthing exercise, it is recommended that Manallur is the best among the four choices of land stretches.

3.3. SITE MATRIX

The choice among the alternative sites which are available in Thiruvallur District was made by constructing a Matrix using Standard set of guidelines and set of recommendations in the Technical Guidance document of MoEF&CC.

The environmental and coastal compatibility of the location which is with respect to the following were studied and compared for all the three locations;

- ✓ Area
- ✓ Access
- ✓ Soil Conditions
- ✓ Ecological Index
- ✓ R& R Requirements

The Site Matrix was evaluated for the above said deciding criteria and the same is presented in **Table 3.1.**

3.4. EVALUATION OF CANDIDATE SITES

The importance of environmental and coastal attributes was examined for their relevance to the proposed project of IP and arbitrary values were assigned. The assigned values of importance for evaluation of candidate sites are listed in **Table 3.2**.

The exact score of values of each site were listed in **Table 3.3.**
The maximum score of **1450** is seen for Manallur and hence only, the land assignment and project development is recommended at Manallur.

TABLE 3.1 SITE MATRIX- ENVIRONMENTAL ANALYSIS OF ALTERNATIVE SITES SIPCOT MANALLUR IP

S.No	Environmental Attributes	Arur	Sanaputhur	Manallur
1	Location	Human Settlement within 2 Km	Human Settlement 1 Km	Human Settlement within 1 Km
2	Land availability	To be purchased	Government Lands	Government Lands
3	Change in Land use	Unclassified	Unclassified	Unclassified
4	Access	No Access Road	No Direct Access	Access Road
5	Soil Characteristics	Clayey	Largely Sandy Fine/Coarse	Sandy with Red Gravely patches
6	Socio Economic	Disturbance to local farming	Farms are in the adjoin location	No Activity; Barren
7	Air	AAQ is well within the prescribed level	AAQ is well within the prescribed level	AAQ is well within the prescribed level
8	Water	No Water Source	No Water Source	No Water Source
9	Noise	Insignificant	Insignificant	Insignificant
10	RR Plan	RR Plan is required	No RR Plan is required	No displacement as the area has no settlement. No RR Plan is required
11	Land Availability	To be acquired	Available	Available and also notified by Government for the promotion of IP
12	Project Costing Budgetary Estimate	More	Comparatively less	Less

TABLE 3.2 SELECTION CRITERIA- ARBITRARY VALUE OF IMPORTANCE

Sl.No	Selection Criteria	Value of Importance
1	Land Availability	200
2	Road Access	100
3	Soil Conditions	100
4	Ecological Sensitivity	200
5	Change in land use	100
6	Interference with fresh water sources	100
7	R& R Requirements	100
8	Project Timeline	50
9	Economics	50
	Net Score	**2000**

TABLE 3.3 SITE MATRIX- Selection Criteria
MANALLUR IP –SIPCOT

Sl.No	Selection Criteria	Site-I Arur	Site-II Sanaputhur	Site-III Manallur
1	Land Availability	Limited	limited	Readily available
2	Road Access	Available	Available	Available
3	Soil Conditions	Coarse sand	Fine sand	Coarse sand
4	Ecological Sensitivity	Nil	Yes	Nil
5	Change in land use	Required	Required	Required
6	Interference with fresh water sources	Nil	Nil	Nil
7	R&R Requirements	Yes	Nil	Nil
8	Project Timeline	More	Optimum	Optimum
9	Economics	Less	Optimum	Less
Site- III is preferred, on the basis of compatibility.				

TABLE 3.4 SITE MATRIX - SCORE
CHOICE OF SITE SELECTION

Sl.No	Selection Criteria	Importance Values	Site-I Arur	Site-II Sanaputhur	Site-III Manllur
1	Land Availability	200	150	50	200
2	Road Access	50	0	0	50
3	Soil Conditions	100	50	100	50
4	Approach Channel	100	50	100	50
5	Ecological Sensitivity	200	150	150	150
6	Change in land use	150	50	100	100
7	Interference with fresh water sources	150	50	100	150
8	Project Timeline	100	100	50	50
9	Economics	100	50	0	100
Total score		**2000**	**950**	**1000**	**1450**
Choice Ranking			**III**	**II**	**I**

CHAPTER-IV

Environmental Baseline Monitoring

IV. ENVIRONMENTAL BASELINE MONITORING

4.1. GENERAL

The location of the proposed SIPCOT IP is characteristically a developing industrial area that has already two Industrial Estates which are in operation. The adjoining Gummidipoondi IP is pre-Notification and is surrounded by many industries in the recent past including Coal based Power plants of smaller sizes. Another IP is known as Thervoykandigai IP which is available within 20Km radius with huge employment potential, since 2011.

The proposed Manallur IP will have industries classified under **Pharma, Dyes, Polymer, Pesticides** and like which are under the sector of Synthetic Organic Chemicals and also industries under the classification of Integrated Paint Industries, as per EIA Notification,2006.

The proposed IP will have **286.065 ha** of land in the revenue limits of Manallur Village, Gummidipoondi Taluk, Thiruvallur district, which is by 47.5 Km North West of Chennai.

The area around 10 km radius from the proposed IP is considered as project impact area for evaluating the environmental due diligence of the proposed IP location.

The proposed project impact area of 10 km radius is presented in **Fig.4.1.**The Satellite image based map showing the impact area features, for a radial distance of 10 km radius are presented in **Fig.4.2.**

Environmental Baseline Monitoring (EBM) was initiated and carried out in line with the generic guidelines of Terms of Reference (ToR) of MoEF&CC for Industrial Estates and also in compliance to Additional ToR as approved by EAC/MoEF&CC.

The prevailing environmental status in respect of all attributes viz., micrometeorology, air, water, soil, noise, biological and socio-economics, have been evaluated using the objective test Results on the field samples.

The baseline data were correlated and interpreted to appreciate the prevailing interactions between the attributes of natural, cultural, socio-economic systems.

The objective is to describe the baseline settings of the prevailing environmental attributes and also to focus the baseline data to facilitate all Value Environmental Components (VECs) that are likely to be affected by the industrial activities of the proposed IP.

The Environmental Baseline Monitoring (EBM) is envisaged on the following objectives;

1. Evaluation of environmental conditions using primary data generated through field survey of sampling and analysis on all value attributes as per CPCB guidelines
2. Interpretation of data on the basis of their relationships among micro meteorology, air, water, noise, soil, biological and socio economics.
3. Identification of sensitive polluting sources requiring prevention, mitigation and control activities.
4. Collection and regulating of input data for prediction models, if necessary.
5. Summation of baseline data against which the results of any future Environmental monitoring programs can be compared.

Systematic observation strategies with program for sampling, analysis, data collection on all VECs were carried out during the period, during **February - June, 2018.** The study was carried out for all VECs in 10 Km radius from the proposed IP.

The Survey was conducted by our associates **VIMTA LABS, Hyderabad** who are NABET accredited laboratory. CEHS has outsourced the services of Vimta Lab for conductance of Environmental Baseline Survey through an exclusive Memorandum of Understanding (MoU) and subsequent job contract.

4.2. HYDRO GEOLOGICAL ENVIRONMENT

The proposed IP will not have any “water taking” activity from the earmarked project area and hence the hydro geological attributes of the project location viz., water and soil are not vulnerable to any impacts. However, the concerns on the existing hydro geological conditions are required to be evaluated for the project impact area of 10 Km radius and it was carried out through a ground-truthing exercise of survey on field.

The water resources and geological characteristics of 10 Km radius of the project location was considered for field analysis for primary parameters.

HYDRO GEOLOGICAL SURVEY

The Project location is largely dry plain lands and in the changing phase to non-agriculture use. There is no significant surface source of water.

The project area is barren land **without any notified water courses, river or lake**. There is a un-notified stream is by 3 Km and the Pulicat lake is by 13.5 Km from the project location.

The un-notified stream, called *Udapperi kalvai* is in the project impact area is not to find with any water shed area. There are also few numbers of small ponds /lakes that are largely dry in most of the years as there is no dedicated Catchment area and feed channels. All such existing water courses as lake and Ponds are directly rain-fed without any feed and exit channels.

The project location has been turned out as mixed use of land pattern due industrial developments in the recent past of less than 20 years.

REMOTE SENSING& GIS BASED STUDIES

The study area is still larger with **20 X 20 Km- satellite imagery** (window for 400 Sq.Km) to essentially evaluate the water prospecting and land use pattern.

The applications of Remote Sensing (RS) data have been the approach of the present study on land use and water prospecting with Secondary and as well primary data through extensive geophysical studies in the project location and area for 1Km radius. The RS map on the project location in the chosen window for 10 x 10Km of the project location was obtained from Indian Remote Sensing Agency (NRSA), Hyderabad for interpretation of geology and hydrology.

NRSA has Satellite imagery capability through Indian Space Research Organization (ISRO) for providing Imageries in various formats. Satellite Imagery of our project location in LISS 3 format was purchased from NRSA. This allowed of an image for processing in different windows for different thematic classes, using IRDAS.

Remote Sensing (RS) based Satellite Imageries for the project location for coverage of 10X10Km area was drawn from National Remote Sensing Agency (NRSA), Hyderabad. The Image was drawn in LISS- 3 format and satellite sourced from Indian Space Research Organization (ISRO).

The raw RS image in IRS -1D, LISS-III format of the project location is presented in **Fig.4.3**.

Visual interpretation, using Image Processing software, **ERDAS**, has been used to comprehend the details and also to bring out image processing for all attributes of the present study area at Manallur. The evaluation of the image processing was complemented with Survey of India (SoI) Topography maps. Digital enhancement techniques were used to fine tune the detestability of specific frames e.g., the drainage pattern, the lineaments, the vegetation cover and the lithology.

The Image was processed to evaluate the following attributes of Hydro Geology of the project location, with complimenting interactions between them for the prevailing conditions of hydro Geo Morphological features by nature in the project impact area.

The following Thematic Maps were generated and Image processed for evaluating the hydro geological status:

- ✓ Drainage Map- Hydrology
- ✓ Contour
- ✓ Network of Water bodies
- ✓ Geomorphology
- ✓ Land Use/Land cover
- ✓ Soil
- ✓ Lineament

The above thematic maps were digitized using **MAPINFO GIS 8.3 version Software (ESRI 2003)** and digital database has been created. Detailed field check was made and actual ground conditions were verified.

The interface and interaction of these attributes by nature and through the anthropogenic activities are seen making impacts to bring in imbalance which likely to make water resources contaminated or exploited.

NETWORK OF WATER BODIES

The Project location is has no water shed area or catchment area for any notified river and the stream and other small lakes are not found with any specific source and they are largely fed directly by rain.

The project location has been turned out as mixed use of land pattern due industrial developments in the recent past of less than 20 years.

The study area of this hydro-geological investigation is **10 km radius** for ground truthing with sampling and analysis for water and land environmental attributes.

Lakes are found heavily silted and hold comparatively very less water against the water what it should hold for its capacity.

The details are presented as Drainage Map in **Fig 4.4**

CONTOUR

The general contour with drainage slope is towards East and that the flow of surface and as well ground water flow is found eastward.

The contour of the project location is presented in **Fig 4.5**

GEOMORPHOLOGY

The geomorphology is largely fluvial with at least three types of soils viz., red soil, colluviums soil and low silt soil, in which red clayey soil is the most prevalent in the project area.

The area Project impact area is a plain and is characterized by pediments, tanks and flood plains etc.

Predominant geological formations are weathered and fractured granite Gneisses, Sandstones and the same seem to have water retention geological formations in the project impact area.

The predominant feature of the geomorphology of the project location is Recent Alluvium, Boulders, & Conglomerate, Sandstones, Gneisses and Charnockites.

The geo morphology of the project location is presented in **Fig 4.6**

LAND USE

The location window is largely dry land with built up; rural for human settlement.

The land cover and use pattern is presented in **Fig 4.7**

The extent of area falling under different land cover is presented in **Table.4.1**

SOIL

The project area soil map was prepared according to Central Groundwater Board, Chennai region soil classification map.

The locations of soil sampling stations is presented in **Fig 4.8**

TABLE 4.1 LAND COVER AND USE PATTERN

NATURE OF LANDFORM	Project Impact Area (20 x20 Km) (Km^2)	% of Land Cover/Use Pattern
Built-up, Rural	24.12	6.03
Built-up, Urban	61.52	15.38
Wetlands/Water bodies, Reservoirs/Lakes, Ponds	10.83	2.70
Wetlands/Water bodies, River/Streams/Canals	23.21	5.80
Barren/Uncultivable/Wastelands,	15.02	3.75
Wetlands/Water bodies, Coastal wetland	13.84	3.46
Built-up, Mining	5.23	1.30
Barren/Uncultivable/Wastelands	24.42	6.10
Agriculture, Plantation	2.61	0.65
Agriculture, Crop Land	212.2	53.05
Forest,	4.88	1.22
Ryann (Desert)	2.12	0.53
TOTAL	**400.00**	**100%**

The soils in the project area in different types like red soil, alluvial soil and colluvium soil. Among these soils, red loamy soil occurs in more area of extent and covers almost the entire project area. The loamy soils confined to poor groundwater potential zones.

LINEAMENT

Using IRS imagery, a structural map of the project area have been traced out and validated with field checks. From the lineament map, it is inferred that major lineaments run from NW to SE direction. The stream flow is controlled by these W-E lineaments in the project area. This lineament also acts as ground water potential zones. There also a few lineaments running towards E-W direction. These NW-SE direction lineaments are not considered as ground water potential zone lineaments.

The intersecting of the lineament supply potential groundwater to agricultural uses during the summer season.

The Satellite Imagery specific on Lineaments is presented in **Fig 4.9.**

DRAINAGE

There are many minor water bodies within the study area. Drainage map of the study area is given in **Fig 4.10.**

WATER REQUIREMENT

The requirement of water for the proposed IP is assessed for **1 MGD** and it is envisaged to avail from Metro Water. No Member Industries will be allowed to have any bore well on their own in allotted Industries premises for their needs. Synthetic Organic Chemical are water-intensive whereas the proposed Integrated paint Industries would require least water.

The approximate water requirement of 5000 lit/acre is assumed as basis for budgeting the water for the proposed Industrial Park.

WATER SUPPLY FACILITY

Metro Water is having existing water supply pipelines already to supply water from Red Hills up to the nearby IP at Thervoykandigai.

Metro Water is having another Water Reclamation project using Membrane Technology based water treatment plant by around 60Km from the project location. However, it will be only less than 15 Km of pipeline is required to be extended to connect with the proposed Manallur IP.

