

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED EXPANSION OF FOUNDRY UNIT FROM 2790 TPM TO 6125 TPM OF FERROUS CASTINGS AT KATHIVAKKAM VILLAGE, TIRUVOTTIYUR TALUK, TIRUVALLUR DISTRICT, TAMIL NADU

EIA REPORT FOR PUBLIC HEARING



TOR Reference No. : SEIAA-TN/F.No.7465/2017/3(a)/ToR-726/2020 Dated: 23.06.2020

Baseline period : July 2020 to September 2020

Environmental Consultant:



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NABET Accredited Category A Consultant

NABET Accredited No.: QCI/NABET/ENV/ACO/19/0957 date 16.04.2019



(Approved Consultant)



Project Proponent :



M/s. Ashok Leyland Limited
Chennai
Tamil Nadu

JULY, 2022

PREFACE

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ASHOK LEYLAND LIMITED
Chennai, Tamil Nadu

ENVIRONMENTAL IMPACT ASSESSMENT

for

**THE PROPOSED EXPANSION AND MODERNIZATION OF FOUNDRY
UNIT FROM 2790 TPM TO 6125 TPM OF FERROUS CASTINGS**

**AT KATHIVAKKAM VILLAGE, TIRUVOTTIYUR TALUK, TIRUVALLUR DISTRICT,
TAMIL NADU, INDIA**

For and on behalf of **VIMTA LABS LIMITED**

Approved by : S. Muneeswaran

Signed :



Driven by Quality. Inspired by Science.

Designation : **Senior Manager / EIA Co-ordinator**

Date : 2022/07/14

This EIA report has been prepared in-line with TOR conditions stated by SEIAA vide letter no. SEIAA-TN/F.No.7465/2017/3(a)/ToR-726/2020 Dated: 23.06.2020.

This report has been prepared by '**Vimta Labs Limited**' with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

DECLARATION

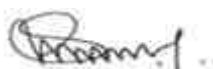
Declaration by Experts Contributing to Environmental Impact Assessment for the Proposed Expansion and Modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA Coordinator:

Name: **Dr S. Muneeswaran**


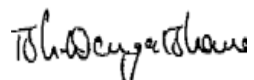
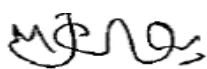
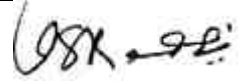
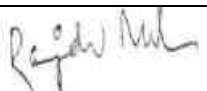
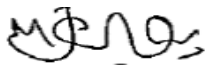
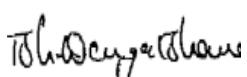
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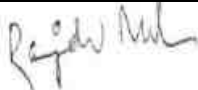
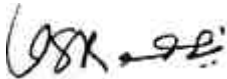


Period of Involvement: June 2020 to July 2022


Contact Information: 0422-2441577

Functional Area Experts:

Sr. No.	Functional Areas	Name of the Expert/s	Involvement		Signature
			Period	Task	
1	AP	Dr.S.Muneeswaran	June 2020 to July 2022	Selected AAQ stations based on IMD data. Identified the sources of pollution and suggested mitigation measures and management plan.	
2	WP	Bh. Durga Bhavani	June 2020 to July 2022	Selected the water sampling locations. Identified the wastewater streams and effective treatment measures are suggested.	
3	SHW	M. Janardhan	June 2020 to July 2022	Suggested effective management practices for solid and hazardous waste.	
4.	SE	Ch. Venkatesham	June 2020 to March 2022	Primary field survey conducted and prepared socio-economic and demography section.	Left the Organization
5	EB	Prof.K. Bayapu Reddy	June 2020 to July 2022	Conducted primary survey in the study area	
6	LULC	J.Rajendra Prasad	June 2020 to July 2022	Preparation of land use map using FCC of IRS RS-2 LISS-IV satellite imagery.	
7	NV	M. Janardhan	June 2020 to July 2022	Predicted noise levels using noise modelling and Suggested suitable mitigation measures for construction and operation phases	
8	AQ	Bh. Durga Bhavani	June 2020 to July 2022	Conducted air dispersion modeling using AERMOD and determination of	

Sr. No.	Functional Areas	Name of the Expert/s	Involvement		Signature
			Period	Task	
				GLS's	
9	RH	Rajgopal Krishnan	June 2020 to July 2022	Detailed risk assessment studies were conducted to identify the impact zone and suitable management measures suggested.	
10	HG	J. Rajendra Prasad	June 2020 to July 2022	Reviewed secondary and primary and identified impacts suggested & mitigation measures	
11	Geo	J.Rajendra Prasad	June 2020 to July 2022	Reviewed secondary and primary and identified impacts suggested & mitigation measures	
12	SC	Prof.K. Bayapu Reddy	June 2020 to July 2022	Involved in identification of sampling locations. Identified the impacts and suggested suitable mitigation measures.	

Other Team involved in EIA Report preparation:

Sr. No	Functional Areas	Name of the Expert/s	Involvement		Signature
			Period	Task	
1.	Team Member	M.Shaik Qadir	June 2020 to July 2022	Baseline data generation & Assisted in EIA report preparation	

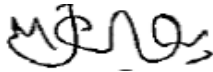
DECLARATION BY THE HEAD OF THE
ACCREDITED CONSULTANT ORGANIZATION/AUTHORIZED PERSON

I, M. Janardhan, hereby, confirm that the above-mentioned experts prepared the **Environmental Impact Assessment for the Proposed Expansion and Modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu**

I also confirm that the EIA Coordinator (EC) has gone through the report, and the consultant organization shall be fully accountable for any misleading information.

It is certified that no unethical practices, plagiarism involved in carrying out the work and external data/text has not been used without proper acknowledgement while preparing this EIA report

Signature:



Name : M. Janardhan

Designation : Head & Vice President

Name of the EIA Consultant Organization: Vimta Labs Limited, Hyderabad

NABET Certificate is Valid till **27th March, 2023** as per letter No. QCI/NABET/ENV/ACO/21/2194
Dated: December 30, 2021

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CHAPTER - 1

INTRODUCTION

 ASHOK LEYLAND	<p align="center">Environmental Impact Assessment for the Proposed Expansion and Modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</p> <p align="right">Chapter - 1 Introduction</p>
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1.0 INTRODUCTION

1.1 Purpose of the report

M/s. Ashok Leyland Limited (*Formerly known as Hinduja Foundries Ltd*) proposes to increase their manufacturing capacity of ferrous castings in their existing premise. The industry is situated at 39A & 39B at Kathivakkam village, Tiruvottiyur taluk, Tiruvallur District, Tamil Nadu.

The existing plant has been operating in a company owned land area of 13.86 ha (34.25 acres) which features furnace, sand preparation and mould making divisions. The furnace division comprises 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace to produce castings of 2790 TPM. The company has obtained Consent to Operate granted under Air & Water Act from TNPCB for the existing unit which is valid up to March 2024.

Presently, the industry has proposed to increase the manufacturing capacity of ferrous castings from 2790 TPM to 6125 TPM. The projected production will be achieved by the existing 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace and other supporting equipment's. The enhancement in the production doesn't require an additional area hence, the existing land would be sufficient to carry out the expansion activity. The estimated total cost for the proposed expansion is Rs. 15.0 Crores.

In order to obtain Environmental Clearance from State Level Environment Impact Assessment Authority (SEIAA) and Consent for Establishment (CFE) from the Tamil Nadu Pollution Control Board (TNPCB), Environmental Impact Assessment (EIA) report with detailed Environmental Management Plan (EMP) is essential as per the EIA Notification 2006 and its subsequent amendments.

As per the Environmental Impact Assessment Notification dated 14th September 2006, the proposed expansion project falls under the **Schedule No. 3(a) [Metallurgical Industries-Ferrous and Non-ferrous]**.


Considering the project activity, nature the project proposal falls under the **Category 'B1'**. The project was considered in the 153rd SEAC meeting held on 04.06.2020 and subsequently in the 382nd SEIAA meeting held on 23.06.2020 received TOR vide letter No. **SEIAA-TN/F.No.7465/2020/3(a)/ALL/TOR-726/2020** dated **23.06.2020** and the EIA report has been prepared in line with the ToR conditions obtained. The copy of Terms of Reference (ToR) and subsequent amendments are attached as **Annexure I** and the compliance to ToR is attached as **Annexure I(a)**.

M/s. Ashok Leyland Limited has availed the services of M/s. Vimta Labs Limited, Coimbatore to undertake Environmental Impact Assessment (EIA) studies for assessing the impact of the proposed expansion on various environmental parameters in the study area and to prepare an Environment Management Plan for negating the adverse impacts of the proposed expansion project.

1.2 Identification of Project & Promoter

1.2.1 Identification of the project

As per the direction of the TANGEDCO/ Central Electrical Authority (CEA) in 2002 the unit was forced to change the Cupola and Arc furnace to Induction furnace in order to avoid the harmonic generation by the High-Tension Industries. Even after the installation of Induction furnace (5 Nos) the production of ferrous castings is remains to be same as the consented quantity of 2790 TPM. The company has

 ASHOK LEYLAND	<p align="center">Environmental Impact Assessment for the Proposed Expansion and Modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</p> <p align="right">Chapter - 1 Introduction</p>
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obtained Consent to Operate granted under Air & Water Act from TNPCB for the existing unit. The Induction furnaces were installed without any prior information to the TNPCB which falls under the violation category of the Environment Protection act 1986.

1.2.2 Identification of Project proponent

M/s. Ashok Leyland Limited, Foundry Division (herein after referred to as ALL) established at Ennore in 1961 is a part of Ashok Leyland, India's largest foundry group. Earlier it was known as Hinduja Foundries Ltd. From castings for automobiles and tractors to industrial engines, construction equipment and power generation equipment, Ashok Leyland Foundries meets the stringent requirement of diverse segments. It even caters to the exceptionally high standards of Defense applications.

The erstwhile Hinduja Foundries Limited was amalgamated with Ashok Leyland Limited pursuant to the Order of the National Company Law Tribunal (NCLT) vide Order dated April 24, 2017. The NCLT order was filed with the Registrar of Companies, Chennai on April 28, 2017 and the scheme became effective on April 28, 2017. The amalgamation is effective from the appointed date of October 1, 2016.

1.3 **Brief Description of the Project**

1.3.1 Nature and Size of the Project

The existing plant has been categorized under "**Red- Large**" Category [**2063 - Steel and steel products using various furnaces like blast furnace/ open hearth furnace/ induction furnace/arc furnace/ submerged arc furnace/ basic oxygen furnace/ hot rolling reheated furnace**] as per the latest notification released by Tamil Nadu Pollution Control Board.

1.3.2 Size of the Project

The total cost of the for the proposed expansion and modernization of foundry unit is Rs. 15.0 crores/-

1.3.3 Location of the Project

The plant site is situated at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu. The plant site is about 15.5 km (SSW) from Chennai and 46.5 km from Tiruvallur district (West). Nearest habitation Ennore and Kathivakkam is about 0.02 km (NNE) and 0.35 km (NNW) from the plant site. The site is adjacent to the SH-114 Connecting Chennai and Ennore. The nearest Railway station is Ennore R.S at a distance of 0.38 km in NNE direction. The Nearest Airport is Chennai International Airport at a distance of 29.0 Km in SW direction.

The Index map of the plant site is shown in **Figure - 1.1**. Similarly, the toposheet of 10 km radius is shown in **Figure - 1.2**. Topographical map of 10 km and 5 km radius prepared using Google Earth are shown in **Figure - 1.3** and **Figure-1.4** respectively. **Figure-1.5** shows the adjoining properties and the aerial view of the plant site are shown in **Figure - 1.6**