HYDROGEOLOGY

The major water bearing formations in the project impact area are weathered and fractured granitic gneisses and some extent sandstones.

The pre-monsoon water depth to water level (May, 2006) was learnt from secondary data as 2.38-7.36m and the same during 2007 as 0.79 to 5.30m.

Using 10 years of data (1998-2007), the Rise is 0.0564 – 0.0984 and the fall is 0.0277 -0.2748 meter per year.

The Hydrogeological maps of the Thiruvalluvar District, as indicate information, from the source of governmental data are presented in **Fig 4.11** to **4.14.**

GROUND WATER SCENARIO

The Hydrogeology of the project location is predominantly both clayey and sandy formations. The predominant geological formations are red clayey and coastal sand. The major water bearing formation in the impact area has been observed as quaternary alluvium and tertiary sediments.

The important aquifer system is constituted by 1) unconsolidated and semi consolidated formations and 2) weathered, fissured and fractured crystalline rocks.

Sand admixed clay is predominant aquifer media in the impact area.

Ground water generally occurs under phreatic conditions in the weathered mantle and under semi-confined conditions in the fissured and fractured zones at deeper levels. The thickness of weathered zone in the district is in the range of 2 to 12 m. The depth of the wells ranged from 8.00 to 15.00 m bgl.

The depth to water level in the district varied between 2.38 – 7.36 m bgl during pre-monsoon (May 2006) and 0.79 – 5.30 m bgl during post monsoon (Jan 2007). The seasonal fluctuation

shows a rise between 0.28 and 4.80 m bgl. The piezo metric head varied between 2.20 to 10.30 m bgl (May 2006) during pre- monsoon and 2.72 to 8.55 m bgl during post monsoon.

WATER QUALITY

Samples were taken from ten locations. There are five sub surface sources and five surface sources were covered in the study.

The water sampling locations were presented in **Table 4.2.** The location of water sampling stations are presented in **Fig 4.15.**

The samples were analyzed for all Standard parameters of potable water quality. The Methodology of Analysis was stated in **Table 4.3.**

The characteristics of sub Surface water samples were presented in **Table.4.4**.

The characteristics of Surface water samples were presented in **Table.4.5**.

The characteristics of both sources are largely clean but the ground sources are contaminated with Hardness and surface sources with Nitrates. This is attributed to the large extend of wet land cover of the project location. The locations of soil sampling stations were presented in **Table 4.6**

The characteristics of soil were presented in **Table.4.7**

TABLE 4.2 LOCATIONS OF WATER SAMPLING STATIONS

Sl.No.	Water Sampling Stations	Location	Type of Source
1	SW 1	Manallur Lake	Surface
2	SW 2	Irugulam Lake	Surface
3	SW 3	Madharpakkam Eri	Surface
4	SW 4	Iguvarpalayam Lake	Surface
5	SW 5	Iguvarpalayam odai	Surface
6	GW 6	Sanaputtur	Sub Surface
7	GW 7	Sathyavedu	Sub Surface
8	GW 8	Irugulam	Sub Surface
9	GW 9	Elavur	Sub Surface
10	GW 10	Chinna Puliyur	Sub Surface

TABLE 4.3 PARAMETERS AND METHODOLOGIES - WATER QUALITY

Quality	Parameter	Method
Physico-chemical	pH	pH meter
	Turbidity (NTU)	Nephelometric method
	Total Dissolved Solids, mg/l	Evaporation method
	Total Suspended Solids, mg/l	Filtration & Evaporation method
	Total Hardness as Ca Co_3	EDTA Titrometric method
	Conductivity uS/cm	Conductivity meter
	Sulphates as SO_4, mg/l	Turbidometric method
	Chloride as Cl, mg/l	Argentometric method
	Sodium as Na, mg/l	Flame Photometric method
	Calcium as Ca, mg/l	EDTA Titrometric method
	Magnesium as Mg, mg/l	Calculation method
	Potassium as K, mg/l	Flame Photometric method
	Nitrates as NO_3, mg/l	U.V Spectrophotometer method
	Ammonical Nitrogen, mg/l	Titrometric method
Biological	Dissolved Oxygen, mg/l	Azide modification
	BOD_5, mg/l	Dilution & DO by Winkler's method
	COD, mg/l	Open reflux method

TABLE 4.4 SUB SURFACE WATER QUALITIES IN THE IMPACT AREA

Quality	Parameter	W1	W2	W3	W4	W5	Tolerance limits
	PH at 25°C	7.12	7.03	7.12	6.43	6.90	6.5-8.5
	Turbidity (NTU)	1.3	1.5	0.8	1.6	1.1	10
	Total Dissolved Solids, mg/l	370	430	280	390	280	500
	Total Suspended Solids, mg/l	15	29	08	12	15	-
	Total Hardness as Ca Co_3	240	360	265	355	270	200
	Conductivity uS/cm	515	745	670	780	520	-
	Sulphates as SO_4, mg/l	75	45	60	35	55	200
	Chloride as Cl, mg/l	175	205	190	215	195	250
	Sodium as Na, mg/l	65	85	90	95	72	-
	Calcium as Ca, mg/l	52	60	45	55	65	75
	Magnesium as Mg, mg/l	35	40	29	34	40	30
	Potassium as K, mg/l	1	-	-	4	-	-
	Fluoride as F, mg/l	0.20	0.15	0.15	0.15	0.20	1.0
	Dissolved Phosphate as PO_4, mg/l	0.01	0.01	0.01	0.02	0.01	-
	Nitrates as NO_3, mg/l	10.40	8.60	7.50	60.10	5.50	45
	Aluminum as Al, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	-
	Manganese as Mn, mg/l	0.19	0.10	0.05	0.01	0.10	-
	Iron as Fe, mg/l	0.05	0.10	0.10	0.05	0.15	0.3
	Ammonical Nitrogen, mg/l	11	13	12	15	10	-
Biological	Dissolved Oxygen, mg/l	4.9	5.7	6.2	5.5	5.9	-
	BOD_3, mg/l	1.3	1.7	1.0	2.0	1.5	-
	COD, mg/l	20.1	15.6	10.5	10.8	9.1	-

TABLE 4.5 SURFACE WATER QUALITIES IN THE IMPACT AREA

Quality	Parameter	W6	W7	W8	W9	W10	Tolerance limits
	pH at 25°C	6.71	7.20	7.20	6.80	7.20	8.5
	Turbidity (NTU)	15.6	10.5	12.1	10.9	10.6	10
	Total Dissolved Solids, mg/l	1020	1510	1270	1450	1120	1500
	Total Suspended Solids, mg/l	36	28	25	36	29	-
	Total Hardness as Ca Co_3	510	470	280	260	160	-
	Conductivity uS/cm	790	670	795	685	480	-
	Sulphates as SO_4, mg/l	60	70	84	54	45	400
	Chloride as Cl, mg/l	345	298	357	420	212	600
	Fluoride as F, mg/l	<0.05	<0.05	BDL	<0.05	BDL	1.5
	Dissolved Phosphate as PO_4, mg/l	0.08	0.06	0.04	0.06	0.02	-
	Iron as Fe, mg/l	0.20	0.15	0.09	0.55	0.62	0.3
	Manganese as Mn, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	-
	Potassium as K, mg/l	<1.0	4.3	<1.0	<1.0	6.5	-
	Sodium as Na, mg/l	76	124	127	182	90	-
	Calcium as Ca, mg/l	35	86	72	67	63	-
	Nitrates as NO_3, mg/l	12.50	10.90	9.60	6.10	5.90	-
	Aluminium as Al, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	-
	Magnesium as Mg, mg/l	8.60	11.0	21.6	15.2	11.1	-
	Ammonical Nitrogen, mg/l	0.14	0.15	0.45	0.14	0.55	-
Biological	Dissolved Oxygen, mg/l	5.2	5.0	4.4	4.6	5.4	-
	BOD_3, mg/l	26	20	31	26	19	-
	COD, mg/l	70	56	45	61	31	-

TABLE 4.6 LOCATIONS OF SOIL SAMPLING STATIONS

Sl.No.	Soil Sampling Stations	Location
1	S1	Project location
2	S2	Soorapundi
3	S3	Madharpakkam
4	S4	Allipukkam
5	S5	Gumpili
6	S6	Valaimadu
7	S7	Kollanur
8	S8	Sathyavedu
9	S9	Irugulam
10	S10	Appayapalem

TABLE 4.7 CHARACTERISTICS OF SOIL

Characteristics	***S1***	***S2***	***S3***	***S4***	***S5***	***S6***	***S7***	***S8***	***S9***	***S10***
Type of soil (Texture)	Reddish brown	Brown	Brown	Reddish brown	Brown	Brown	Reddish brown	Brown	Brown	Reddish brown
Colour	Silt loam	Sand	Silt loam	Silt loam	Sand	Sand	Clay	Sand	Sand	Clay
pH	6.00	5.7	5.10	5.60	5.90	5.40	5.80	5.70	5.45	6.20
Conductivity (micro mhos/cm)	140	150	180	190	160	170	180	170	450	140
Magnesium (mg/kg)	16	15	21	29	32	35	41	33	42	31
Nitrogen (kg/ha)	29	30	31	35	37	28	30	35	35	38
Phosphorous (kg/ha)	42.5	46.2	40.5	45.2	44.5	40.8	41.8	45.8	44.3	45.5
Potassium, as K^{++}, (kg/ha)	42	47	50	49	47	45	45	47	49	50
Calcium, as Ca^{++} ,mg/kg	20	25	20	20	25	25	21	20	22	24
Sand (%)	32.50	90.2	35.50	47.50	91.5	88.5	20	92.2	91.2	22
Gravel (%)	7.70	12.80	5.10	5.30	11.50	12.50	7.10	9.20	12.80	9.50
Silt and Clay (%)	16.40	40.50	43.50	20.40	39.50	46.00	49.50	19.70	40.90	23.80
Infiltration (cm/hr)	3.10	2.90	2.60	2.90	2.70	2.80	2.30	3.10	2.90	3.10
Bulk Density (g/cc)	1.50	1.70	1.90	1.45	1.45	1.50	1.75	1.45	1.60	1.55

4.3. AIR ENVIRONMENT

A micrometeorological station was installed in the project site for continuous monitoring of the meteorological parameters, during **February, April, May,** and **June 2018.**

MICROMETEOROLOGY

The climate is hot and tropical, during the study period of April-June, 2018. The Project location receives the rain during both South East and North East monsoons. Most of the precipitation occurs in the form of cyclonic storm caused due to the depressions in Bay of Bengal chiefly during northeast monsoon period. The southwest monsoon rainfall is highly erratic and summer rains are negligible.

4.3.1. Wind Speed and Direction

The wind speed and directions were observed at the observatory station in the proposed IP project site on hourly basis with an average wind speed is 1.75 m/s

The observed data were used to draw a Wind Rose Diagram which is presented in **Fig.4.16**

The predominant wind direction, up wind, down wind and other wind characteristics are evaluated from Fig.4.12. The predominant wind directions were **E** and **NE**. The clam period was observed for **18.29 %** during the study period.

4.3.2. Temperature

The highest temperature observed was **31.2°C** and the lowest was **17.5°C**.

Relative Humidity

The relative humidity was observed to vary in the **morning hours from 65 to 75 % and in the evening hours between 40 to 65%, during** the study period

The profile on the relative humidity during **February, April**, **May and June 2018.**

4.3.3. Rainfall

Annual total rainfall was 1391.5 mm. Maximum and minimum rainfall of 407.4 mm and 2.2 mm was recorded in the months of Nov and Feb respectively.

4.3.4. Topography

The proposed project IP is presented in the Topo sheet No**. 66C/3, Survey of India.**

The location of IP is plain and dry area located **+20 m Mean Sea Level (MSL).**

- **Latitude 13^0 26' 43.45"N to 13^{0}27' 15.37"N**
- **Longitude 80^{0}01' 21.79"E to 80^{0}01' 56.24"E**

The contour and topography of the project site has been surveyed and already presented in Fig.3.5. The contour plan of the project site will be integrated for assessing runoff flow pattern and to provide drainage for the project site. This slope is found eastwards.

The ambient air quality is quite clean and free from air pollutants, despite the nearby industrial activities in the past one decade of time. The condition favors the establishment of IP Project.

The Environmental survey was carried as for Ambient Air Quality Monitoring (AAQM), considering **10 AAQ** stations. The AAQM stations were chosen on the basis wind directions.

The Four AAQ station were fixed within 5km radius and another Six AAQ station were fixed above 5km radius

Upwind direction	-	3Nos.
Downwind direction	-	4Nos.
Crosswind direction	-	3Nos.

The locations of the AAQM stations in the project impact area are presented in **Table 4.8**.

The locations of AAQM stations considered in the study area are presented in **Fig.4.17.**

The standard methods recommended by MoEF&CC used for analysis of the parameters viz., PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2) Nitrogen Oxides (NO_X). Carbon monoxide (CO) and Ammonia (NH_3) are presented **Table 4.9**.

The comprehensive analysis values of the parameters are presented in **Table 4.10** to **Table 4.15.**

The observed AAQ data is presented in **ANNEXURE VIII**.

TABLE. 4.8. LOCATIONS OF AAQ STATIONS

Sl.No.	AAQ Stations	Village Name	Direction	Distances (km)	Category of Wind
1	A1	Project location	N	0.5	Down Wind
2	A2	Soorapundi	E	1.25	Up Wind
3	A3	Madharpakkam	SW	3.50	Down Wind
4	A4	Pallavada	N	3.8	Up Wind
5	A5	Burma nagar	NNE	7.5	Cross Wind
6	A6	Pappankuppam	SE	8.4	Up Wind
7	A7	Periyapuliyur	SSE	7.4	Down Wind
8	A8	Sathyavedu	SW	8.5	Down Wind
9	A9	Palagunta	NW	6.50	Cross Wind
10	A10	Madanapalem	NNW	9.2	Cross Wind

TABLE 4.9 AIR QUALITY ANALYSIS – METHODOLOGY

S. No.	*Parameters*	*Method*
1.	PM_{10}	▪ Gravimetric
2	$PM_{2.5}$	▪ Gravimetric
3	Sulphur dioxide (SO_2)	▪ Ultraviolet fluorescence
4.	Nitrogen Oxides (NO_x)	▪ Chemiluminscence
5.	Carbon Monoxide(CO)	▪ Non-Dispersive Infra Red (NDIR)
6.	Ammonia (NH_3)	▪ Indophenol blue
7.	Ozone (O3)	▪ Colorimetri
8.	Lead (Pb)	▪ ASTM D 4185-90
9.	Benzene (C6H6)	▪ USEPA
10.	Benzo Pyrine (BEP)	▪ USEPA
11.	Arsenic (As)	▪ ASTM D 4185-90
12.	Nickel (Ni)	▪ ASTM D 4185-90

TABLE 4.10 AMBIENT AIR QUALITY OF VARIOUS AAQ STATIONS (24 Hours)
($PM_{2.5}$, $\mu g/m^3$)

Sl. No.	AAQ Stations	Village Name	Maximum	Minimum	Average	98th Percentile
1	A1	Project location	29.3	21.4	25.4	28.7
2	A2	Soorapundi	36.1	23.5	29.5	35.3
3	A3	Madharpakkam	33.5	23.4	27.3	33.0
4	A4	Pallavada	22.5	17.5	20.2	22.2
5	A5	Burma nagar	25.7	17.4	20.7	24.8
6	A6	Pappankuppam	24.8	17.4	20.5	24.3
7	A7	Periyapuliyur	38.6	29.4	34.1	38.4
8	A8	Sathyavedu	25.6	18.2	21.2	24.8
9	A9	Palagunta	25.7	17.4	20.7	24.8
10	A10	Madanapalem	33.5	23.4	27.3	33.0

TABLE 4.11 AMBIENT AIR QUALITIES OF VARIOUS AAQ STATIONS (24 Hours)
(PM_{10}, $\mu g/m^3$)

Sl. No.	AAQ Stations	Village Name	Maximum	Minimum	Average	98th Percentile
1	A1	Project location	67.8	41.2	52.8	66.5
2	A2	Soorapundi	76.8	56.2	66.0	76.6
3	A3	Madharpakkam	74.3	49.7	60.6	72.9
4	A4	Pallavada	69.4	52.4	61.2	69.0
5	A5	Burma nagar	67.5	49.0	59.2	67.4
6	A6	Pappankuppam	58.4	35.8	47.1	57.4
7	A7	Periyapuliyur	79.8	56.2	67.2	78.4
8	A8	Sathyavedu	53.4	35.8	45.2	52.9
9	A9	Palagunta	69.4	52.4	61.2	69.0
10	A10	Madanapalem	76.8	56.2	66.0	76.6

TABLE 4.12 AMBIENT AIR QUALITY OF VARIOUS AAQ STATIONS (24 Hours)
(SO_2,µg/m^3)

Sl. No.	AAQ Stations	Village Name	Maximum	Minimum	Average	98th Percentile
1	A1	Project location	12.4	6.2	9.0	12.4
2	A2	Soorapundi	6.8	3.5	5.0	6.7
3	A3	Madharpakkam	7.8	3.6	5.9	7.7
4	A4	Pallavada	16.4	8.7	12.4	16.0
5	A5	Burma nagar	16.4	8.7	11.9	15.8
6	A6	Pappankuppam	12.5	6.2	9.4	12.5
7	A7	Periyapuliyur	13.8	7.5	10.4	13.2
8	A8	Sathyavedu	6.8	3.5	4.9	6.6
9	A9	Palagunta	6.8	3.5	5.0	6.7
10	A10	Madanapalem	7.8	3.6	5.9	7.7

TABLE 4.13 AMBIENT AIR QUALITY OF VARIOUS AAQ STATIONS (24 Hours)
(NO_x, µg/m^3)

Sl. No.	AAQ Stations	Village Name	Maximum	Minimum	Average	98th Percentile
1	A1	Project location	31.5	22.4	26.0	30.8
2	A2	Soorapundi	22.1	17.5	19.5	21.8
3	A3	Madharpakkam	22.5	15.2	18.3	22.0
4	A4	Pallavada	23.3	15.6	19.8	22.9
5	A5	Burma nagar	23.3	16.2	19.7	22.9
6	A6	Pappankuppam	27.1	17.6	23.2	26.8
7	A7	Periyapuliyur	26.4	18.8	23.0	26.2
8	A8	Sathyavedu	22.1	16.0	19.1	22.1
9	A9	Palagunta	22.1	17.5	19.5	21.8
10	A10	Madanapalem	27.1	17.6	23.2	26.8

TABLE 4.14 AMBIENT AIR QUALITIES OF VARIOUS AAQ STATIONS (8 Hours)
(CO, mg/m^3)

Sl. No	AAQ Stations	Village Name	Maximum	Minimum	Average (8 Hours)	98th Percentile
1	A1	Project location	0.23	0.17	0.2	0.19
2	A2	Soorapundi	0.22	0.14	0.18	0.18
3	A3	Madharpakkam	0.16	0. 05	0.10	0.10
4	A4	Pallavada	BDL	BDL	BDL	BDL
5	A5	Burma nagar	0.07	0.07	0.07	0.06
6	A6	Pappankuppam	0.03	0.03	0.03	0.02
7	A7	Periyapuliyur	0.08	0.08	0.08	0.07
8	A8	Sathyavedu	BDL	BDL	BDL	BDL
9	A9	Palagunta	BDL	BDL	BDL	BDL
10	A10	Madanapalem	BDL	BDL	BDL	BDL

TABLE 4.15 AMBIENT AIR QUALITY OF VARIOUS AAQ STATIONS (24 Hours)
(NH_3, mg/m^3)

Sl. No	AAQ Stations	Village Name	Maximum	Minimum	Average	98th Percentile
1	A1	Project location	BDL	BDL	BDL	BDL
2	A2	Soorapundi	BDL	BDL	BDL	BDL
3	A3	Madharpakkam	BDL	BDL	BDL	BDL
4	A4	Pallavada	BDL	BDL	BDL	BDL
5	A5	Burma nagar	BDL	BDL	BDL	BDL
6	A6	Pappankuppam	BDL	BDL	BDL	BDL
7	A7	Periyapuliyur	BDL	BDL	BDL	BDL
8	A8	Sathyavedu	BDL	BDL	BDL	BDL
9	A9	Palagunta	BDL	BDL	BDL	BDL
10	A10	Madanapalem	BDL	BDL	BDL	BDL

The **National Ambient Air Quality** (**NAAQ**) standards are presented in **Table 3.16** for ready reference.

The ambient air quality has been monitored at 10 locations for 14 parameters including 12 parameters as per NAAQS, 2009 within the study area. The baseline levels of PM10 (45.2-66.0 µg/m³), PM2.5 (20.2-34.1 µg/m³), SO2 (4.9-12.4 µg/m³), NOx (18.3-26.0 µg/m³), CO (0.121—0.350 mg/m3), all the parameters are well within the National Ambient Air Quality Standards for Industrial, Commercial and Residential areas at all monitoring locations during the study period from February, March, April to June 2018. This represents a pollution controlled air shed and favors the establishment of IP project.

4.4. NOISE ENVIRONMENT

Ten Noise observatory stations are fixed for noise sampling in the study area. The locations of noise observatory stations are presented in **Fig.4.18.**

The locations of noise observatory stations are presented in **Table 4.17.**

One station was taken very near to the project site and another 9 stations were taken in the location of road intersection points, railway station, schools and village administrative office.

Noise level monitoring at each observatory station was carried out three times, uniformly distributed, during the study period of one month. Noise levels were studied separately during daytime and nighttime in all ten stations. The observed noise level in the observatory stations are presented in **Table.4.18**.

TABLE 4.16 NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Time Weighted Average	Concentration in Ambient Air	
		Industrial Area, Residential, Rural & Other Areas	Sensitive Area
Particulate Matter,PM10 $\mu g/m^3$	Annual* 24 hrs.**	60 / 100	60/ 100
Particulate Matter,PM2.5 $\mu g/m^3$	Annual* 24 hrs.**	40 / 60	40/ 60
Sulfur dioxide (SO_2) $\mu g/m^3$	Annual* 24 hrs.**	50 / 80	20/80
Oxides of Nitrogen as (NOx) $\mu g/m^3$	Annual* 24 hrs.**	40 / 80	30/80
Carbon Monoxide (CO) mg/m^3	8 hours ** 1 hour *	02/04	02/04
Ammonia (NH_3) $\mu g/m^3$	Annual* 24 hrs.**	100/400	100/400
Ozone (O3) $\mu g/m^3$	8 hours ** 1 hour *	100/180	100/180
Lead (Pb) $\mu g/m^3$	Annual* 24 hrs.**	0.5/1	0.5/1
Benzene (C_6H_6) $\mu g/m^3$	Annual*	5	5
Benzo (a) Pyrene (BaP) – particulate phase only ng/m^3	Annual*	1	1
Arsenic (As) ng/m^3	Annual*	6	6
Nickel (Ni) ng/m^3	Annual*	20	20

* Annual Arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform interval.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

TABLE 4.17 LOCATIONS OF NOISE OBSERVATORY STATIONS

Sl.No.	Noise Observatory Stations	Location
1	N1	**Project location**
2	N2	**Soorapundi**
3	N3	**Madharpakkam**
4	N4	**Pallavada**
5	N5	**Burma nagar**
6	N6	**Pappankuppam**
7	N7	**Periyapuliyur**
8	N8	**Sathyavedu**
9	N9	**Palagunta**
10	N10	**Madanapalem**

TABLE 4.18 AMBIENT NOISE LEVEL IN THE OBSERVATORY STATIONS

Stations	*Day Time*			*Night Time*			*dB(A) standard*	
	Max. dB(A)	*Min. dB(A)*	*Avg. dB(A)*	*Max. dB(A)*	*Min. dB(A)*	*Avg. dB(A)*	*Day time*	*Night time*
N1	35.45	30.65	34.20	32.10	27.90	24.50	55	45
N2	38.90	36.98	36.45	35.40	30.50	28.45	55	45
N3	36.90	31.60	34.82	35.10	32.70	30.40	55	45
N4	38.90	33.53	34.96	36.95	33.70	32.16	55	45
N5	36.20	30.60	35.94	35.20	31.20	30.70	55	45
N6	37.40	32.75	34.57	33.25	31.40	29.60	55	45
N7	35.70	30.02	33.86	31.30	31.50	30.10	55	45
N8	38.20	35.43	36.81	32.50	32.40	30.96	55	45
N9	37.50	34.22	35.86	32.65	32.90	29.20	55	45
N10	36.00	34.80	35.40	33.47	32.75	30.10	55	45

4.5. BIOLOGICAL ENVIRONMENT

The distribution of living organisms (flora and fauna) in the study area represents the Biological Environment. Vegetation is the sum of the total of various plants growing in an area. The vegetation analysis and cover studies were carried out as a part of Ecological Studies.

A detailed survey of the study area was carried out in order to record / document the flora and fauna present on that site. Botanical survey was carried out during February and March, 2018.

Study of Vegetation

Plants growing together have the mutual relationships among themselves and with the environment. Such a group of plants in one area form a stand. Several similar stands represent a community. Community is a part of an ecological system in which transformation, accumulation and flow of energy are involved.

The structure of a plant community can be studied by taking into consideration a number of characters which are usually grouped into analytical and synthetic characters. The analytical character of a community are determined by means of area , line and point as employed in quadrant, transect and point method respectively.

Quadrant is the name given to the sampling unit, an area of a definite size. It is usually employed for the studying grassland vegetation.

A transect is a sampling strip extending across a stand or several stands depending upon objectives, one may employ line transect or Belt transect.

In the present survey, Belt transects of 10 m length and 10 m breadth was employed in order to record the name of the species and their numerical strength in a particular area. From this data frequency, density and basal area can be calculated.

Abundance, frequency and density are the synthetic characters. Abundance is the number of individuals per quadrant of occurrence. Frequency expresses the distribution of various species in a community. Density is the number of individuals per quadrant. Relative frequency (RF) is the percentage of frequency of number of sampling units in which the species occur out of the total number of sampling unit studied. These RF values were calculated and compared to Raunkiaers law of frequency. The law states that the class A is greater than B. B is greater than C.C is greater than or less than or equal to D and D is less than E .(A>B>C=D<E) This law

can be explained in the form of histogram which is called Raunkiaers normal frequency diagram. This would be very helpful in providing the information as the heterogeneity and homogeneity of plants.

Relative density is the percentage of number of individuals of species out of total number of individuals of all species. Basal area refers to the ground actually penetrated by the stems. This is measured at 2.5 cm above the ground or at ground level.

Identification of Flora

An extensive floristic survey was made in the study area to document/record the vegetation present on that site.

The identified plants were recorded with their family name. The natures of the habit of the species were also mentioned. It is presented in **Table. 4.19.**

Fauna

The survey on fauna indicated very common species in the study area. There is no rare or endangered species are available in the study area.

The fauna in the study area was also studied by experts in the same time frame as that off flora.

It is very clear to note that the biological environment of the project location there is no rare or endanger species.

The list of Fauna as listed during the survey in the study area is presented in **Table. 4.20**.