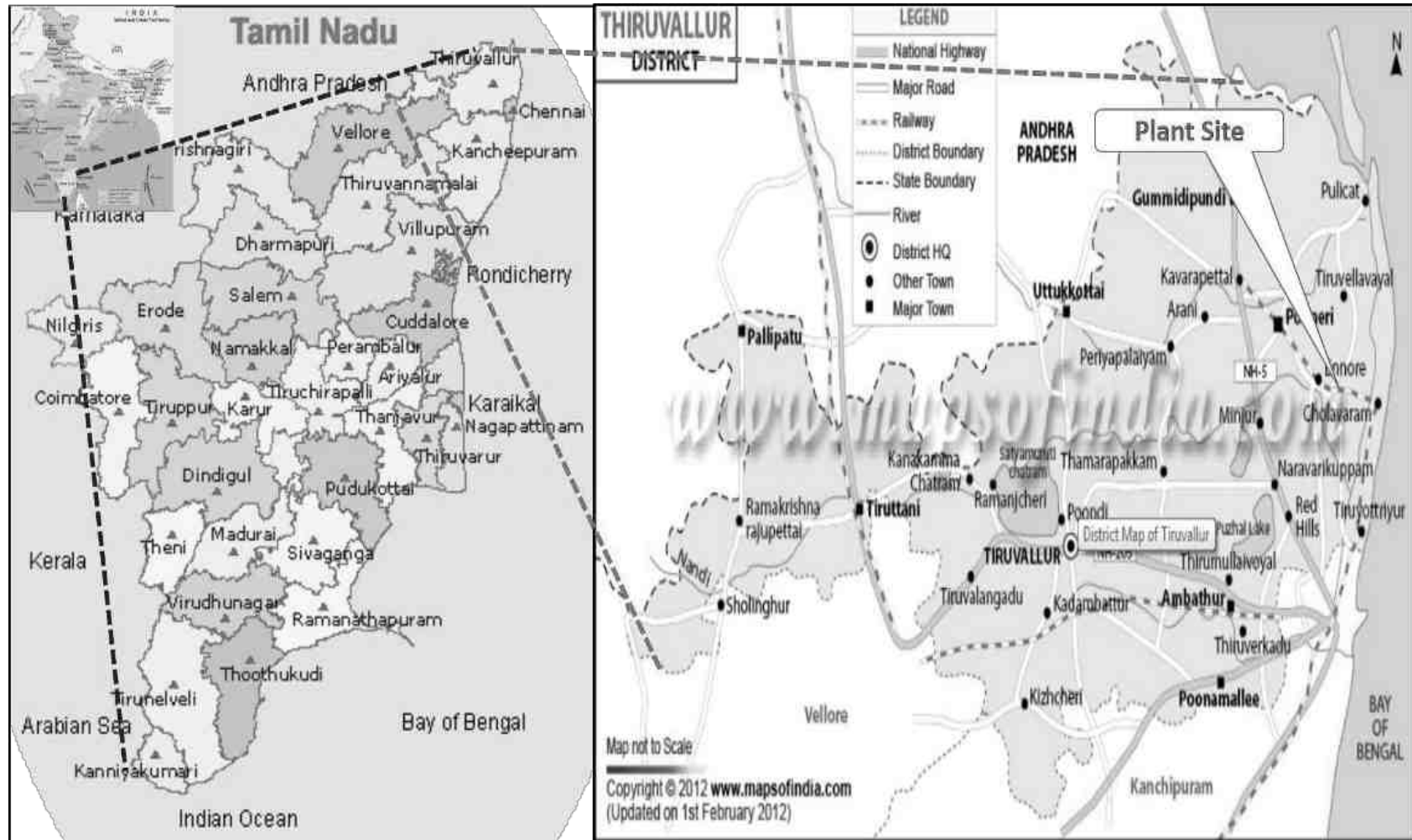


FIGURE-1.1
INDEX MAP OF THE PLANT SITE

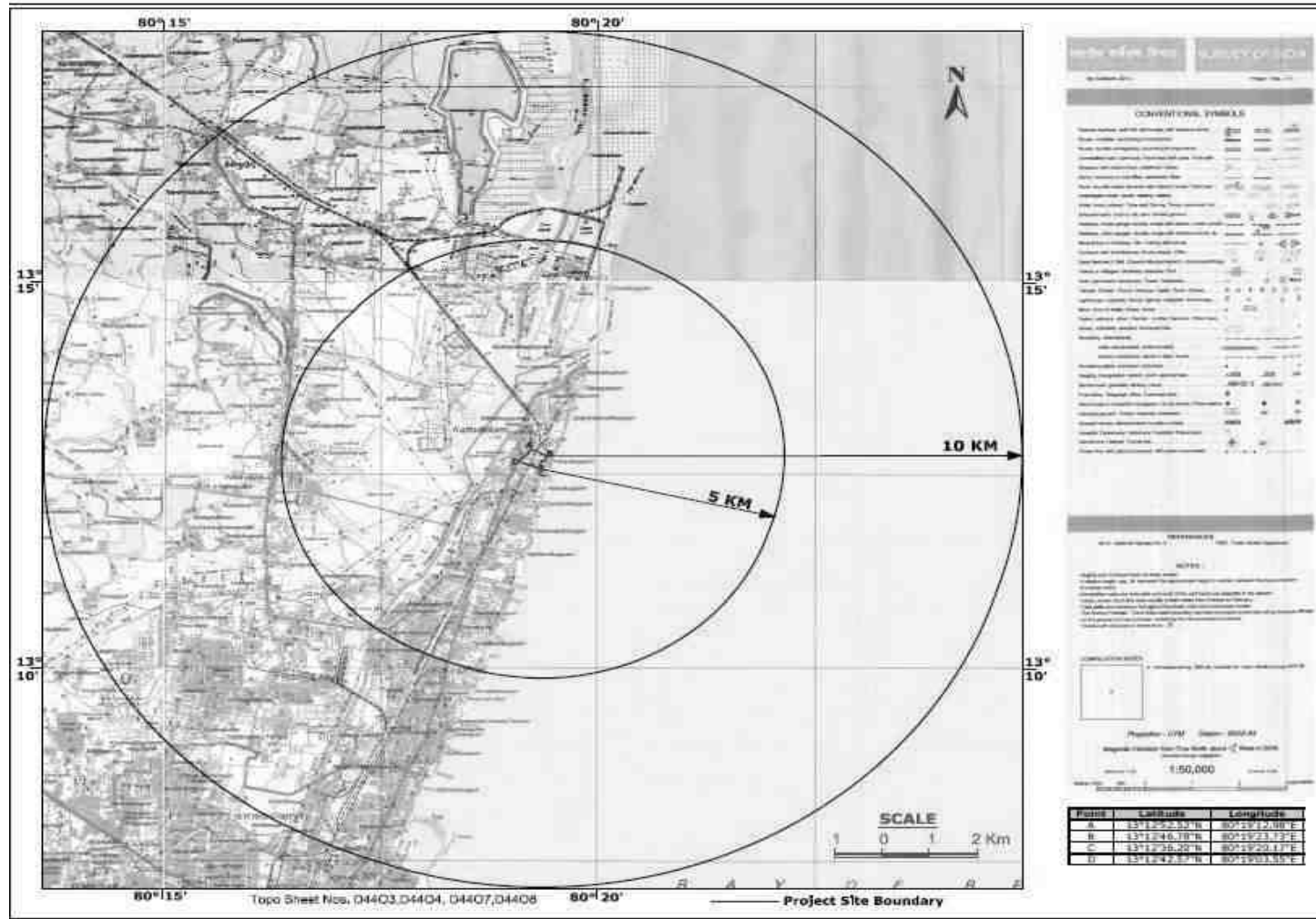


FIGURE - 1.2
10 KM RADIUS TOPOMAP USING SURVEY OF INDIA TOPOSHEETS



FIGURE - 1.3
10 KM RADIUS TOPOMAP USING GOOGLE EARTH



**FIGURE - 1.4
5 KM RADIUS TOPOMAP USING GOOGLE EARTH**



FIGURE - 1.5
ADJOINING PROPERTIES TO THE PLANT SITE

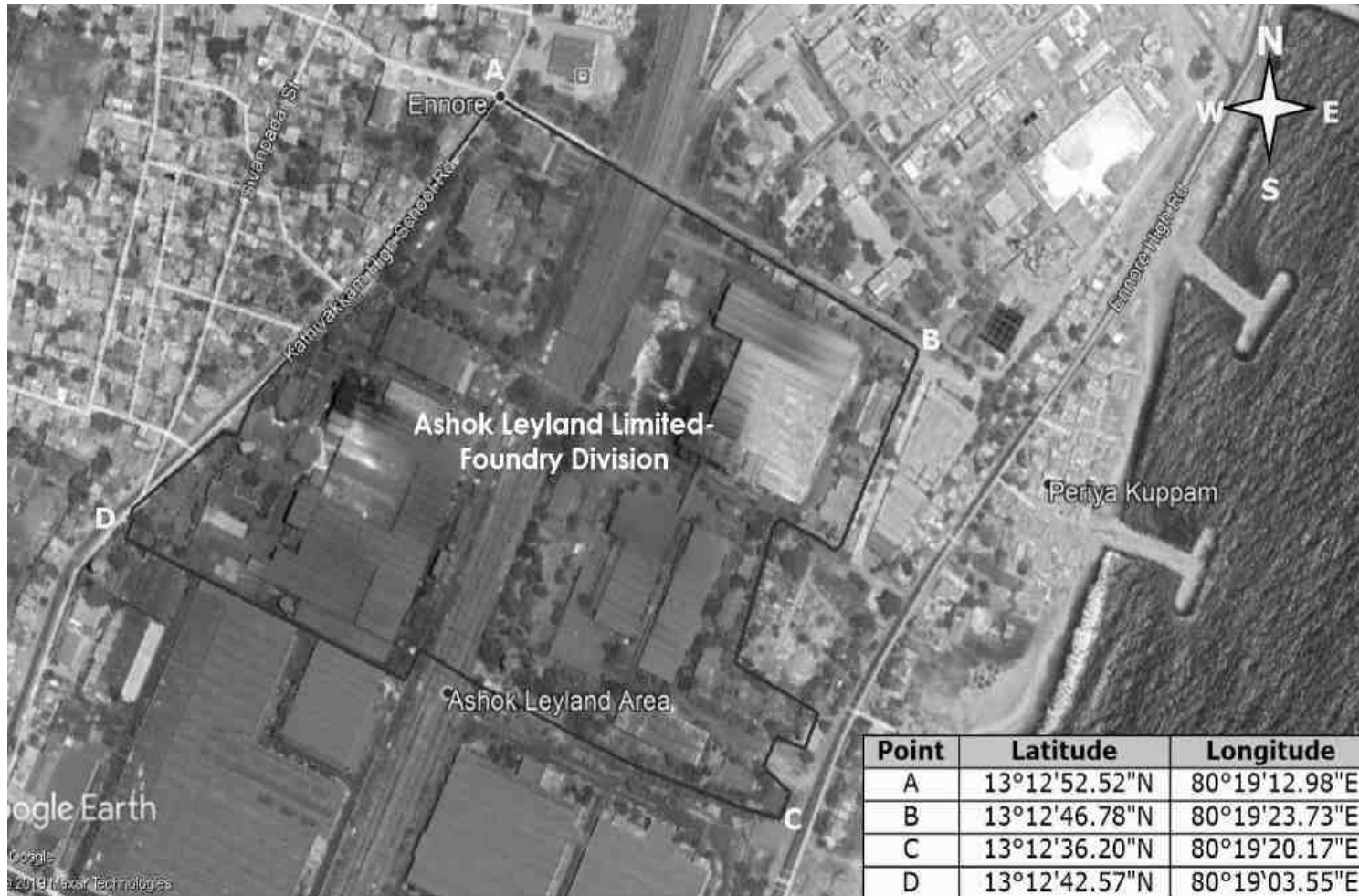


FIGURE - 1.6
AERIAL VIEW OF THE PLANT

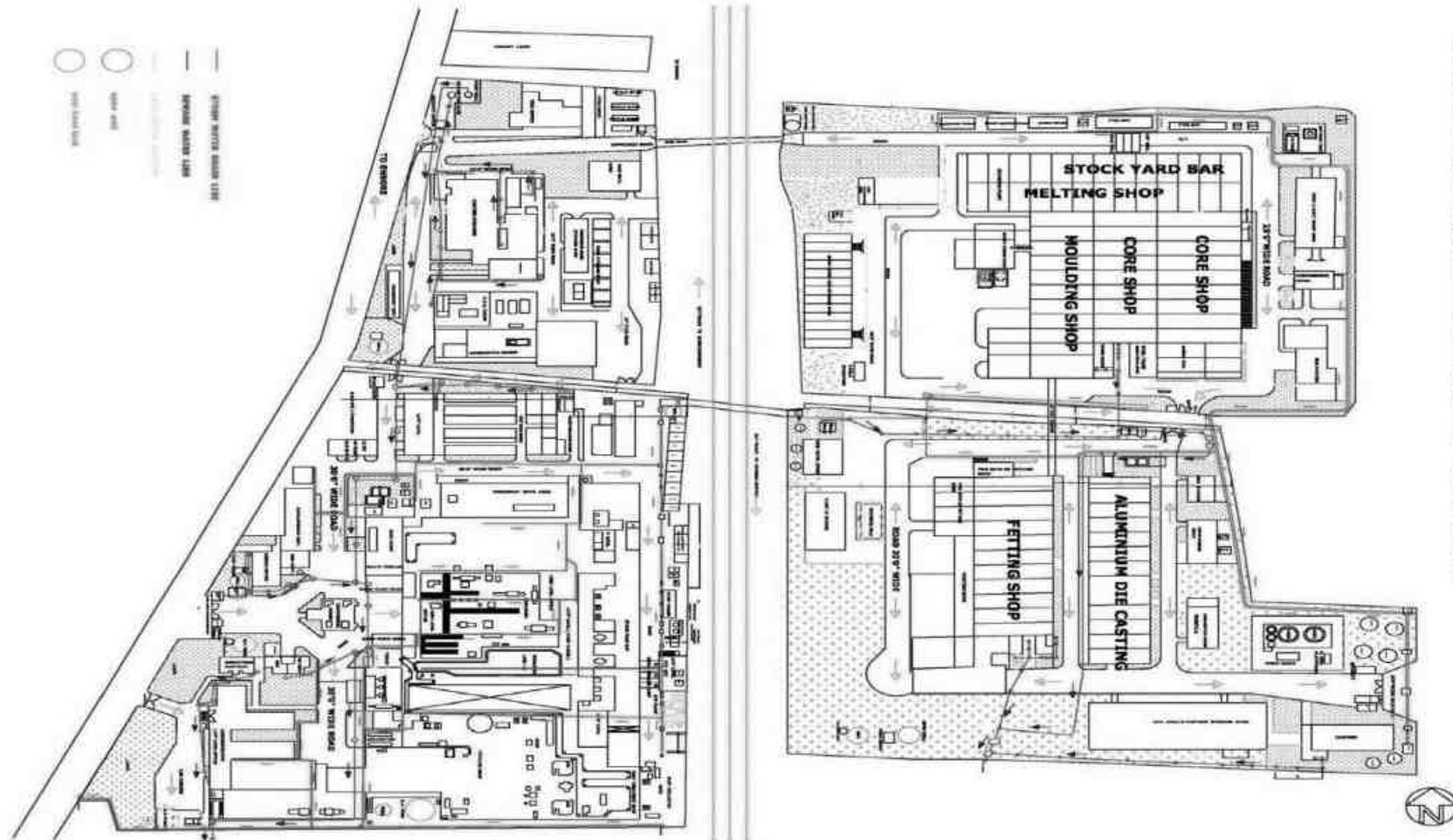


FIGURE-1.7
LAYOUT OF THE PLANT SITE

1.3.3.1 Advantages of the Location

The proposed expansion of the foundry unit is carried out based on the following criteria

1. The existing plant area is located in Industrial Land use zone;
2. The land area of 13.86 ha (34.25 acres) is already under the ownership of promoters which is sufficient to carry out the proposed expansion;
3. No forest land is involved;
4. No crop land or agricultural field located nearby;
5. The site has near connectivity to raw material suppliers;
6. Located near to waste co-processing industries and disposal centre;
7. Accessibility to Ennore railway line and Ennore seaport;
8. National highway (SH-114) is adjacent to plant site;
9. Power connectivity from TANGEDCO;
10. Nearest Fire station is below 5 km;
11. Manpower availability from nearby areas;
12. No resettlement and rehabilitation issues; and
13. Absence of areas of archaeological and historical importance within 10 km radius.

The details of environmental setting are given in **Table - 1.1**.

TABLE-1.1
ENVIRONMENTAL SETTING IN 10-KM RADIUS

Sr. No.	Particulars	Details		
		Point	Latitude	Longitude
1.	Latitude & Longitude	A	13°12'52.52"N	80°19'12.98"E
		B	13°12'46.78"N	80°19'23.73"E
		C	13°12'36.20"N	80°19'20.17"E
		D	13°12'42.57"N	80°19'03.55"E
2.	Elevation above MSL	4 – 9 m		
3.	Land use at the project site	Industrial Land use as per DTCP		
4.	Nearest Habitation	Ennore- 0.02 km, NNE Kathivakkam – 0.35 km, NNW		
5.	Nearest Highway	SH-114 Connecting Chennai to Ennore-Adjacent, W		
6.	Nearest Railway station	Ennore Railway Station – 0.38 km, NNE		
7.	Nearest Air Port	Chennai International Airport – 29.0 km, SSW		
8.	Nearest Harbor	Ennore Port - 5.31 Km, NNE		
9.	Nearest Town	Ennore – 0.02 km, W		
10.	Reserve Forest within 10-km radius	Nil in 10 km radius		
11.	Nearest water bodies	Bay of Bengal - 0.12 km, E Kosisttalayar River – 0.37 Km, WNW Kadapakkam Panchayat Lake – 7.1 Km, W Vichoor Lake – 8.27 Km, W		
12.	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10-km radius		

Sr. No.	Particulars	Details
13.	Defense Installation / Archaeological / Ports	Nil in 10 km radius
14.	CRZ identification	CRZ-II as per CZMP/study by IRS, Anna University
15.	Historical places	Nil
16.	Socio-economic factors	No resettlement and rehabilitation involved
17.	Nearest Hospitals	Ernavur Government Hospital (2.86 Km, SW) Urban Primary Healthcare center (4.02 Km, SW)
18.	Religious places	CSI St. Peter church (0.01 Km, WNW) Masjid-e-Mammor (0.15 Km, SW) Sri Batherakali Amman Temple (0.43 Km, N)
19.	Nearby Industries	Ashok Leyland Defence Unit – Adjacent, S Coromandel International Limited – 0.15 Km, N Ennore Thermal Power Station-1.0 Km, SW NTPC thermal Power plant- 2.5 Km, N

1.3.4 Demand for castings and its importance to country and region