TABLE 4.19 LISTS OF FLORA SPECIES IN AND AROUND THE STUDY AREA

S.No	Scientific Name	Common Name	Family
		Tree	
1.	Azadirachtaindica	Neem	Meliaceae
2.	Ficusbenghalensis	Bargat	Moraceae
3.	Acacia nilotica	Babool	Mimosaceae
4.	Cocos nucifera	Coconut	Arecaceae
5.	Ficusamplissima	Bat tree	Moraceae
6.	Aegle marmelos	Bel	Rutaceae
7.	Mangiferaindica	Mango	Anacardiaceae
8.	Tamarindusindica	Tamarind	Caesalpiniacae
9.	Albizzialebbeck	Kala Siras	Fabaceae
10.	Delonixregia	Gulmohr	Fabaceae
11.	Citrus medica	Stock Melon	Rutaceae
12.	Emblica officinalis	Amla	Euphorbiaceae
13.	Euphorbia tirucalli	Pencil plant	Euphorbiaceae
14.	Musa paradise	Banana	Musaceae
15.	Pongamiapinnata	Karanja	Fabaceae
16.	Wattakakavolubilis	Sneeze Wort	Asclepiadaceae
17.	Syzygiumcumini	Jamun	Myrtaceae
18.	Tectonagrandis	Teak	Lamiaceae
19.	Sidacordifolia	Country Mallow	Malvaceae
		Shrubs	
1.	Jatropha curcus	Ratanjoti	Euphorbiaceae
2.	Solanum indicum	Ubhiringon	Solanaceae
3.	Lantana camara	Wild Sage	Verbenaceae

4.	Jatropha glandulifera	Glandular Jatropha	Euphorbiaceae
5.	Datura metel	Dhutura	Solanaceae
6.	Abrusprecatorius	Coral bead vine	Fabaceae
7.	Asparagus racemosus	Shatavari	Liliaceae
8.	Cressacretica	Rudravanti	Convolvulaceae
9.	Flueggealeucopyrus	Bushweed	Phyllanthaceae
10.	Jasminumsessiliflorum	Kuruvilaangkodi	Oleaceae
11.	Morindapubescens	Indian Mulberry	Rubiaceae
12.	Pavettaindica	Indian Pavetta	Rubiaceae
13.	Vitextrifolia	Lagundi	Lamiaceae
14.	Solanum pubescens	Turkey berry	Solanaceae
15.	Tridaxprocumbens	Tridax daisy	Asteraceae
16.	Cassia tora	Chakvad	Fabaceae
17.	Neptuniaoleracea	Water mimosa	Fabaceae
18.	Ochnaobtusata	Golden champak	Ochnaceae
19.	Euphorbia geniculata	Fireplant	Euphorbiaceae
20.	Plumbagozeylanica	White leadwort	Plumbaginaceae
21.	Opuntiadillenii	Prickly pear	Cactaceae

Herbs			
1.	Xanthium strumarium	Common cocklebur	Asteraceae
2.	Dinebraretroflexa	Viper grass	Poaceae
3.	Cynodondactylon	Durba grass	Poaceae
4.	Mimosa pudica	Lajwanti	Fabaceae
5.	Partheniumhysterophorus	Gajarghas	Asteraceae
6.	Phyllanthusamarus	Bahupatra	Phyllanthaceae
7.	Sporobolusfertilis	Giant Parramatta Grass	Poaceae
8.	Panciumpaludosum	Torpedo Grass	Poaceae

9.	Schoenoplectusacutus	Bulrush	Cyperaceae
10.	Tridaxprocumbens	Tridax Daisy	Asteraceae
11.	Oldenlandiacorymbosa	Daman pappad	Rubiaceae
12.	Typhaangustata	Ramban	Typhaceae
13.	Tribulusterrestris	Mithugokhru	Zygophyllaceae
14.	Sidacordifolia	Flannel weed	Malvaceae
15.	Aervalanata	Chaya	Amaranthaceae
16.	Ocimumbacillicum	Sweet basil	Lamiaceae
17.	Dactylocteniumaegyptium	Crowfoot grass	Poaceae
18.	Sporoboluscoromandelianus	Smut grass	Poaceae
Climbers			
1.	Cocciniaindica	Kundru	Cucurbitaceae
2.	Cissampelospareira	Abutua	Menispermaceae
3.	Cardiospermumhalicacabum	Balloon Vine	Sapindaceae
4.	Cocciniagrandis	Ivy Gourd	Cucurbitaceae

TABLE 4.20 FAUNA OBSERVED IN THE IMPACT AREA

S.No	Scientific Name	English Name
Mammals		
1.	Susfalconeri	Pig
2.	Canisfamiliaris	Dog
3.	Bosindicus	Cow
4.	Bos Taurus	Cow
5.	Capra hircus	Goat
6.	Rousettusleschenaultii	Fruit Bat
7.	Herpestesedwardsii	Mongoose
8.	Funambulus pennant	Palm-Squirrel
9.	Feliscatus	Cat
Birds		
1.	Mesophoyx intermedia	Intermediate Egret
2.	Elanuscaeruleus	Black-winged Kite
3.	Francolinusondicerianus	Grey francolin
4.	Milvus migrans	Black kite
5.	Egrettagarzetta	Little Egret
6.	Bubulcus ibis	Cattle Egret
7.	Columba livia	Rock pigeon
8.	Burhinusoedicnemus	Stone curlew
9.	Streptopeliachinensis	Spotted dove
10.	Streptopeliasenegalensis	Little brown dove
11.	Cuculuscanorus	Common cuckoo
12.	Cuculusmicropterus	Indian cuckoo
13.	Centropussinensis	Greater coucal
14.	Pstittaculakrameri	Rose ringed parakeet
15.	Eudynamysscolopacea	Asian Koel
16.	Charadriusdubius	Little ringed plover
17.	Calidrisminuta	Little stint
18.	Cypsiurusbalasiensis	Asian palm swift
19.	Alcedoatthis	Small blue Kingfisher
20.	Phaenicophaeusviridirostris	Blue-faced Malkoha
21.	Sterna hirundo	Common Tern
22.	Corvussplendens	House crow
23.	Corvusmacrorhynchos	Jungle crow
24.	Mirafraerythroptera	Indian Lark

25.	Larusbrunnicephalus	Brown Headed gull
26.	Anthusrufulus	Paddy field pipit
27.	Eremopterixgrisea	Ashy-crowned Sparrow lark
28.	Passer domesticus	House sparrow
Reptiles		
1.	Ophisops leschenaultia	Snake-eyed lizard
2.	Calotes versicolor	Common Garden Lizard
3.	Hemidactylus sp.	House lizard
4.	Eutropismacularia	Common skink
5.	Bungaruscaeruleus	Common Krait
Amphibians		
1.	Rana tigrina	Common yellow frog
2.	Bufomelanostictus	Toad
3.	Hyla sp.	Tree frog

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4.6. SOCIO ECONOMIC & HEALTH ENVIRONMENT

Thiruvallur is a coastal district of an area of 3394 sq.kms. The district has Chennai and Bay of Bengal as its boundary on the east flanked to the north and west by Andhra Pradesh and to the south by Vellore and Kancheepuram districts. The land area is flat while some parts of the district are undulated and some of them are even hilly. The taluks of Ponneri, Gummidipoondi and Thiruvallur do not have any landscape worth to mention while a number of hillocks are seen scattered in and around Tiruttani taluk. The sandy strip of the coast is replete with casuarina plantations. (Source: Census 2011).

Thiruvallur was originally known as Tiruvallur which specifies the sleeping position of the holy lord "Balaji", in the Veeraragava temple of Tiruvallur. Later people began to refer it by names such as Trivellore and Tiruvallur. The area of the district is 3,423Sq.k.m and the population is 37,28,104 as per 2011 census which is 2.43 percent of total Tamilnadu population as against 2.52 percent in 2001. The district has 03 revenue divisions, 09 taluks, 14 blocks, one corporation 12 municipalities, 13 town panchayats and 671 revenue villages. Seven constituencies and one Loksabha are in the district.

The total population of Thiruvallur district is **37,28,104**. (as per census 2011 status). The number of male is **18,76,062**. The Population Density of Thiruvallur districts **1098/km^2**.

The percentage of literacy is 84 %. The district has a SC population is around 22.03% of the total population as per 2001 Population census.

Agriculture is the main occupation on which 22.37 of the people depend on it.. The important food crops in the district are paddy, Cholam, cumbu, ragi, varagu, samai and commercial crops like cotton, chilly, sugarcane and groundnut.

Socio-economic Scenario

The proposed Industrial Park project is surrounded by Gummidipoondi Talukhas a larger area of waste lands. Since the general people are residing far away from the proposed project, this will not create any additional negative impact on the people. The Proposed IP will create additional employment opportunities to the people.

Brief profile of Thiruvallur District (as per census 2011 status) is presented in **Table 4.21.**

The total population of Thiruvallur district is **37,28,104**. (as per census 2011 status). The number of male is **18,76,062**. The number female is **18,52,042**. The Population Density of Thiruvallur districts **1098/km^2**.

TABLE 4.21. DEMOGRAPHY PROFILE OF THIRUVALLUR DISTRICT

Description	2011	2001
Actual Population	37,28,104	27,54,756
Male	18,76,062	13,97,407
Female	18,52,042	13,57,749
Area Sq. Km	3,394	3,394
Density/km2	1098	776
Proportion to Tamil Nadu Population	5.17%	4.41%
Sex Ratio (Per 1000)	987	971
Child Sex Ratio (0-6 Age)	946	957
Average Literacy	84.03%	76.94%
Male Literacy	89.69%	85.26%
Female Literacy	78.32%	68.39%
Total Child Population (0-6 Age)	4,05,669	3,29,761
Male Population (0-6 Age)	2,08,449	1,68,476
Female Population (0-6 Age)	1,97,220	89,980
Literates	1,349,697	1,131,406
Male Literates	703,106	593,868
Female Literates	646,591	537,538

CHAPTER – V

Environmental Impacts and Mitigation Measures

V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1. GENERAL

The proposed IP will have two broadly classified industries viz., Synthetic Organic Chemicals and Integrated Paint industries. By nature and requirements, Synthetic Organic Chemicals which includes mainly the industries for Polymer, Dyes, Pesticides, Pharma and the like which are water intensive and also to have significant area sources of emission due to storage and conveyance of raw materials. The paint industries will have emissions from both and point and as well area sources, mainly from the storage and transfer of chemicals like solvents.

The member industries shall submit an appraisal report on Environmental Management by any MoEF&CC approved Environmental organization. This will remain a pre-requite document for applying for land allotment by SIPCOT.

Specifically, the Zero Liquid discharge Scheme is must and that will fully devoid the pressure and impact on the water sources of the location. The state of the art Zero liquid discharge Scheme will prevent pollution to water and soil attributes of the project location, which otherwise would be.

SIPCOT is committed to have all well devised plans, protocols and procedures to ensure sustainable operation of the IP in all phases of project establishment from planning to operation.

The activities are varied from phase of project implementation and hence, the impacts are characterized on the following two phases, viz.,

- ✓ Planning
- ✓ Construction Phase
- ✓ Operation & Maintenance Phase

Strategic Planning of the IP with Infrastructure components were carried out by **SIPCOT** to get the project feasible and environmentally compatible**.**

The impacts were evaluated for Impact prone activities and were assessed for their extent and respective mitigation methods.

5.2. IMPACT PRONE ACTIVITIES

The proposed IP will have primarily three activities of concern which are prone for releasing pollutants to cause Environmental Impacts. They are;

- ✓ Land development with building infrastructures
- ✓ Waste water Management
- ✓ Emissions
- ✓ Handling & Storage of Chemicals
- ✓ Solid Waste managemer 100

There are also other activities which require management systems for production schedules and workers environment.

Necessary systems for mitigation and management to minimize these impacts will be in line with the Guidance document of MoEF&CC and CPCB.

5.3. PLANNING & DESIGN PHASE

The most important phase of the project is to get the strategic planning of the project components with state-of-the-art Plant and Machinery to ensure the following;

- ❖ Choice of Raw Materials for Environmental Compatibility
- ❖ Optimal use of Raw Materials
- ❖ Processes requires less water requirements
- ❖ Choice of Plant & Machinery that require
  - ✓ Process Control & Monitoring Systems
  - ✓ least foot print
  - ✓ safe for operation
  - ✓ least energy requirements
  - ✓ least residue generation
  - ✓ Man power optimization

The planning Phase should draw

- Material Balance
- Water Balance
- Energy Balance

To ensure the prevention of sources of pollution, reduce the pollutant concentration and enable the operation schedule to manage the pollution scientifically.

The design phase is important to integrate the multi-disciplinary team to facilitate the best of processes and plants will be incorporated to reduce the impact of the project activities, principally through prevention and reduction of polluting sources.

5.4. CONSTRUCTION PHASE

All construction of infrastructures including land development towards conversion of land use pattern involving many activities like construction material transfer, construction waste disposal, workers disposals, etc., which could have their impact on activities.

Hence, all project establishment activities m 101 planned strategically with specified engineering, workmanship and time frame to minimize the impacts or to keep them under control to have the emissions, including fugitive dust within the allowable limits of independent pollutants. This requires enormous planning schedules with stringent implementation on site with engineering supervision.

It is important that SIPCOT to execute the IP from its planning stage itself and it will become still more important while the project is executed at site. Engineering supervision and carrying the works in compliance to Standard practices and as per conditions and recommendations laid in Environmental Clearance have become critical for successful completion through controlling avoidable activities concerning environmental impacts.

Workers Safety and mandatory Insurance Cover must be ensured for the work force and the contract labors. Specific monitoring schedules must be practiced on the value environmental attributes, as the recommendations of EC.

SIPCOT is committed to comply with conditions of Consent for Project Establishment (CTE) from state Pollution Control Board, on getting the Environmental Clearance.

5.4.1. Water Balance

The water requirement for the entire activities of the member industries in the proposed IP is assessed for **1 MGD**. Rather, the member industries will be chosen on the basis of water requirement and allotment will be made, with the limitation of water supply.

5.4.2. Drinking Water

Water will be purified to adhere **BIS 10500** and separate supply lines will be made available from the common system of SIPCOT.

The systems towards source development, treatment, storage and distribution network of water supply for all member industries, for both industrial and drinking requirements, shall be operated and maintained by SIPCOT.

Member industries shall pay, separately on annual basis and on the basis of consumption rate, to SIPCOT for proper operation & maintenance.

Member industries will also pay TNPCB, the chess fee under different categories of water use, as per Water Act 1974.

5.4.3. Water Treatment Plant

Zero Waste initiatives will be must and mandated for all member industries in their Corporate Responsibility of Environmental Protection (CREP).

Any residual liquid waste shall be treated to have zero disposals. The entire treated effluent shall be reused in their utilities and green belt development.

The solid waste stream will be sent to CPCB approved recyclers or to MoEF&CC approved TSDF for proper and ultimate disposal.

5.5. OPERATION & MAINTENANCE PHASE

The Operation & Maintenance Phase is largely pertaining to member industries and will be multifarious, as member industries will be of varied sizes and types, eventually the waste streams are varying.

The ETPs as ZLDP and Process stacks must be installed with online monitoring and continuous data logging and transfer systems. The SIPCOT and as well the Member Industries will have to

obtain Consent to Operate (CTO) from State PCB. All conditions of CTO shall be complied with SIPCOT and as well by Member Industries.

5.5.1. Water Treatment & Use Pattern

The water requirement for the entire activities of the member industries in the proposed IP is limited to **1 MGD**. Rather, the member industries will be chosen on the basis of water requirement and allotment will be made, with the limitation of water supply.

SIPCOT will facilitate supply of water from Metro Water to all member industries.

The Water Use Pattern is unknown *per se*, as it can be assessed and pertaining to individual member industries.

5.5.2. Effluent Treatment, Water Reclamation & Reuse

Member industries will be mandated to submit a "**Zero Disposal**" Scheme on a detailed effluent management plan. The effluent must be collected, treated, and reused by recycling. There is no reject because of Zero liquid Discharge System is installed for each member industries.

Monitoring of reject TDS and its disposal through Evaporators and concentrated sludge through TSDF will be monitored regularly for it's out flow rate, periodically.

Any residues out of the solids-separation (sludge) are disposed off through approved TSDF.