The consumption of casting per capita can be easily considered as an indicator of development of economy of a country. As compared the per capita consumption in the United States of America, Indian consumption is merge one sixth. There is, therefore, great scope for the growth of foundries in India. Further, due to stringent environmental pollution control norms in the developed countries and non-availability of work force for working in trying conditions of foundries, western economy is procuring their casting requirement from BRIC countries. This situation is poised to escalate further in the coming decade, helping metal casting industry to greater highlights in terms of capacity output as well as quality standards. Rapid growth of automotive and farm equipment business in India. Will pose huge requirement of quality and high integrity casting on foundry industry.

The Indian foundry industry manufacturers metal cast components for applications in Auto, Tractor, Railways, Machine tools, Sanitary, Pipe Fittings, Defense, Aerospace, Earth Moving, Textile, Cement, Electrical, Power machinery, Pumps / Valves, Wind turbine generators etc. Foundry Industry has a turnover of approx. USD 19 billion with export approx. USD 2.5 billion. There are approx. 5000 units out of which 90% can be classified as MSMEs. Approx. 1500 units are having International Quality Accreditation. Several large foundries are modern & globally competitive. Many foundries use cupolas using LAM Coke. However, these are gradually shifting to Induction Melting. There is growing awareness about environment & many foundries are switching over to induction furnaces & some units in Agra are changing over to coke less cupolas.

Major Foundry Clusters

Each cluster is known for its products. The major foundry clusters are in Batala, Jalandhar, Ludhiana, Agra, Pune, Kolhapur, Sholapur, Rajkot, Mumbai, Ahmedabad, Belgaum, Coimbatore, Chennai, Hyderabad, Howrah, Kolkata, Indore, Chennai, Ahmedabad, Faridabad, Gurgaon etc.

Typically, each foundry cluster is known for catering to some specific end-use markets. For example, the Coimbatore cluster is famous for pump-sets castings, the Kolhapur and the Belgaum clusters for automotive castings and the Rajkot cluster for diesel engine castings, Howrah cluster for sanitary castings etc.

Auto sector

Auto, Auto Components & Capital Goods Industry have drawn up ambition plans to grow three folds in next 10 years which will drive the demand for metal casting industry. The Capital Goods Policy of Govt envisages the sector to grow from USD 35 Bn to USD 115 Bn Industry by 2025. Whereas the auto sector as per Automotive Mission plan 2016-26 envisages auto sector to grow 3.5 to 4 times of the current value of USD 74 billion to USD 260 billion to 300 billion. Even if these plans are realized by 75-80%, it will augur well for the Indian Foundry Industry. The casting demand for iron & Aluminium castings could grow by 35-40 % by 2019-20 from current levels. The export import data for major castings are presented in **Figure-1.1**.

There is focus on infrastructure in India. Construction of roads & rural housing etc. which will push demand for earthmoving & allied equipment. Good monsoons augur well for agricultural sector which will drive demand for tractors. The tractor industry grew by 21% in 2016-17 compared to previous year after registering a decline of approx. 6.5% in 2015- 16 compared to 2014-15.

Manpower

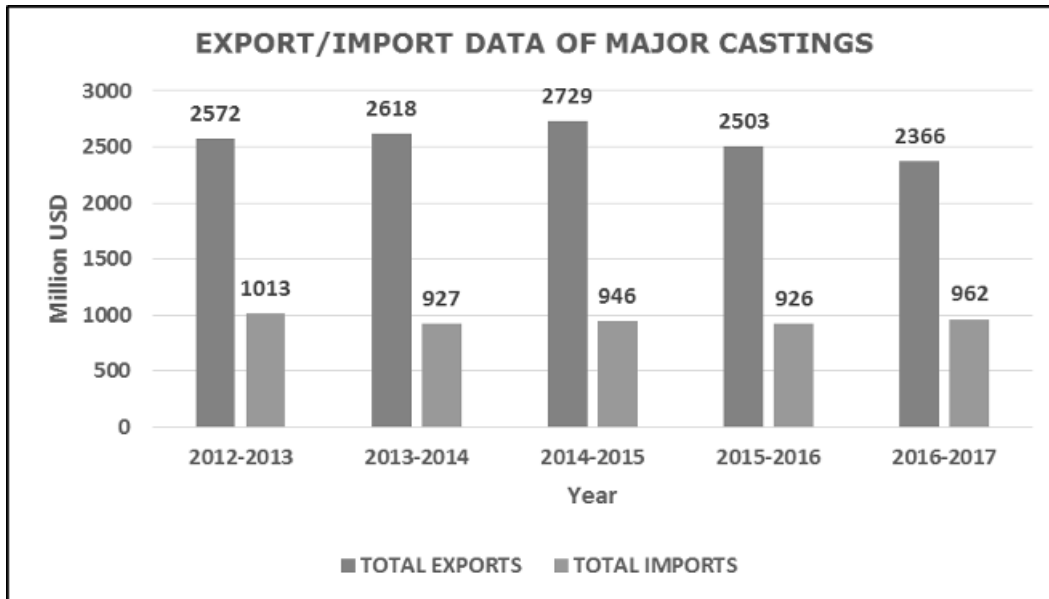
The total Manpower in Foundry Sector is approx. 500,000 Directly & 150,00,00 indirectly. The foundry sector is highly labour intensive & currently generates employment for 2 Million directly & indirectly mainly from socially & economically weaker sections of society. It has potential to generate additional employment of 2 Million in next 10 years.

Global Scenario

As per 51th World casting Census published by Modern Castings USA in December 2017, Global Casting Production Stagnant. Worldwide casting production grew by less than half a percent for second year in a row in 2016. In 2016, world casting production reached 104.4 million metric tons, a shade over the 104.1 million metric tons produced in 2015. The World's top 10 casting producing nations produced 91.6 million metric tons of the total 104.4 million metric tons. China reported a 5.4% increase since 2015 putting its total production at 47.2 million metric tons. India the second largest casting producers in the World reported 5.4% increase in production to 11.35 million metric tons. The remaining 2016 top 10 casting nations are USA, Japan, Germany, Russia, Korea, Mexico, Brazil and Italy.

Role in Manufacturing Sector

The new manufacturing policy envisages the increase in the share of manufacturing in the GDP to 25% from current 15% & to create 100 Million additional jobs in next 10 years. Since all engineering & other sectors use metal castings in their manufacturing, the role of foundry industry to support manufacturing is very vital. It is not possible to achieve the above goal without the sustainable corresponding growth of the foundry sector.



Source: http://foundryinfo-india.org/profile_of_indian.aspx

FIGURE-1.8
EXPORT IMPORT DATA FOR MAJOR CASTINGS

- The “Make in India” initiative is expected to witness significant investments in Construction, Infrastructure, Automobile, Shipbuilding and Power sectors, which will stimulate steel demand. Hence, efforts will be made to pass on such benefit to the domestic steel producers. Use of cost efficient and competitive ‘Indian Made steel’ will pave the way for infrastructure development and construction activities in the country.

1.3.5 Role of Ashok Leyland expansion activity to the industry and country

- To fulfil the increasing upcoming demand for castings in the developmental sectors like automobiles.

1.4 **Scope of the study**

The ToR application for the expansion project was submitted to State Level Environmental Impact Assessment Authority, Tamil Nadu on 13.12.2019. The proposal was placed in 153rd SEAC meeting held on 04.06.2020. Based on the presentation made to the SEAC members, the committee members decided to recommend the proposal to SEIAA.

The proposal was further considered in 382nd SEIAA meeting held on 23.06.2020 and after detailed discussion. The SEIAA decided to recommend the proposal for the grant of Terms of Reference (ToR) with Public hearing.

M/s. Ashok Leyland Limited has retained the services of M/s. Vimta Labs Limited, Hyderabad/Coimbatore to carry out the EIA study and preparation of Environmental Impact Assessment (EIA)/ Environmental Management Plan (EMP) report.

The baseline monitoring study has been carried out from 1st July to 30th September, 2020 for various environmental components so as to assess the anticipated impacts of the proposed project on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed activities. The scope of the study broadly includes:

- Field sampling of environmental attributes at the various representative locations in the study area to establish the baseline environmental status;
- Collate and compile secondary data including Socio-economic data from published literature / government publications;
- Estimate pollution loads that would be generated by the proposed expansion activity;
- Predict incremental levels of pollutants in the study area due to the proposed expansion;
- Evaluate the predicted impacts on the various environmental attributes by using scientifically developed and widely accepted Environmental Impact Assessment Modelling methodologies;
- Prepare an Environmental Management Plan (EMP) to mitigate the predicted impacts; and
- Identify critical environmental attributes required to be monitored during the project execution and to suggest post-project monitoring.

Field studies were conducted for a period of three months (1st July to 30th September 2020) to determine existing conditions of various environmental attributes as shown in **Table-1.2**.

TABLE - 1.2
ENVIRONMENTAL ATTRIBUTES AND FREQUENCY OF MONITORING

Sr. No	Attributes	No of Sampling Locations	Parameters	Frequency
1	Ambient Air Quality	8	PM ₁₀ , PM _{2.5} , SO ₂ and NO ₂ , CO, Ozone, Lead, Ammonia, Benzene, Pyrene, Arsenic (As), Nickel (Ni). Monitoring as per NAAQS, 2009	24 hourly sample, twice a week for 13 weeks. CO & O ₃ -8 hourly samples
2	Meteorology	1	Wind speed, Wind direction, Temperature, Relative humidity, Rainfall (Min and Max), Cloud cover, Atmospheric pressure	One hourly recording of wind speed, wind direction, cloud cover, Temperature
3	Water Quality (Groundwater, Surface water Sources)	16 (8 +8)	Groundwater (GW) as per IS:10500-2012 and Surface water (SW) source in 10 km radius	Once during study period

4	Soil Characteristics	6	Grain size, pH, Salinity, Electrical Conductivity, Texture, N, K, P, TDS, Organic Carbon, SAR, Cl, Na, Ca, SO ₄ , Fe, Hg	Once during study period
5	Noise Levels	8	L _{day} , L _{night} , L _{dn} , L _{eq}	Once during the study period. 24-hourly monitoring
6	Ecology (Terrestrial and Aquatic)	Study Area	Identification of endangered species	Once during study period
7	Land Use	Based on District Census Handbook (2011), Satellite Imagery and ground trothing		
8	Demography	Based on Secondary Data like Census of India-2011 & Primary Survey		
9	Geology & Hydro-geology	Based on Secondary Data, Satellite Imagery and Primary survey		
10	Environment Management Plan	EMP for various parameter including post project monitoring.		
11	Risk Assessment and Disaster Management	Identify areas where disaster can occur by fires and explosions and release of toxic substances.		

1.5 Organisation of the Report


The proposed expansion project would naturally have implications on the neighbourhood with reference to socio-economic aspects of society, environmental attributes such as land, water, air, aesthetics, flora and fauna. In assessing the environmental impact, collection, collation and interpretation of baseline data are of prime importance. Environmental impact analysis and assessment which is required for every industrial project should preferably be carried out at the planning stage itself.

The basic objective of identification of impacts is to aid the proponents of the project to rationalize the procedure for an effective environment management plan, leading to an improvement in environmental quality as a result of the location of the proposed expansion project. This has been attempted by the following procedures.

- Collection, collation and analysis of baseline data for various environmental attributes;
- Identification of impacts;
- Impact assessment through modelling;
- Evaluation of impacts leading to preparation of environment management plan;
- Outlining post project monitoring methodology.

CHAPTER - 2

PROJECT DESCRIPTION

 ASHOK LEYLAND	Environmental Impact Assessment for the Proposed Expansion and Modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu
	Chapter – 2 Project Description

2.0 PROJECT DESCRIPTION

This chapter highlights the features of the existing and the proposed expansion and modernization activity with plant layout, process details, various utilities and services, infrastructural facilities and the sources of waste generation with suitable measures for safe disposal of the wastes.

2.1 Project Details

The industry has proposed the expansion and modernization to increase the manufacturing capacity of ferrous castings from 2790 TPM to 6125 TPM. The proposed expansion will be developed in the existing industrial premise, in an area of 13.86 ha (34.25 acres) which will be equipped with sound environmental technologies in addition to the existing technologies for controlling pollutants. The location and environmental setting of the plant site are already presented in *Chapter-1* of this report.

2.2 Need for the Project

Auto, auto Components & capital goods industry have drawn up ambition plans to grow three folds in next 10 years which will drive the demand for metal casting industry. The Capital Goods Policy of Govt envisages the sector to grow from USD 35 Bn to USD 115 Bn Industry by 2025. Whereas the auto sector as per automotive mission plan 2016-26 envisages auto sector to grow 3.5 to 4 times of the current value of USD 74 billion to USD 260 billion to 300 billion. Even if these plans are realized by 75-80%, it will augur well for the Indian foundry industry. The casting demand for iron & aluminium castings could grow by 35-40 % by 2022-23 from current levels.

In India, the automotive sector has seen a good increase in the recent years. In view of the increasing Market demand, Ashok Leyland Foundries Limited intends to increase their production capacity to cater the domestic requirement. The expansion of the industrial unit will also provide additional employment opportunities to the people in the nearby region. The production will be increased by keeping the same machinery and equipment.