5.6. ANALYSIS OF IMPACTS

5.6.1. WATER POLLUTION

Water, Air and Land are the most vulnerable environmental attributes in serving the proposed industrial activities. Solid waste is another significant environmental issue from the proposed member industries. More discharges, discards and disposals can be listed to have significant impact on water, air and land environments.

5.6.2. IMPACT OF WATER USE

The quantity of water is 1MGD and it is par se, out sourced through Metro Water through dedicated pipelines from the existing facilities of Metro Water.

There will not be any withdrawal point of water in the impact area to meet the requirement of 1 MGD.

Member industries will not be permitted to have bore wells. Hence, impact due to withdrawal of water in the project area will be avoided.

5.6.3. TREATMENT OF WASTEWATER 103

5.6.3a. Effluent Recycle & Reuse

The effluent treatment is mandated for Zero Liquid Discharge plant to prevent any disposal of residue into water and land environment.

The membrane based water reclamation plants will have rejects from the membrane to the tune of 25-40% which will be concentrated to disposable solid form through Evaporators.

The sludge from chemical treatment, if any, will be sent for disposal in offsite TSDF. It will be stored in closed and paved shed temporarily by each member Industry. As there will not be any spillage or leaching, the impact will be prevented.

5.6.3b. Effluent Recycle & Reuse

The reclaimed water from the ETPs (ZLDP) will be reused in the secondary applications like reactor washing, etc., for the Synthetic Organic manufacturing and paint manufacturing.

5.6.4. AIR POLLUTION

5.6.4a. Construction Operations

Most of the construction activities for buildings are envisaged for pre fabricated engineering structures which are largely just assembled and erected, there will not be any dust emission, which otherwise will be.

5.6.5. SOLIDWASTE

The solid waste from process will be dealt by respective member industries and will be mandated for its management only through Off site TSDF. The general waste from area and sludge from ETP will be responsibility of SIPCOT and the general waste will be sent to local bodies and Sludge will be sent to TSDF.

The IP will not have any facility to manage Solid Waste of any stream and hence there will not be any impact.

5.6.6. NOISE

The operations or any activity pertaining to material handling will be less and not requires any specific material handling equipments and hence if there is any accidental noise it will only be temporal. There may be only isolated incidence of noise pollution due to occasional heavy vehicle movement. There are no high vibrating machines or plant components involved in the MIP.

5.6.7. BIOLOGICAL ENVIRONMENT

No discharge of effluent or disposal of solid waste from the proposed MIP. The traffic due to MIP will impart disturbance to existing status of infrastructures. However, SIPCOT will ensure necessary enhancement in the roads by the time the project is getting commissioned, in consultation with NHAI.

5.6.8. SOCIO ECONOMICS

There is no scientific concern credible against the IP as the water from Terrestrial area.

More than a lakh peoples will be benefitted from the IP with direct or indirect employment. The local women of not less than 10000 can expect to get a decent job in the member industries.

CEHS found the villagers demanding for certain domestic logistics and philanthropy such as protected water supply, better roads, sufficient employment opportunities, during the visits for conducting environmental survey.

5.6.9. TRANSPORTATION IMPACTS

The vehicles that are serving member industries will be facilitated in well laid roads to prevent fugitive dust which otherwise will be. There is no sea ward transportation.

The proposed activities of member industries for raw material, products and their work force will increase traffic in roads towards the proposed IP.

5.7. EVALUATION OF IMPACTS

The impacts due to the proposed ITIP are net positive and the project can be implemented and operated in environmentally compatible way. The project will bring additional revenue to

Government of Tamilnadu and facilitate industrial development in Thiruvallur District. SIPCOT will catalyze the socio economic development of the people in the project location.

The impacts are required to be evaluated for potential significances and value indexes. The environmental impacts are considered in four accounts as follows;

Impact I: Mitigated by EMP and systems

Impact II: Not yet fully and qualitatively assessed.

Impact III: Not yet fully and quantitatively assessed.

Impact IV: Positive impacts.

The potential significance of impacts are denc 105 /iz., short term (S), long term (L) and permanent (P).

However, the elaborate methodology of constructing **EIA Matrix** is not required as the proposed project is not cause for any type of pollution and environmental impact on the project location.

5.8. IMPACT QUANTIFICATION

To quantify the assessed impacts, they are assigned certain arbitrary weightage on the basis of standards and listed in **Table 5.1.**

The values of the importance of the environmental parameters are related to the impacts of the proposed project activities of the proposed IP.

To sum up impact score, the coefficient of impacts for different environmental parameters is assumed. The values are ranging from **0 – 5** are used in Quantification of total impact value for the proposed project of **SIPCOT** and listed in **Table 5.2**.

The assumed coefficients of impact, which are devised based on the impact quality, are for quantifying the total impact values of the proposed project of **SIPCOT.**

The detailed impact calculation is tabulated in **Table 5.3.**

The total impact value, as calculated in the Table is **+2450**, which favor the implementation of the proposed project of **IP by SIPCOT.** The total impact score is an assertive, positive score, which favors the implementation of the project.

TABLE 5.1 ARBITRARY WEIGHTAGE VALUES FOR IMPACT ASSESSMENT

Sl.No.	Parameters	Importance Value
1.	Air Quality	100
2.	Water Resources	200
3.	Land Use Pattern	100
4.	Solid waste disposal	100
5.	Noise Level	50
6.	Human Settlement	50
7.	Economic Growth	200
	TOTAL	**1000**

TABLE 5.2 COEFFICIENT VALUES FOR IMPACT ASSESSMENT

Sl.No.	Coefficient Criteria	Coefficient of Impact
1.	No impact	0
2.	No appreciable impact	0
3.	Significant impact-short term	-1
4.	Major impact-long term reversible	-1
5.	Major impact-long term irreversible	-2
6.	Permanent impact	-2
7.	Positive impacts	+1, +2

TABLE 5.3 IMPACT QUANTIFICATION

Sl.No.	Environmental Parameters	Importance Value	MIP SIPCOT		
			IP	Targeted Industrial Growth	Impact Value
1.	Air Quality	100	-1	-1	-200
2.	Water Resources	200	+1	+1	+200
3.	Land Use Pattern	100	+1	-1	0
4.	Solid Waste Disposal	100	0	-1	-100
5.	Noise Level	50	0	0	0
6.	Human Settlement	50	-1	+4	+150
7.	Economic Growth	200	+5	+10	+3000
		1000			**+2450**

5.9 MITIGATION MEASURES

Mitigation of impacts from the project activities of IP have been devised for all the three phases of project viz,

1. Planning & Designing
2. Construction & Establishment
3. Operation & Maintenance

5.9.1. Land Use Pattern

The proposed construction of Industrial Park infrastructures will change the present land use into industrial use. The change in the present land use pattern will likely change the surrounding environment. Hence, SIPCOT proposes a buffer Zone along the four boundaries with species of native trees and plantations.

5.9.2. Effluent Treatment Plant

Member industries will be mandated to submit a "**Zero Disposal**" Scheme on a detailed effluent management plan.

The effluent must be collected, treated, and reused by recycling. Any residues out off solids-separation (sludge) are disposed off through approved TSDF.

The member industries shall submit an appraisal report on effluent management by any MoEF&CC approved Environmental organization. This will remain a pre-requite document for applying for land allotment by SIPCOT.

SIPCOT will initiate a joint monitoring preparation of "Zero Waste" from all member industries through a Joint Action Committee of SIPCOT and member industries.

CHAPTER – VI

Additional Studies

VI. ADDITIONAL STUDIES

6.1. GENERAL

Specific additional studies were carried out on **Socio Economic status of the project Location,** Manallur, Gummidipoondi Taluk. Also, conceptual studies were suggested for *Risk Analysis, Emergency Management and Disaster Management Plans*. Anyhow, as the industrial activities in the proposed Industrial Park could not be assessed now, the factual studies on these issues shall further be evaluated on commissioning the IE.

The social impact of the proposed IE on its surrounding community has been evaluated through a detailed socio economic survey in **10 Km** radius of the project location. The due diligence of the Socio economic conditions of the project location has been surveyed in the pre project scenario.

The health impacts and risk to life for the surrounding community in the project impact area, due to the existing IEs and proposed IE have been evaluated through Standard tools for risk evaluation, analysis, and assessment and management systems.

Emergency Preparedness Plan has been conceptually drawn for both on-site (within the premises of IE) and off-site (10Km radius around the IE location) were devised to manage the situations of accidents like fire or industrial sabotage.

The possible catastrophic situations, if any due to activities of the proposed IE or by any natural calamites, also have been evaluated conceptually through a *Disaster Management Plan (DMP)*.

Anyhow, detailed studies on these aspects of Emergency Preparedness, Risk Analysis and Disaster Management can be carried out only on enlisting all member units and on full-fledged commissioning of the IE.

6.2. SOCIAL IMPACT ASSESSMENT

The development of IE must be made responsive to social development of its surrounding, at large the community of Manallur, Gummidipoondi Taluk, Thiruvallur District. The people vulnerable to the said industrial activities of IE should be made to draw socio economic benefits. The available natural resources and human skill shall be positively taken care by the programs and policies of the proposed IE and SIPCOT.

6.2.1. Socio-Economic Profile

A rapid survey and review of socio-economic scenario of the project impact area have been made. The livelihood of the community and its socio-economic, cultural, health and educational status were evaluated.

The population of the district as per 2011 Census is 37,28,104 which comprises of 18,76,062 males and 18,52,042 females.

The people around the project location are largely farmers (land owned **23%** and land less **69%**). The marginal income sourced by the landless people is kept significant population under poverty line (less than **40%**). The district has good primary and secondary education infrastructure in urban and rural areas. The literacy rate is 84.03% which is higher than the same of Tamil Nadu (80.09%) and of India (73%). The literacy rate has been the major determinant of the rise or fall of the other indicators.

There is an underneath conflict present in the impact area between adi draviders, most backward sector and forward community. Anyhow, there is no visual and open communal issue that prevails in the impact area.

The demography and social details on the community in the project area were collected from Government of India; Census **2001**, and a due diligence study for the project location has been completed.

6.2.2. Cultural Profile

The cultural profile of the community is rich in its heredity without any mixing of any latest modern activities.

The people in these remote villages are having more cultural-combined with religions activities and keep their community in harmony and in strong unity, notwithstanding the religions divergences.

6.2.3. Health Profile

There are no specific diseases of concern, in common, in the project impact area. People are largely free from any kind of specific diseases and no endemic or epidemic has been found to get reported in the recent years.

6.2.4. Legislative and Regulatory setups

The Gram Panchayat and the elected representatives for local Panchayat and Municipality are strong and working together for the benefit of the peoples.

Although there is no big scale of developmental activities, their basic amenities like water, power etc., were made available. Several "Self Helping Groups" were identified which formed in the recent years and found to do well for the socio-economical upliftment of peoples.

6.2.5. Social Development Scheme

SIPCOT, the developer of the proposed IE is committed to sustain the social fabric of the community, without get harmed by the proposed industrial activities.

SIPCOT is committed to have the community participation in the design and development of the IE, through access for all information and participation framework.

SIPCOT will develop strategic plans for social up gradation plans to minimize the health and other economical livelihood risks of the peoples.

6.2.6. Health Surveillance Plan

SIPCOT will evaluate a detailed Health Surveillance Plan for the entire population around the project location, with regular health check-up and treatment through public health centre and specialized health camps.

IE member enterprises will be mandated to evolve their own HSP and to implement it through their own funds, in the project impact area.

6.2.7. Rehabilitation and Resettlement (R&R) Plans

There is no displacement of human settlement or hamlet, required for the development of IE.

The location, rather the allotted lands is entirely free from any account of human settlement. So RR plan is not required for any policy or framework of actions.

6.3. RISK ANALYSIS

The proposed **member** Enterprises in the IE, **will have significant emissio**n, will impart particulates and **VOCs**, on to ambient environment. There are **no toxic or flammable substances or gas** emission from any of the industrial activities in the proposed IE. However,

there will be storage of flammable oils at significant level, required as fuel in the processes and utilities like Boiler, DG, etc.

Synthetic Organic and Integrated Paint Industrial activities are vulnerable to lead accidents accident due to human error and mishandling of the equipments.

Requisite training, mock drill, personal safety systems and *monitoring of equipments* are the required tools for Risk or Emergency, Management Plan.

6.3.1. Risk Management Plan

Although, No credible accidents are assessed and the list of industries are not fully available, a conceptual Risk Management plan has been formulated to act positively during any accidental fire or industrial sabotage.

An **exclusive fire station** with devoted fire brigade with systems and devoted fire brigade for extinguishing the fire has been recommended as common facility shall be maintained by IE administration.

Fire fighting systems with requisite water sources, chemical storages and flexible hose lines shall be kept ready to meet any such situation of emergency.

6.3.2. Emergency Management Plan

Emergency situation may arise like emissions, leak of chemicals-gases, fire due to human error or electrical short circuit and industrial sabotages.

In the absence of any credible release for toxic substances or gas leak, the only credible cause of emergency concern is narrowed down to **"fire"**. On-site and off-site emergency plan are devised to meet such situation of exigencies.

SIPCOT will establish a Emergency Management Team in line with MoEF guidelines, as a common system in coordination with the district collector.

6.3.3. On-Site Emergency

The IE shall be equipped with **24** hours-round the clock facility of fire vehicles and manpower, stationed at one common place as centralized facility.

On-site emergency be handled and managed by exclusive team of peoples, with well assigned responsibilities.

Exclusive plans for On-site emergency can be evaluated, on getting all creditable industrial activities from the member industries. Anyhow, till such a time too, an exclusive emergency control centre shall be established in the initial stages of IE construction.

The conceptual protocol of on-site emergency control centre and its responsibilities is presented in **Fig. 6.1**.

6.3.4. Off-site Emergency plan

On establishment and commissioning of the IE, the **District Administration** shall be facilitated by SIPCOT along with member industries, to develop off site emergency management plan.

The **Crisis Management Groups** be formed at IE, Taluk and District level for managing such situations of Emergency.

Perhaps, revised and wholesome studies on Risk Analysis, Emergency Management (On-site and Off-site) are to be evaluated on commissioning the IE, along with the member enterprises, district authorities and state PCB.

SIPCOT is committed for these studies and preparation of programs and active systems as per **Rules for Emergency planning, preparedness, and Response for Chemical Accidents 1996**.

6.4. DISASTER MANAGEMENT PLAN

Natural Disaster like cyclone or storm has not been reported for the project location in the historical data.

The area is plain and very less in population density. Hence, no human life or property loss has been reported in any such rain or flood conditions.

The project location is relatively far away from any possibility of Natural calamity and hence, as such, Disaster Management Plan has not been considered.

6.5. PUBLIC CONSULTATION

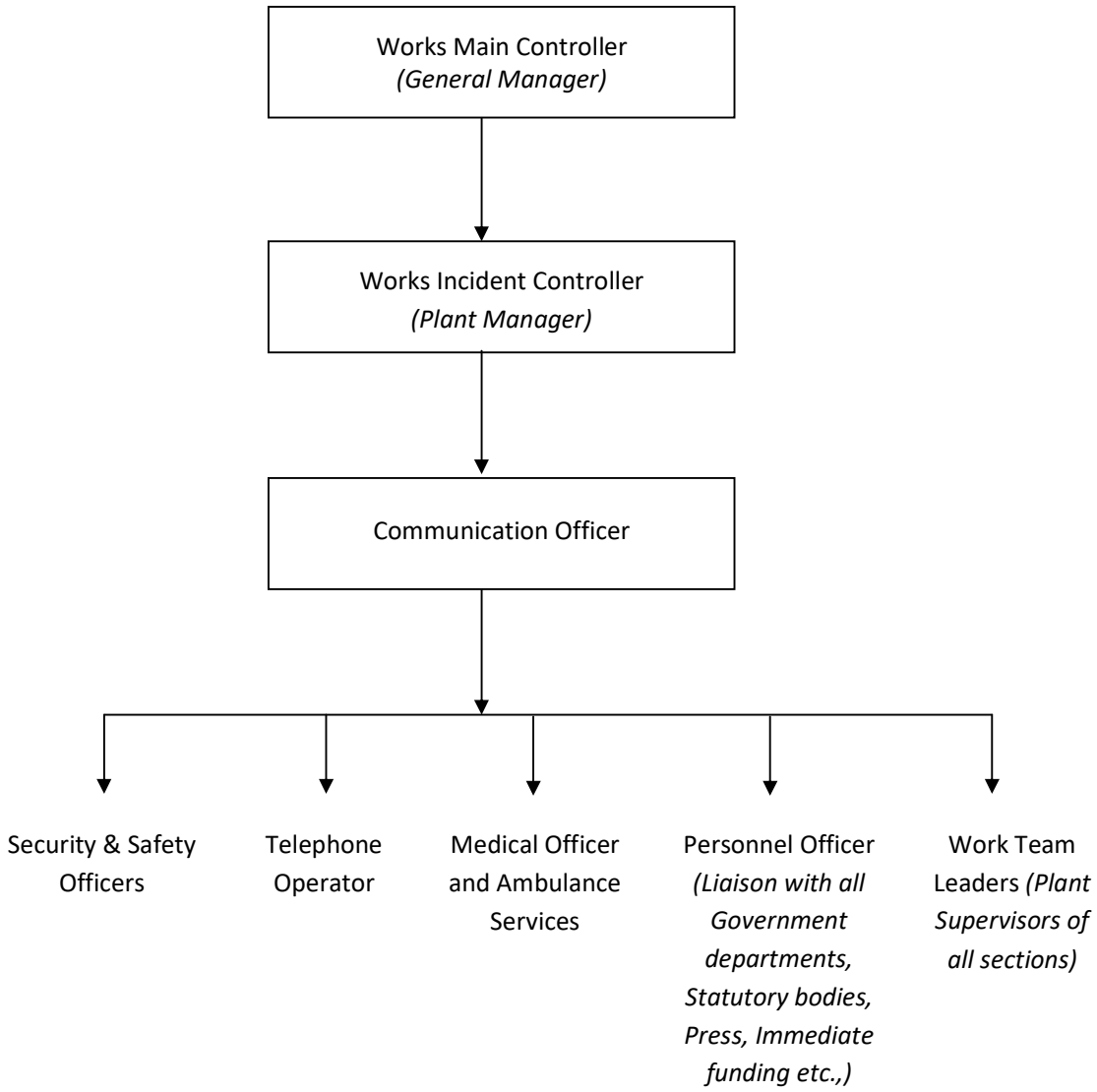
The proposed IE will **house A or B category** industrial activity like **Synthetic Organic manufacturing** and **Integrated Paint Industries**

Even though, the total area for IP development is, which is less than **500 Hectares**. Hence, the proposed IE is considered under **A** category.

The proposed IE will not house any Industry which requires EC

Public Consultation prior to EC is not required as per EIA Notification.

FIG 6.1 PROTOCOL OF EMERGENCY CONTROL CENTRE



CHAPTER – VII

Project Benefits

VII. PROJECT BENEFITS

7.1. GENERAL

Manallur Industrial Park (IP) is proposed to have environmentally compatible operations with infrastructures for **Synthetic Organic Chemical** and **Integrated Paint processing industries**. These classified sectors of industries covers **Pharma, Polymer, Pesticides, Paints, Dyes and alike industries**. Also, it will have other ancillary engineering industries and others to support the operations of these two sectors of industries. SIPCOT intends to address the demanding requirements for promoting Synthetic Organic Chemical (**5f**) and Integrated Paint processing industries (**5h**) in North Tamilnadu.

Already an exclusive IP is operational for Synthetic Organic Chemical and Integrated Paint processing Industries at Cuddalore, Tamilnadu. That IP is pre Notification and operational for the last four decades and presently fully occupies to demand additional land mass.

The proposed project location of Manallur is in Thiruvallur District. Its nearness to Chennai and direct access to Karnataka and Andhra Pradesh by NH Roads, Ports and Railways is the major advantageous reason for the present proposal of SIPCOT.

The land mass of **286.065 ha** is vacant, government owned and unutilized and has been already delineated to SIOCOT for establishment of the proposed IP. The allocated land is barren without any agricultural activities.

SIPCOT intended to promote the IP as a showcase model Synthetic Organic Chemical and Integrated Paint processing Industries incorporating environmental infrastructures of green belt, solid waste management, road which will enable the Synthetic Organic Chemical and Integrated Paint processing member industries to have their operation in compliance to Environmental Acts.

The human environment is significant as the human settlement in the core impact area of 10 Km radius from the project location is already industry oriented in the absence of agriculture for want of water. There will be an opportunity for job at different cadres and work force for not less than 1 lakh due to the proposed member industries. IP is assessed to make a strong net positive impact on the socio economic status of the surrounding human environment and increased inflow to the exchequer of Tamilnadu Government.

7.2. PHYSICAL INFRASTRUCTURES

The proposed Manallur IP will have infrastructure to facilitate sustainable operations of Synthetic Organic Chemical and Integrated Paint processing industries, which will enhance the overall development of infrastructures in Thiruvallur district. Hence, Government of Tamilnadu is very keen as part of their industrial development plan for promoting this IP with a committed budget allocation and timeframe.

The proposed IP will eventually improve the public infrastructures like roads, water, power line, drainage lines, tele communication, etc., in the project impact area. The existing roads will also be suitably widened and this will eventually enhance the existing domestic lines.

7.3. SOCIAL INFRASTUCTURES

The nearby village community in view of the likely interference by the activities of the proposed IP in the Post Project Scenario, is need not be worried upon as no activities of IP will have interruption to their agriculture and other existing activities.

The existing agricultural land will not be disturbed by any activity of the proposed IP.

SIPCOT is committed to do every possible associated activity to enhance the social infrastructures of the local community.

The proposed IP and its member industries will accommodate the educated local youths for possible employments. SIPCOT will devise an exclusive Corporate Social Responsibility (CSR) plan to improve upon the social infrastructures and progressively contribute to the social growth of the nearby village community around the project location.

7.4. WATER & WASTE WATER REUSE/RECYCLE

SIPCOT will avail water at 1MGD from Metro Water through the existing pipelines from their approved sources. No member industry will be permitted to have any independent bore wells.

The most important and salient feature of the proposed IP will be independent ETP as ZLDP to reclaim water at more than 60% for recycle and reuse which will offset the requirement of virgin water.

The ZLDP will prevent the stress on the existing fresh water sources. SIPCOT will envisage a

scheme to share some water with the local public for their domestic use, in consultation with the Collector, Thiruvallur.

Government of Tamilnadu will further promote project location for industrial development with the proposed IP.

7.5. EMPLOYMENT

IP will enable more than 1,00,000 people to draw benefit of employment directly and as well through indirect sectors like housing, cargo handling, transportation, educational institutes, hospitals, hotels etc.

SIPCOT in coordination with the candidate industries will improve the employment potential directly in its activities of processing, purchase/sale, management, etc., and will also indirectly enable the community to have alternative earnings through opportunities of hotels, travels, transfer of cargo, etc.

7.6. INDUSTRIAL GROWTH POTENTIALS

SIPCOT has demanding reasons to promote this IP at a place nearer to Chennai as Government of Tamilnadu has several requests for such IP from tiny sector to corporates. In such demanding situations, SIPCOT proposes this IP to promote industries which eventually enhance the growth potential of Thiruvallur District.

7.7. NATIONAL GROWTH

The export potential for finished and semi-finished Synthetic organic Chemicals and Paints is ever growing and Tamilnadu is known for its quality produce and already in the international Synthetic Organic Chemical generation map. Hence, the proposed IP will have other extended and spilling effect in the other adjoining districts and will take country in the global map for quality Synthetic Organic Chemicals like Pharma, Dyes, Polymer and Integrated Paint processing products.

CHAPTER – VIII

Environmental Cost Benefit Analysis

VIII. ENVIRONMENTAL COST BENEFIT ANALYSIS

8.1. GENERAL

The proposed Manallur Industrial Park (IP) is an Industrial infrastructure of developed industrial plots. SIPCOT envisages the proposed IP as a showcase model of Industrial Park (IP) for sustainable of water management Practices in Synthetic Organic Chemical Integrated Paint processing industries.

The proposed location is precisely a compatible land with advantages of having two Industrial Parks, nearby within 50 Km of distance. The proposed land stretch is vacant, unclassified and government owned. The allocation of lands was already made by government to SIPCOT for project execution. The land mass is fully devoid of any human settlement and hence would not require any Resettlement & Rehabilitation (R&R) schemes.

SIPCOT is committed to comply with the Central and State Government Guidelines, Acts and Notifications on environmental management. The Environmental cost benefit analysis, anyhow, carried out conceptually to sustain the superior environmental results at a lower overall cost to society to reap the benefits.

The Environmental Cost Benefit Analysis (CBA) is to evaluate the feasibility, on the account of Environmental Economics, of the proposed IP under the purview of Environmental Acts and Notifications.

The CBA assessment is not just on the basis of money value or expenditure and income. Rather, it is based on the cost to ensure the quality of environmental attributes to sustain while the project is executed and operated. It is conceptually evolved to ensure better environmental quality and socio-economics of the human environment in the IP area and the proposed IP is more focused or concerned with water environment through advanced technology based plants and sustainable strategies. The proposed initiatives of SIPCOT is to support Government of Tamilnadu to promote Synthetic Organic Chemicals and Paint manufacturing industries in an environmentally compatible location for a net positive score on any account of CBA.

8.2. COST OF ACTION Vs COST OF BENEFIT

The use pattern and value of available land and command area is being optimized with the proposed IP. The use value of the available resources get enhanced and incorporated with state of the art technological implements.

The project cost of budgetary estimate at **INR 250** Crore is highly justifiable from the expected promotion of **5(f)** and **5(h)** categories of industries. There will also a significantly benefit in terms of enhanced industrial development which will eventually benefit the socio economics of the project location.

The cost on Environmental Management Plan (EMP) and annual budget for the implementation of Corporate Social Responsibility (CSR) plans are the critical components in the CBA to make the IP, environmentally sustainable.

8.3. ECONOMIC VALUE OF ECOSYSTEM

The likely physical changes in the location ecology and impact environment are assessed for minimum and non-disruptive in its characteristics to the prevailing environmental conditions by ground truthing exercises and interpretation of environmental and activity data. Nevertheless, the changed environmental behavior and response shall be economically valued.

The implementation of EMP is to ensure the sustenance of the prevailing environmental quality despite the impacts of the activities from the proposed IP.

The Index of **Total Economic Value** (**TEV**) is only conceptual and for such Industrial Infrastructural development project as IT, it will remain as a "**myth**

The elaborate work on CBA shall be made on assessing the complex account of environment and the infrastructures of proposed IP.

8.4. VALUING HEALTH AND LIFE

The value index of health of people around the project location is governed by **"Value of a Statistical Life"** (**VoSL**). The transfer of VoSL from the non-environmental context to environmental context is an issue to be resolved.

The baseline data observed in Chapter-IV suggests that community in the project impact map is free from any kind of specific diseases, pertaining to any exclusive source of pollution. The

health records found in the **Primary Health Center** (**PHC**) are not suggesting any localized disease or any common health disparity.

Age is very relevant for valuing future health risks. So, the impact value on children and bringing into the domain of CBA is more important, with a default position being to use the adult valuations of "Own" life risks for the risks faced by children.

8.5. CBA-PROJECT ESTABLISHMENT

The value Environmental CBA can be evaluated by incorporating the cost on EMP and also cost on CSR as primary components with the financial feasibility of the establishment of the proposed IP. As the lands are allocated from Government, the saving on land purchases by SIPCOT shall be spent on EMP and CSR.

The cost on the construction of proposed infrastructures for industrial plots has got justified with enhanced Industrial development objectives and the values of Socio Economic growth of Thiruvallur District, in particular. SIPCOT is committed to evaluate a detailed Cost Benefit Analysis to sustain the demands for member industries for their sustainable development in the project location.

Anyhow, as stated earlier, SIPCOT will not formulate its Environmental Policies and Programs on the basis of CBA only. Rather, it will do so on the basis of statutory requirements and Socio Economic development to ensure inclusive growth of the Project location. More precisely, cost on EMP and annual budgets for CSR will be inbuilt in the financial-expenditure framework of the proposed IP, by SIPCOT.

CHAPTER – IX

Environmental Management Plan

IX. ENVIRONMENTAL MANAGEMENT PLAN

9.1. GENERAL

An exclusive **Environmental Management Plan (EMP)** is envisaged with a comprehensive framework of action plan for implementing the proposed IP with all infrastructures to ensure the environmental performance so as to prevent pollution and keep up the environmental attributes of the project location.

The EMP is devised for three different phases of the proposed IP implementation, viz.,

- *Planning and Designing Phase*
- *Establishment and Construction Phase*
- *Operation and Maintenance Phase*

Requisite **EMP** framework shall be in force, right from site earmarking and development. Perhaps, the course of activities shall continue for ensuring the sustainable performance of the IP. The water supply, effluent treatment, Zero Liquid Discharge, emission control and solid waste management are the environmental concerns which require to be addressed by SIPCOT through state of the art systems in compatible conditions.