2.3 Project Location and Layout

The existing plant site is situated at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu. The proposed expansion and modernization will be carried out within the existing plant premises itself in an area of 13.86 ha. Thus, no additional land will be acquired for the proposed expansion activity.

2.4 Size or Magnitude of Operation

Considering, reliability of equipment and matching capacities between the different sections of the plant, type of equipment/installation system and the departmental capacities at the plant, have been required.

A brief description of the existing and proposed utilities and major equipment is given in the following sections.

The facility is proposed to enhance the production quantity of ferrous castings from 2790 TPM to 6125 TPM.

2.4.1 Land Requirement

The total land available under the ownership of the Ashok Leyland Limited is 13.86 ha (34.25 acres). The existing plant site is classified as Industrial Land use Zone. The land document is attached as **Annexure V**. The land use breakup details for expansion is given in **Table-2.1**

**TABLE - 2.1
DETAILS OF LANDUSE BREAK-UP**

S. No.	Break up	Area		Percentage
		Ha	Acres	
1	Process building area	4.79	11.83	34.55
2	Non-process building area	0.68	1.66	4.84
3	Storage area	0.34	0.84	2.45
4	Parking Area	0.06	0.17	0.50
5	Driveway & pathway area	2.16	5.36	15.65
7	Green belt area	4.90	12.1	35.32
8	Open area	0.93	2.29	6.69
	Total	13.86	34.25	100

Source: Ashok Leyland Limited

No additional land would be required to carry out the expansion activity. The existing plant has a greenbelt area of 35.32% and the same shall be maintained in the expansion activity to the fulfil greenbelt norms of CPCB.

2.4.2 Raw Material Requirement

The major raw materials required for the proposed project are scraps, mild steel, CI borings, pig iron and silica sand. The details of various raw materials, sources and their mode of transport are given in **Table - 2.2**. The material balance for the existing and after expansion is attached as **Annexure X**

**TABLE-2.2
RAW MATERIAL REQUIREMENT**

S. No.	Raw Material	Existing (TPM)	After Expansion (TPM)	Source
1	Pig Iron	203.0	565.0	Goa, Karnataka
2	Mild Steel	1522.0	3300.0	Tamil Nadu
3	CI Borings, CI Scrap& Returns	1268.0	2825.0	Tamil Nadu
4	Product scrap	320.0	0	-
5	Washed Silica Sand	2635.6	3675.0	Andhra Pradesh
6	Sodium Silicate	8.36	1.5	Tamil Nadu
7	Resin & Binders	41.0	59.0	Maharashtra
8	Core Paints	50.0	66.0	Maharashtra
9	Casting Paints	8.36	13.8	Maharashtra
10	Thinner (3:1 ratio)	3.825	4.600	Maharashtra
11	Di methyl Formaldehyde	0.396	0.594	Tamil Nadu
12	S M Release Oil (Silicone oil)	0.253	0.380	Tamil Nadu

2.4.3 Power and Fuel Requirement

The peak power demand for the entire unit is 19,100 KVA while the average power demand will be about 17000 KW. In order to meet the desired quantity additional power supply of 700 KVA will be required. Therefore, the peak power demand for the entire unit after expansion will be 19900 KVA while the average power demand will be about 17910 KW. The entire power requirement will be sourced through TANGEDCO. The Induction furnaces are installed in the existing activity as per Central Electricity Authority's directions to minimize the power surge and harmonic distortion in the incoming feeders. To meet the emergency power requirement during power cuts and grid failures 2 Nos of 1250 KVA DG Sets will be installed and the existing DG set of 5000 KVA will be decommissioned. The Power & fuel requirement details are given in **Table – 2.3 and Table 2.4**

TABLE-2.3
POWER REQUIREMENT

Particulars	Existing	After Expansion
Power Requirement Source: 1. TANGEDCO	19100 KVA	19900 KVA
Backup facility DG-Set	1x5000 KVA	2x1250 KVA

Note: After the Proposed expansion 5000 KVA DG-set will be decommissioned.
Source: Ashok Leyland Limited

TABLE-2.4
FUEL REQUIREMENT

S. No	Description	Existing TPD	After Expansion TPD
1	HSD	3.0	4.0
2	HFO	0.1	0
Existing DG set of 5000 KVA will be decommissioned, hence HFO will not be used			

2.4.4 Water Requirement

The total water requirement for plant activity will be 447.0 KLD after the proposed expansion activity. The daily freshwater demand will be 425.0 KLD which will be sourced from the open wells located within the plant premises. The NOC for the water withdrawal has been obtained from Chennai Metropolitan Development Authority and the respective document has been attached as **Annexure XI**. The water requirement of the existing and after expansion is shown in **Table-2.5** and Water balance is shown in **Figure-2.2**.

TABLE – 2.5
WATER REQUIREMENT

S No	Category	Requirement in KLD	
		Existing	After Expansion
1.	Cooling tower makeup	28.0	50.0
2.	Process	72.0	97.0
3.	Domestic requirement	350.0	300.0
Total		450.0	447.0

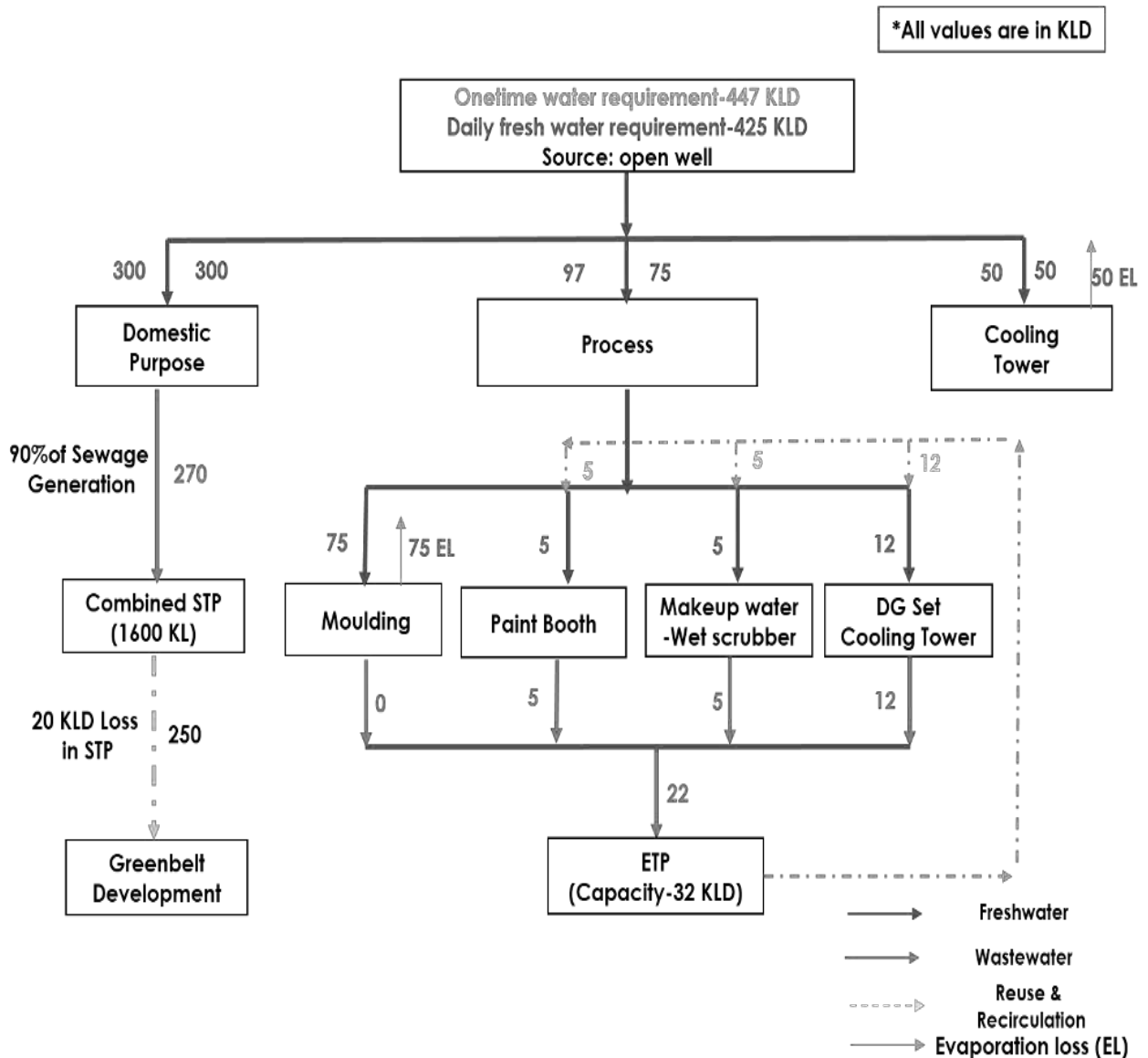


FIGURE - 2.1
WATER BALANCE-AFTER EXPANSION

2.4.5 Manpower Requirement

The total manpower available in the existing plant is about 1950 nos. After expansion activity additional man power of 250 nos will be equipped from the nearby communities for various plant operations. The unit is operated round the clock in three shifts. The total manpower after the proposed expansion will be 2200 nos.

2.5 Project Schedule for Approval and Implementation

The expansion and modernization activities will be completed in a period of one (1) year from the date of receipt of all the approvals from statutory authorities.

2.6 Technology and Process Description

The conversion of MS scrap, borings in to castings does not require any sophisticated technology. Various grades of scraps, borings and ferro alloys are melted in furnaces and pour into the moulds. The moulds of required size and shape prepared by using sand and bentonite (clay) which act as a binding material. Then the castings separated from sand moulds and cleaned.

2.6.1 Induction Furnaces

Induction heating takes place when an electrically conductive material is placed in a varying magnetic field. Induction heating is a rapid form of heating in which a current is induced directly into the part being heated. Induction heating is a non-contact form of heating.

The heating system in an induction furnace includes:

- Induction heating power supply,
- Induction heating coil,
- Water-cooling source, which cools the coil and several internal components inside the power supply.

The induction heating power supply sends alternating current through the induction coil, which generates a magnetic field. Induction furnaces work on the principle of a transformer. An alternative electromagnetic field induces eddy currents in the metal which converts the electric energy to heat without any physical contact between the induction coil and the work piece. The furnace contains a crucible surrounded by a water cooled copper coil. The coil is called primary coil to which a high frequency current is supplied. By induction secondary currents, called eddy currents are produced in the crucible. High temperature can be obtained by this method. Induction furnaces are of two types: cored furnace and coreless furnace. Cored furnaces are used almost exclusively as holding furnaces. In cored furnace the electromagnetic field heats the metal between two coils. Coreless furnaces heat the metal via an external primary coil.

- Electrical Mains Equipment

The mains input power source voltage level shall be 33 kV. A Furnace Duty Rectifier Transformer shall be provided to step down the voltage to 575 Volts which is appropriate level needed by the Static Frequency Converter. Transformer shall be protected by 33 KV Vacuum Circuit Breaker fitted with fault sensing relays.

- Steel Frame Furnace

Hydraulically tilted steel frame furnace constructed from steel structure to provide higher rigidity and strength. Iron shunts prevent heating of the steel frame from the strong magnetic field; the shunt also holds the coil and prevents the coils from deformation.

The induction coil is placed between the special top refractory block and bottom made out of special refractory clamped by a vertical steel channel. The coil is made out of electrolytic hollow copper section with top and bottom cooling turns made out of non - magnetic stainless steel. The complete steel frame is pivoted on strong stanchions.

Advantages of steel frame furnace:

1. High efficiency voltage fed series inverter design for lowest energy consumption for each ton of Iron melted.
2. Highest performance index- more kg/hour produced per KVA demand.
3. Low loss energy storage in DC capacitor.
4. High power factor at all power levels - 0.98 Lag.
5. Lower harmonic distortion

➤ Plant Cooling System

The water reservoirs of 10,000 Lit capacities are filled with properly treated water with desired level of softness. The Cooling system shall have a Cooling tower and two sets of pumps, one set connected to the primary side of the heat exchanger to cool DM water. And second set of pumps will circulate soft water through both the crucibles. Another set of non-ferrous pumps connected to the secondary side of the heat exchanger shall circulate DM water through Capacitors and DC Choke in close loop. One number Diesel pump is also required for emergency fill-up of overhead water tank. The heat absorbed by the soft water from the furnace coils, cables & the heat exchanger primary is effectively cooled by the cooling tower from a maximum of 46°C down to 36°C. The technical specifications of Induction furnace are given in below **Table-2.6**.

TABLE-2.6
TECHNICAL SPECIFICATIONS OF INDUCTION FURNACES

S. No.	Description of Items	Specifications
1	General	
	Melting Charge	Steel Scraps + CI Scrap + Pig Iron
	Melting Rate as per kW @ 1500°C	15.1 MT/Hr
	Energy Consumption with 60% Yield and 100% utilization factor	625 kWh/Ton
2	Furnace Crucible	
	Type of Furnace	Induction Furnace
	Mode of Tilting	Hydraulic
	Coil Design	Electrolytic Grade copper tube, duly taped & inter- turn class F insulated
	Coil Cooling mode	Water Cooled
3	Static Frequency Panel	
	Rated output Kw	(3000 KW X 3) + (2000 KW X 2)
	Rated output Voltage	2000 - 3000 V
	Rated input Voltage	575 V
	Rated Frequency	300 Hz
	Mains Power Factor	0.9
	Maximum input KVA	16670 KVA
	Medium for cooling	DM /Distilled water

	Enclosure	IP-54
4	Hydraulic Power Pack	
	Pump capacity	900 LPM
	Line Pressure	4.5 Bar
	Motor Rating	8 x 12.5 HP
5	Remote Control Desk	
	Enclosure	IP-54
	Attachment	Direct reading analogue for kW. Potentiometer for operator, mains ON, Ready, Heat ON, SCR Trip current & voltage limit interlock, earth leakage trip
6	Plant Cooling System	
	Soft water Reservoir	1,50,000 ltrs.
	Emergency water tank	3,00,000 ltrs.
	Primary cooling pump	4200 lpm
	Head	35 m
	Pump	5 x 12.5 HP
	Soft water quality	TDS < 200 ppm Hardness < 5 ppm Iron < 0.3 ppm Turbidity < 5 ppm
	DM water flow rate	2000 lpm each
	Head	15 m
	Temp. in /out	380C – 480C
	Pump	12.5 HP x 5
	Heat exchanger design	SS Plate type
	Cooling Tower	300 lpm each 48°C to 38°C

Technical Specification of the Existing Moulding Machines and Sand Plants

Moulding Machine 1:-

The process involves sand receipt, Sand filling, Pneumatic Jolting, Multi ram head Squeezing the mould, stripping off, Turnover units, Mould close-up and mould transfer and transport, Liquid metal pouring into the mould, in mould cooling and Knock out of casting.

TABLE-2.7 (a)
TECHNICAL SPECIFICATIONS OF MOULDING MACHINES

Make	Gustav Zimmermann
Country on Manufacturing	Germany
Machine Year of Manufacturing	1981
Moulding Flaks Size	1170 X 810 X 380 / 380 mm
Moulding Capacity (moulds/hr)	50 Nos
Moulding Capacity (moulds/hr) - Cored	40 Nos
Number of Flasks in the Moulding Loop	122 Nos
In mould cooling time minutes	150
Hydraulic Squeeze pressure at mould Top face (Kg / cm ²)	110
Sand Requirements	51 Tons / hour
Electrical System Requirements	380 KW
Line Voltage to be specified	415, 3 PH, 50 H2
Control voltage	24 VDC
Cooling water requirements	Average at 32°C inlet

Moulding Machine 2:-

➤ **Sand Preparation Plant:**

The advantages of the Moulding Sand Preparation process include;

- Spontaneous activation of Bentonite binding forces due to steam atmosphere;
- Reduction in the loss of ignition substances (Fines);
- No lump formation;
- Constant prepared sand quality obtained also with varying sand parameters;
- Independent of varying climatic conditions;
- Flexible plant design and lower space requirement;
- Reduction of vibration and noise pollution;
- Reduction of the Dust Extraction System;
- Reduction in the operating costs; and
- Low investment costs and environmentally friendly

TABLE-2.7 (b)
TECHNICAL SPECIFICATIONS OF MOULDING MACHINES

Make	Fritz Hansberg
Country on Manufacturing	Italy
Machine Year of Manufacturing	1990
Moulding Flaks Size	810 x 710 x 330/380 mm
Moulding Capacity (moulds/hr)	100 Nos
Moulding Capacity (moulds/hr) - Cored	90 Nos
Number of Flasks in the Moulding Loop	73 Nos
In mould cooling time minutes	90
Hydraulic Squeeze pressure at mould Top face (Kg / cm ²)	90
Sand Requirements	60 Tons / hour
Electrical System Requirements	350 KW
Line Voltage to be specified	415, 3 PH, 50 H2
Control voltage	24 VDC
Cooling water requirements	Average at 32°C inlet

➤ **PLC control sand plant**

The PLC control sand plant comprises of the following:

- Sand Mixer;
- Bucket elevators;
- Belt Conveyors;
- Polygonal screen;
- Lump Breaker;
- Return Sand & Additive Hoppers; and
- Return Sand Cooler

➤ **Storage Hoppers**

For storing the return sand bunkers of each 8 x 100 Tons capacity installed. For additives the bentonite and coal dust storage respectively 14 and 10 ton capacity storage hoppers are installed. For conveying the additives, the bentonite, coal dust and new sand pneumatic conveying system provided to avoid dust pollution and man power reduction. For conveying the prepared sand mix to moulding machine and back to Hoppers for conveying the return sand by Belt conveyors.