The Synthetic Organic chemicals and integrated paint processing are, *per se* to have high-end products and required to have global standards of Environmental Performance.

Environmental Management Systems (**EMS**) is the environmental Policies and programs for SIPCOT, being the project implementation agency, along with required coordination of the member industries towards effective environmental management to meet the statutory requirements under Environmental laws. This will have engineered plants and systems for collection, transfer, treatment and monitoring of all residues of activities in the proposed IP and periodical monitoring the natural terrestrial resources.

Environmental due - diligence, Site development, Technology alternatives for The Synthetic Organic chemicals and integrated paint processing industries with respect to chemicals and machineries, Effluent Treatment Plant, Water recycle and reuse lines and Zero Liquid Discharge are the Core of environmental management activities of the proposed IP.

9.2 EMP - PLANNING AND DESIGNING PHASE

The proposed IP with ZLD infrastructures shall be planned for its environmental sensitivity, regulated and compatible environmental conditions, pollution control and monitoring systems. Exclusive documents on Risk Assessment and Disaster Management Systems are required to establish the proposed IP.

The establishment activities of these infrastructures shall be compatible to the environment conditions and people around. The existing land boundaries are primary important in sizing the extent of project line for IP and ancillary infrastructures.

EMS is framed to have explicit environmental policy with environmental performance objectives for pollution prevention and sustainable operation.

9.2.a. IP Siting

The location was chosen based on a detailed and comprehensive analysis of three different places and on the basis of weightage index scored. Manallur, the proposed location is well away from human settlement and still close to direct access of the National Highways.

There is no R&R problem or any agriculture in the proposed land bank of around 300 Ha and its immediate surroundings. The land is barren and uncultivated.

9.2.b. IP Land Use Pattern

The physical features like its zone classification, as defined under EIA Notification, 2006 have been contemplated through extensive field survey and soil conditions.

9.2.c. IP- Building Infrastructures

All buildings are envisaged to be built largely using pre fabricated structures, except for foundation. The constructions of buildings are the respective responsibilities of the member industries. They will be mandated to obtain necessary permits before construction activities from Directorate Town & Country Planning (DTCP) or Village Panchayat, as the case may be.

The roads will be paved and required spaces will be allocated by SIPCOT for managing water and power supply systems to all member industries.

9.2.d. Zero Liquid Discharge

The effluent must be collected, treated, and reused by recycling. Any residues out off solids-separation (sludge) are disposed through approved TSDF.

The member industries shall submit an appraisal report on effluent management by any MoEF approved Environmental organization. This will remain a pre-requite document for applying for land allotment by SIPCOT.

Member industries will be mandated to submit a "**Zero Disposal**" Scheme on a detailed effluent management plan. SIPCOT will initiate a joint monitoring preparation of "Zero Waste" from all member industries through a Joint Action Committee of SIPCOT and member industries.

9.3. EMP-ESTABLISHMENT AND CONSTRUCTION PHASE

The establishment and construction of MIP involves very elaborated works at site viz.,

- Site earmarking
- Construction of Buildings & Environmental Infrastructures
- Water supply & Reuse Lines
- Effluent collection lines

9.3.a. Site earmarking

The geo reference ear marking of the project boundary with proposed IP lay out with specific allocation of lands for other infrastructures will be exclusively carried out to ensure the entire IP.

9.3.b. Construction of Buildings & Environmental Infrastructures

Except for foundations, roads and water tank and ETP facilities, all other structures will be ready to built and assemble systems of pre-fabricated structures to avoid impacts of construction debris, transportation dust, etc., while project establishment.

9.3.c. Water supply & Reuse Lines

SIPCOT will ensure the pipes are all out special reinforced plastic pipes to work against external salty environment.

9.3.d. Effluent collection lines

The effluent collection lines from all member industries will be off special reinforced plastic pipes to work against corrosion and laid above ground with special surface coating to sustain the external salty environment.

9.4. EMP - OPERATIONS AND MAINTENANCE PHASE

SIPCOT will have very elaborate program of schedule and plan of actions for a detailed EMP, for the monitoring and augmentation phase, in consultation with the member industries.

The monitoring and maintenance of these structures will be on annual basis.

The **EMP** for **IP** will, anyhow, largely for

- Water Supply & Distribution
- Effluent Treatment Plant & Recycle line
- Environmental Monitoring
- Solid Waste Management

9.4.a. Water Supply & Distribution

Water for 1 MGD to meet the requirements of the member industries will be outsourced and there will not any bore well in the project area.

The distribution network will be a common facility, will be operated by SIPCOT.

This will fully avoid any stress on the water environment of te project location

9.4.b. Effluent Treatment Plant & Recycle line

The effluent treatment and water reclamation from the treated effluent are the two major objectives of the proposed IP. The salient features have been already discussed and presented in Chapter-II.

The Effluent Treatment Plant is envisaged as a **Physico Chemical Treatment Plant** with a two-stage, **Pressure Filter System,** in series. Each unit operation shall be monitored for its influent and effluent flow rates, pH, Solids (TSS & TDS) and COD on daily basis.

The proposed effluent treatment plant will reclaim water from the treated effluent through RO plants. The monitoring Protocols will be suggested by the Plant supplier on the Turn Key basis.

All member units will be mandated to have water meters and flow measuring devices with auto data logging systems for effluent and water recycle lines.

9.4.c. Emission Control and Monitoring

Emission stacks are specific to industrial operations and respective member industries.

However, SIPCOT will coordinate with State PCB to establish a continuous AAQ Monitoring station with data logging and transfer systems.

AAQ data will be transferred to State PCB Interface for continuous monitoring. A Micrometeorological Station shall be installed by SIPCOT and continuous data on Wind, Temperature, Relative Humidity and Rail fall.

9.4.d. Solid waste Management

Solid waste of assessed 10 TPD, generated from the general area, roads and gardens including canteen will be collected and transferred to the approved Municipal Solid Waste Management or else SIPCOT will set up its facility through renowned agencies by out sourcing their services on annual contract basis.

The hazardous waste from member industries and sludge from ETP operations will be sent to offsite TSDF for proper management.

9.4.e. Monitoring of Biodiversity

Biological monitoring program for assessing the flora and fauna community in the project area spread of 10Km radius shall be carried out by MoEF&CC approved agencies.

The EMP and EM is a regular and coordinated process and have to be managed by exclusive environmental division in the SIPCOT Administration. The division should be equipped with well qualified and trained manpower such as environmental engineers, marine geologists, marine chemists and marine biologists.

In addition, the SIPCOT should undertake the Environmental Monitoring activities through a recognized and experienced research institution. The environmental monitoring data has to be informed to the public through website, updated daily during construction period and weekly during operational period in order to maintain the transparency in environmental management and also to focus the commitment.

9.5. ENVIRONMENTAL CELL

An exclusive set up of executives and a team of skilled peoples will be formed as core active group as **Environmental Cell**.

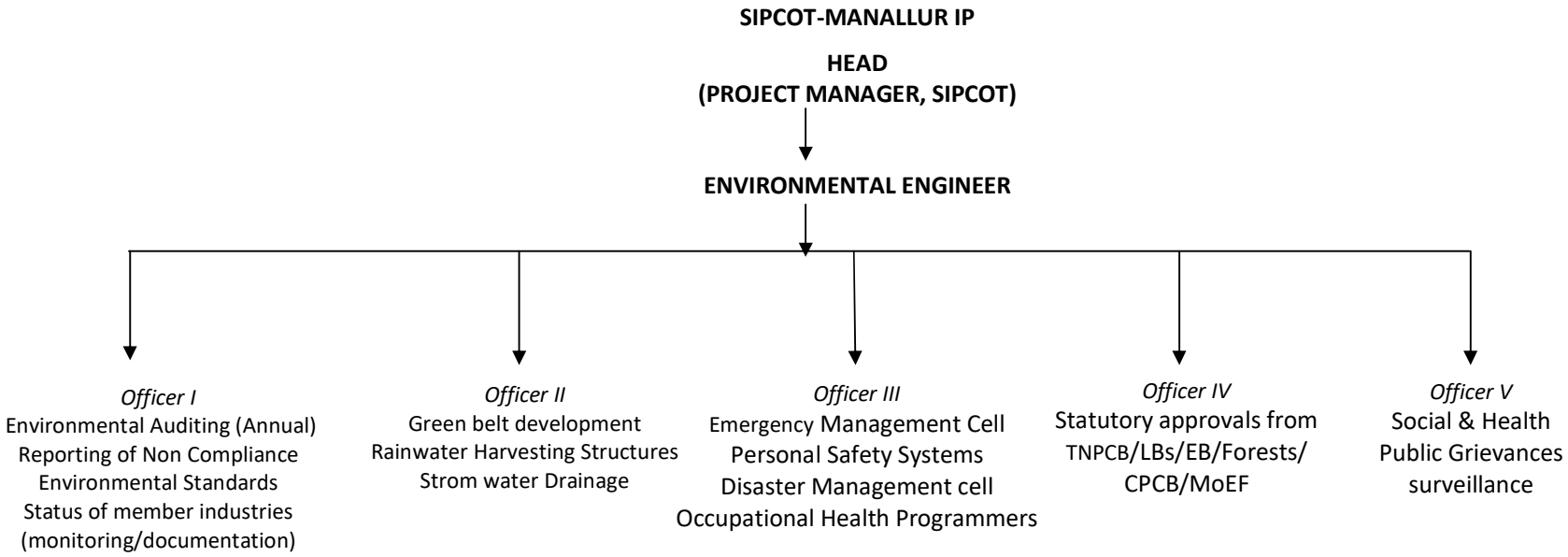
The cell will have a head with approvals for financial allocation, and responsibility drawn.

The cell will evaluate the **EMP** on annual basis and will envisage a budgetary allocation to implement from the **MIP** administration.

The Cell shall have Executives from SIPCOT and selected member industries in it.

The Protocol of Environmental Cell is presented in **Fig.9.1.**

Fig. 9.1. PROTOCOL OF ENVIRONMENTAL CELL



CHAPTER – X

Environmental Monitoring Program

X. ENVIRONMENTAL MONITORING PROGRAM

10.1. GENERAL

Environmental monitoring, continuous and as well on periodical basis, is very important to plan strategies to comply with Environmental Standards as well to Water and Air Acts. Ambient air shed and water environment are very important attributes to be monitored continuously while the other attributes can be monitored in the given schedule of periodicity. Environmental Clearance will impose certain project and location specific monitoring requirements and SIPCOT and the member industries are committed to comply with those conditions, if any.

The activities of Zero Liquid Discharge for reclamation of water, recycle/reuse pipelines are to be monitored for specific parameters to meet the Standards. There are emission stacks which require sampling ports for sampling of said parameters and analysis. Ambient Air Quality Monitoring for evaluating the polluting contribution of the proposed activities.

Perhaps, specific and general conditions of Consent Order from state PCB may also mandate SIPCOT to have full-fledged environmental monitoring systems for all its attributes. Monitoring also should be carried out by NABL/QCI or MoEF&CC accredited laboratories.

The post project scenario, where the IP will become functional with 5f and 5h category of industries viz., Synthetic Organic Chemicals and Integrated paints , shall be required for monitoring of environment in two different approaches viz.,

- ✓ **On Site Monitoring** – IP Area
- ✓ **Off Site Monitoring -** *(10km radius)*

The impact area of around 10 km radius from the IP shall be continuously monitored for all its VECs in regular intervals as per CPCB guidelines and Protocols of Environmental Acts.

Specific protocols shall be identified to evaluate the polluting impacts of the activities of the IP. An exclusive program of sampling and analysis of components of VECs have been devised with laboratory schedule of monitoring instruments and manpower.

The monitoring mechanism will be having two different mode viz., Continuous and Periodical. The monitoring and data logging will be advised to as per the specific conditions of PCB.

The technical aspects of monitoring schedules and programs for all installed control or mitigation systems shall be assessed and evaluated.

The Environmental monitoring for two different approaches have been devised for general assessment on the Environmental status of IP and its 10km radius of environ.

10.2. ON-SITE MONITORING – MANALLUR IP

The sources of effluent streams from Synthetic Organic Chemicals and Integrated paints processing, Effluent Treatment Plant and Zero liquid discharge systems require periodical monitoring.

The emission stacks and AAQ monitoring will likely to become a mandated independently for the member industries and as well for SIPCOT for operating the proposed IP. SIPCOT administration may prefer to avail the services of a MoEF&CC accredited Monitoring **laboratory** to conduct the environmental survey, in regular intervals as per CPCB standards for air, water life monitoring.

The objective test results of SIPCOT laboratory shall always be checked and validated with similar tests during Environmental monitoring conducted by state **PCB** or any other third party-EIA laboratory (MoEF&CC or NABL approved).

Strategic locations for locating sampling points shall be identified, in consultation with state PCB, which will change from time to time, so that the entire project impact area of IP will be always under Environmental monitoring.

A conceptual schedule of monitoring program for IP is presented in **Table 10.1.**

10.3. OFF-SITE ENVIRONMENTAL MONITORING- IP and its Environ of 10 Km

The IP and its Environment of **10km** radius**,** as its Impact area is mandated for continuous and or periodical monitoring for all environmental attributes.

The SIPCOT administration is committed to conduct the Environmental survey by its own initiatives. SIPCOT and its member industries can prefer to conduct the environmental survey through **state PCB** or through third part EIA laboratory (MoEF&CC or NABET approved) so that they can validate their own test results and can log data for statutory purposes.

TABLE 10.1 SCHEDULES FOR ENVIRONMENTAL MONITORING: ON-SITE / SIPCOT ADMINISTRATION

Sl.No.	VECs	Parameters of Analysis	Frequency of monitoring	Sampling stations
1	Air (Ambient Air quality monitoring)	PM_{10}, $PM_{2.5,}$ SO_2, NO_X, CO, NH_3	Twice in a Week	5 Numbers (1- Upwind 2- Downwind 2- Cross Wind)
2	Water	a) pH, TDS, TSS, Nitrates (Surface sources) b) pH, TDS, TSS, Nitrates sulphates, Heavy metals Hardness (Sub-surface sources)	Once in a month	2 (Surface sources) 3 (Sub-surface sources)
3	Wastewater	a) Effluent –combined flow raw/treated pH, BOD_5, COD, TDS, TSS	Once in a month	1)Raw Effluent (2) Treated Effluent from ETP
4	Soil	Acidity / Alkalinity, organic matter	Once in a month	5 Numbers (be changed as per professional advice and state PCB)
5	Noise	Ambient Noise-day time/Night time	Once in a month	5 Numbers (be changed as per professional advice and state PCB)

The consent renewal, in the scheduled time frame, shall be monitored by SIPCOT administration. The off-site environmental monitoring of the IP impact area shall be for its 10Km radius around the location. SIPCOT will have annual review on its compliance.

The schedule of environmental monitoring for Off-site is presented in **Table 10.2.**

10.4. SIPCOT-ENVIRONMENTAL LABORATORY

SIPCOT is proposing an in-house laboratory for environmental monitoring, for the quality of water and sediments. The laboratory will also have the facilities for analyzing the basic parameters of analysis for water, effluent, and recycle stream of water, air and soil.

Laboratory can assume the responsibility of maintain the documents on EMP. The compilation of data pertaining to ambient air and water environmental attributes.

The laboratory will be equipped with requisite account of instruments, chemicals, glassware and skilled man power. The laboratory be headed by an environmental engineering graduate and assisted with two chemical graduates for sampling and analysis.

The laboratory would be required an independent vehicle for transfer of sampling instruments and samples.

The instruments, chemicals and glass wares required for setting up the laboratory is presented in **Table 10.3**.

The budgetary estimate for establishing the laboratory is presented in **Table 10.4.**

The annual allocations of sound and financial independency are important. The laboratory shall coordinate with the respective laboratories in the member industries and state PCB.

The data acquisition and maintenance be continuously carried out by the laboratory. The SIPCOT laboratory shall prepare "**Environmental profile of IP"** on *annual basis* as a policy tool for preparing Environmental Management Plan for IP.

TABLE 10.2 SCHEDULE FOR ENVIRONMENTAL MONITORING: IP ENVIRON OF 10KM RADIUS

Sl.No.	Environmental Attributes	Parameters of Analysis	Frequency of monitoring	Sampling stations
1.	Ambient Air quality	M_{10}, $PM_{2.5}$,SO_2, NO_X, and NH_3 All Parameters, as per the NAAQ standards of MoEF	Once in a season	5 Number (1- Upwind 2- Downwind 2- Cross Wind)
2.	Water environment	a) pH, TDS, SSS, Nitrates (Surface sources) b) pH, TDS, TSS, Nitrates sulphates, Heavy metals Hardness (Sub-surface sources)	Once in a month Once in a month	2 (Surface sources) 3 (Sub-surface sources)
3.	Soil	Acidity / Alkalinity, organic matter	Once in a season	5 Numbers (be changed as per professional advice and state PCB)
4.	Noise	Ambient Noise-day time/Night time	Once in a month	5 Numbers (be changed as per professional advice and state PCB)
5.	Biological	Flora/Fauna	Once in a season	10 Km radius
6.	Socio-Economics	Public concern/Impact	Once in a season	10 Km radius

TABLE 10.3 SIPCOT ENVIRONMENTAL LABORATORIES, INSTRUMENTS, CHEMICALS AND GLASS WARES

INSTRUMENT	CHEMICALS	GLASSWARES
1. U.V. Spectro Photometer	1. Sodium hydroxide	1. 1000ml Volumetric flask - 4 Nos
2. pH meter	2. Phosphoric acid	2. 500ml Volumetric flask - 4Nos
3. Conductivity Meter	3. Sulphanilamide	3. 250ml Volumetric flask - 4 Nos
4. Turbidity Meter	4. N-(1-Napthyl Ethylene Diamine di-hydrochloride)	4. 100ml Volumetric flask - 4 Nos
5. BOD Incubator	5. Hydrogen peroxide	5. 100ml Measuring Jar - 4 Nos
6. COD apparatus	6. Sodium nitrite	6. 50ml Measuring Jar - 4 Nos
7. High Volume Samplers	7. Sodium tetra chloromercurate	7. 25ml Measuring Jar - 4 Nos
8. Meteorological Tower	8. Sodium chloride	8. 500ml Amber bottle - 6 Nos
9. Sound Level Meter	9. Mercuric chloride	9. 100ml Amber bottle - 6 Nos
10. Dust Fall Apparatus	10. P-Rosaniline hydrochloride	10. 50ml Amber bottle - 6 Nos
	11. Formaldehyde	11. Test tube 50ml with stand etc., -24 Nos
	12. Sodium meta bi-sulphate	
	13. Starch solution	
	14. Iodine solution etc.,	

TABLE 10.4 BUDGETARY ESTIMATES- SIPCOT LABORATYORY

S. No.	Items	Budgetary Estimate (Lakhs)
I.	**ESTABLISHMENT**	
	a) Instruments	10.00
	b) Chemicals	1.00
	c) Glass wares etc.,	1.00
	d) Table, furniture	1.00
	e) Computer, Printer, etc.,	1.00
	Total	**14.00**
II.	**ANNUAL MAINTENANCE**	
	I. Instruments/Chemicals/Glass wares	
	a) Instruments-system supports	5.00
	b) Chemicals	2.00
	c) Glass wares etc.,	1.00
	d) Accessories – Administration	1.00
	Total	**9.00**
III.	**MANPOWER**	
	Salary and Other perks	10.00
	Total	**33.00**
	Contingencies	**8.00**
	Net Requirement of Budget allocation	**40.00**

CHAPTER – XI

Summary & Conclusion

XI. SUMMARY & CONCLUSION

11.1. GENERAL

Government of Tamilnadu is keen to promote the Industrial sector for its infrastructural requirements towards ensuring sustainable development and come up with the present proposal of establishing an **Industrial Park (IP)** exclusively **for Synthetic Organic chemicals (5f) and Integrated Paint (5h)** Industries to enable them to have environmentally compatible land mass and settings.

State Industries Promotion Corporation of Tamilnadu (**SIPCOT**) is the implementing authority of the project, as the nodal agency of Government of Tamilnadu and it is committed to establish the IP in compliance to **EIA Notification, 2006** and in adherence to National and International Standards for Quality (ISO 9000 Series) and Environment (14 000 Series).

SIPCOT already have taken **Terms of Reference** (ToR) approval from EAC/MoEF&CC vide their **F.No.21-59/2015-IA.III** dated **22/07/15**. The ToR was renewed through F.No.21-59/2015-IA. III (Pt) dated 13/11/2018 by MoEF&CC.

The broad classification of Synthetic Organic Chemical Industries are having the following industrial sub-sectors, though even this list is far from exhaustive:

- ✓ Basic organic chemicals
- ✓ Dyes and Dye intermediates
- ✓ Polymer Chemicals
- ✓ Bulk drugs and Intermediates
- ✓ Pesticides
- ✓ Synthetic Rubbers
- ✓ Other synthetic organic chemicals and chemical intermediates

In general, Integrated Paint manufacturing involves various grades of Thinners, Varnishes, Exterior and Interior paints.

11.2. INTEGRATED TEXTILE INDUSTRIAL PARK

The proposed Manallur Industrial Park (IP) will have ***Chennai advantage*** for promoting Synthetic organic chemicals and integrated paint processing industries in the cluster format, with direct access for cargo movement and as well-established commercial acquaintances.

The location of IP is proposed in an environmentally compatible area in **Manallur, Gummidipoondi Taluk**, **Thiruvallur District**.

Government of Tamilnadu already delineated **286.065 ha** of land in Manallur, Thiruvallur district for the establishment of the Park. The geographical coordinates of the project location is 13^0 26' 48.15" to 13^0 27' 15.37" N Latitude and 80^0 01' 21.79" to 80^0 01' 56.24" E Longitude.

The Budgetary Estimate of the project is **INR 250 Crores**.

11.3. SUMMARY

11.3.1. ENVIRONMENTAL DUE DILIGENCE

The project Impact area of 10 Km radius around the proposed IP is found to have characteristically clean, pollution-free environment. Environmental Baseline Data was surveyed and primary data were observed during the study period of **February -March-April, 2018**. A vast data of secondary sources of government were also considered and interpreted to appreciate the prevailing environmental setting.

The AAQM was run for all the recommended parameters and observed **less than their respective permissible limits.** The water environment is not good without any notified surface sources; however, the quality has no significant variation or having any objectionable contaminants, except the natural salinity. There is an acute shortage for potable quality- water sources. The water is characterized with **moderate salinity and in few locations, Nitrates.**

The Soil is predominantly **red sandy with patches of fine clay. The soil is also have alluvial and colluvium by characteristics**. The Noise levels in all the observatory stations are observed to be well **within the permissible values for both Day and Night.**

The human environment is significant. The socio economical status is very stable though it is learnt for changes from **agriculture to industry in the last two decades.**

The project location has direct access to National Highways which can be directly connected to Port and Railways to serve traffic and ease of cargo transportation.

The Impact area has notified Reserved Forests; however, they found to continuously **lose their biological significance of both, fauna and flora, with interference with intensive anthropogenic activities and exploitation of forest reserves.**

11.3.2. AREA DEVELOPMENT- INDUSTRIAL PLOTS.

The proposed land mass of **286.065 ha** will be divided into plots of varied sizes which depends on the requirements of applicant industries.

The developmental infrastructures like **Water supply, power lines from TANGEDCO, Storm Water Collection systems, Rain Water Harvesting Systems, Internal roads** and continual administration of all these infrastructures will be succeeded by SIPCOT.

11.3.2a. Water

1MGD of water will be drawn from the existing waterlines of Metro Water and for which an agreement was already facilitated by Government of Tamilnadu.

SIPCOT will have an Over Head Water Tank to temporarily store the water and supply the member industries by gravity lines with measuring meters and monitoring systems.

11.3.2b. Effluent Treatment Plant

The effluent collection, treatment and reuse/recycle will be entirely the responsibility of individual industries on their own.

The effluent streams from the Synthetic Organic Chemical processing industries is the most important environmental concern in the proposed IP. The member industries shall submit an appraisal report on effluent management by any MoEF&CC approved Environmental organization. This will remain a pre-requite document for applying for land allotment by SIPCOT.

SIPCOT will initiate a joint monitoring preparation of “Zero Waste” from all member industries through a Joint Action Committee of Environmental Cell of SIPCOT, member industries and State PCB. Zero Waste initiatives will be mandated for all member industries in their Corporate

Responsibility of Environmental Protection (CREP).Any residual liquid waste shall be treated to have zero disposals.

The effluent management as Zero Liquid Discharge Plant to reclaim water for reuse and recycle will be the responsibility of the individual industries.

The effluent streams are largely biodegradable with significant account non-biodegradables also. Typically, **Biochemical treatment processes, Media Filtration** followed by **Membrane based Plant components having Micron Filtration, Ultra Filtration and Reverse Osmosis with Mechanical Evaporator** for reject management is the most ideal form of ZLDP for treating effluent from the synthetic organic industries.

The effluent from integrated paint industries are non-biodegradable and toxic that can be treated using **Physico-Chemical treatment processes followed by membrane based plants with Mechanical Evaporator** for reject management.

11.3.2c. Solid waste Management

The Solid waste generated from the member industries will be handled by respective industries and they will be managed in compliance to Hazardous Solid Waste Management Rules, 2016.

They will be collected, stored temporarily, transferred and will be treated and disposed, in any off-site, approved TSDF. Tamilnadu has two approved TSDF and hence industries can have their choice, depending upon the characteristics of solid waste and with permission from TNPCB.

The general solid waste from gardens and street sweepings is assessed for 10 TPD and will be disposed either through facilities of local bodies. If none is available, during the time of project commissioning, SIPCOT is committed to develop its own facility, on site for management of general waste in compliance to MSW Management Rules, 2016.

SIPCOT has allocated **10 Ha of land in the proposed IP exclusively to facilitate solid waste management**.

11.3.2d. Environmental Management Plan

SIPCOT will have joint and concerted effort with all member industries to upkeep the environmental settings in the impact area of about 10Km radius of the project location.

Project specific Environmental facilities like water, wastewater, solid waste, etc., will be managed as per the recommendations of EC and Consent Order for project operation by TNPCB.

An exclusive Environmental Cell under the Project Manager of the SIPCOT will be in place with requisite funding and manpower. SIPCOT, as the proposed IP administrator, will ensure the EMP executed by all its member industries through Environmental Cell.

11.3.2e. EMP Cost

The annual EMP Cost is assessed for **INR 1 Crore** for the operation and maintenance of all common facilities like water, power, drainage, roads, rain water harvesting structures, etc.

Additional **INR 0.5 Crore** will be exclusively spent on upkeep of green belt development and any situations of emergency like cyclone.

The annual budget of another **INR 0.5 Crore** will be exclusively made to support the health Centres, water supply, sanitation and education of the nearby population in the impact area, in consultation and coordination with district administration and State PCB.

11.3.2f. Environmental Monitoring

Environmental Monitoring will be carried out to assess and monitor all discards like **effluent, emission and solid waste** in the respective treatment strategies.

SIPCOT in coordination with State PCB will ensure the continuous of Ambient Air Quality by the member industries.

SIPCOT will coordinate with all member industries for overall Environmental Monitoring of the Impact area of the IP.

11.3.2g. Corporate Social Responsibility Plan

SIPCOT will coordinate with District Administration for necessary coordination for the implementation of all national and State programs for Social development in the villages around 10km radius of the project location.

Being an infrastructural and land development project, SIPCOT will have specific plans for developing their boundary lines with native species of trees and shrubs in order to support the prevailing eco system.

Social Responsibility of member industries will be stressed among them and in line with guidelines of MoEF & CC and CPCB and exclusive Plans will be drawn independently for all member Industries and its implementation will be ensured with the allocation of Annual Budgetary provisions.

The Environmental Cell of SIPCOT administration and Association of Member Industries will monitor with specific protocols and procedures.

11.4. CONCLUSION

SIPCOT is committed to implement a well devised EMP and Corporate Social Responsibility and will have a comprehensive Environmental Policy to enable the member industries for environmentally compatible activities to facilitate upkeep of the project impact area and its environment.

SIPCOT is committed to comply with all and any conditions of EC; and also conditions of Consent Orders from TNPCB.

SIPCOT will address all requirements for ISO 14 000 for Environmental Management Systems to ensure safe and environment friendly operations of the proposed IP for its continued operation, complementing to inclusive growth and development of socio economics of the project location.

BEFORE THE NATIONAL GREEN TRIBUNAL SOUTH ZONE AT CHENNAI

MEMORANDUM OF APPEAL

(Under Sections 16(h) read with 18(1) of the National Green Tribunal Act, 2010)

Appeal No. 34 of 2020

G. Praveena & another ....Appellants

Vs.

The Union of India & Ors … Respondents

FILE - B

Part - II

Through

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