➤ **Sand Mixer**

KUENKEL WAGNER and DISA make batch type Sand mixers of capacity of 3 T each to mix the additives and moisture to attain desired level of compression strength and compatibility

➤ **Sand Cooler**

KUENKEL WAGNER and WESMAN SIMPSON make 100 and 150 MT / Hour capacity respectively to cool the Hot Return Sand from moulding line knockout by addition of moisture and premixing of sand for Homogeneity.

2.7 Manufacturing Process

The manufacturing process of castings involves the following steps in sequence. The Process flow diagram given in **Figure 2.3**

- Sand preparation and Mould Making/Core making;
- Making cores and sand moulds;
- Melting in induction furnace and Pouring;
- Shot blasting and fettling; and
- Quality testing and Dispatch.

2.7.1 Sand preparation and Mould Making / Core making

The sand is prepared by carbon dioxide moulds method. Return Sand and bentonite, coal dust, new sand is mixed in the sand mixer. The mixed sand is sent for mould making. Moulds are prepared by machine and hand mould.

In the Machine mould, the sand is filled up to the top of the moulding box and is jolted by operating the jolt valve 3 to 5 times. Then the mould is squeezed one or

two times by operating the squeeze valve. The hardness of the mould is checked using mould hardness tester. The sand mould is gassed with CO₂ after ramping.

The cores are made separately in a core box. The core box with core print is anchored and supported adequately. During preparation bonding materials like air setting oil is added and cores of required shape and size are made and the cores are dried at room temperature, after drying the cores are baked well in ovens. Cores are set in the prepared moulds and then moulds are closed with guide pins and are clamped. Now moulds are ready for metal pouring.

2.7.2 Metal Melting in Induction Furnace

The raw materials will be melted in induction furnace having capacity of 3 MT. In induction furnace, metallic material placed in magnetic field generated by the current in induction coil of the furnace, electromotive force is induced by the action of electromagnetic induction, and induced current flows to heat up the material by its Joule's heat.

The induction furnace has the following features compared to the other types of melting furnace.

- Its heat efficiency is high because the material is directly heated by electromagnetic induction;
- No carbon dioxide is produced and little smoke and soot are emitted because cokes are not used as fuel;
- Metal loss by oxidation is little, thus little contamination of metal because of heating without air;
- Temperature control is simple, uniform composition of metal product is attained by agitation effect and alloyed cast iron/steel is easily produced;
- Induction melting is suitable for high temperature melting because of its energy concentration, and installing space is reduced as compared with other types of melting furnace.

The molten metal from induction furnace is transferred into ladles. From ladles molten metal is poured into the sand moulds, which are arranged in a row.

2.7.3 Cleaning of Castings

The formed castings are knockout from the moulds after removing the runner, and riser by means of wedge cutting / Runner Breaker. The adhering sand particles are removed with the help of wire brushing and sent to shot blasting machine.

2.7.4 Shot blasting and fettling

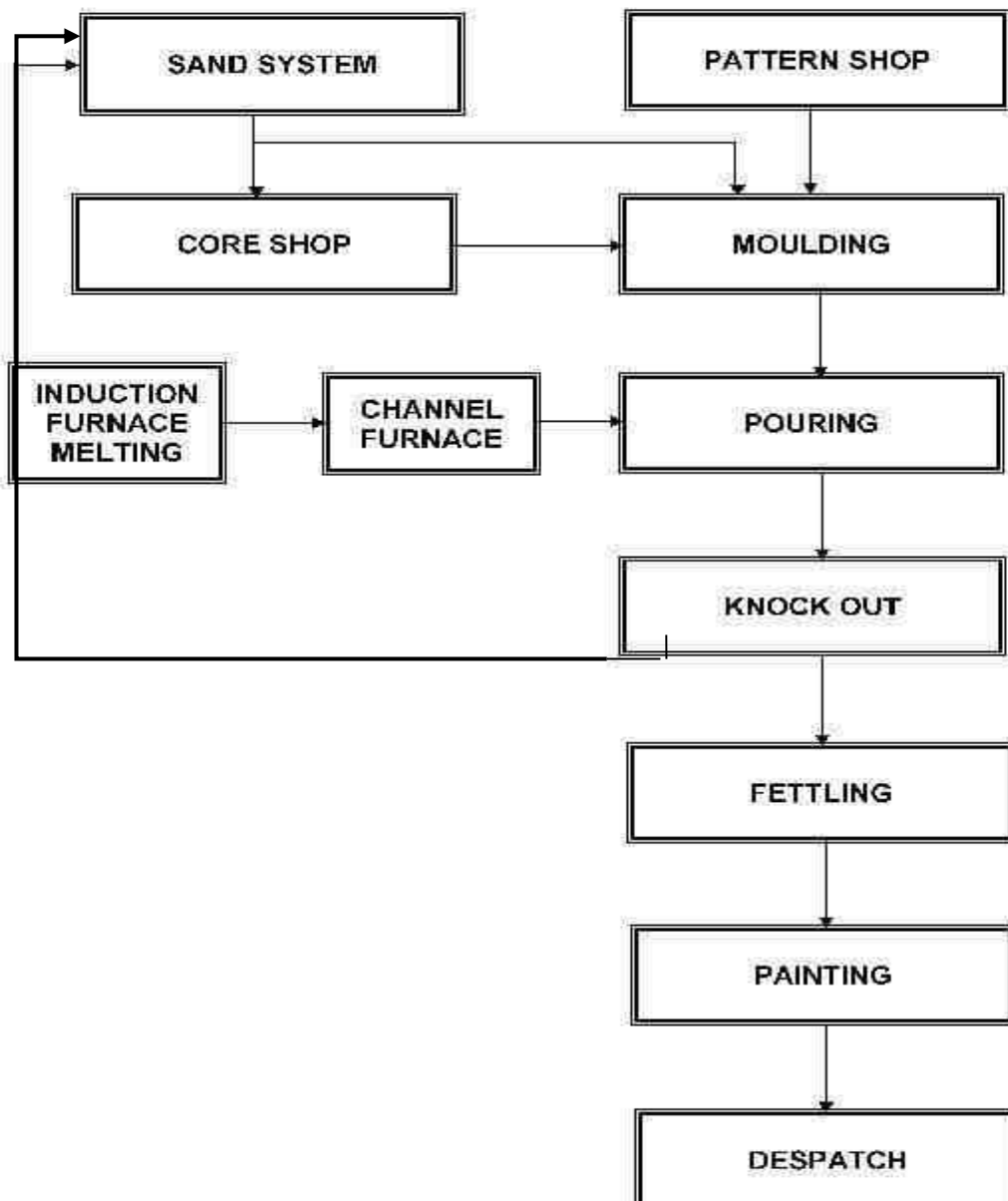
Shot blasting is the most efficient and mechanical method of removing the unwanted particles. Casting is hung from hooks in a moving conveyor inside a chamber. The particles of shot or grit are thrown at the casting by means of centrifugal force and steel balls are placed through the conveyor bucket on the rotating vanes and blasted in to the chamber and hanged castings are cleaned. This method has peening effect on the surface and it makes the surface bright and shiny. Grinding is usually



performed using portable or stationary pedestal grinders. After shot blast, the excess materials and joint chips are removed by grinding then the castings are sent for further process.

2.7.5 Quality Testing and Dispatch

All the castings are inspected and tested for strength and other required properties. Then the castings are sent to warehouse for dispatch.



**FIGURE-2.2
PROCESS FLOW DIAGRAM**

2.8 Sources of Pollution

The various types of pollution from the expansion and modernization project are categorized under the following types:

- Air Pollution;
- Water Pollution;
- Solid waste; and
- Noise Pollution

2.8.1 Air Pollution Sources and Mitigation Measures

The sources of air emission from the expansion and modernization of foundry unit are dust and gaseous emissions from melting machineries such as induction furnaces, DG Sets and sand plants and moulding sections. The melting of metals and alloys in the induction furnaces generates dust and metal oxide fumes. The air pollution management is presented in *Chapter - 4* of this report.

Melting of metals and alloys in the induction furnaces generates dust and metal oxide fumes. These dust and fumes are extracted from the furnace and they are passed through an air pollution control system consisting of spark arrestor, dilution damper followed by wet scrubber etc. and then it would be released into the atmosphere through stacks. These dust and fumes are extracted from the furnace and they are passed through wet scrubber for treating. After treatment, it will be released onto the atmosphere through the individual stacks of above 30 m. Fugitive Emissions are generated from vehicular movements for transporting the raw material and end products to and from the plant premise. The list of stack details and pollution control equipment details are given in **Table - 2.8**

**TABLE 2.8
STACK DETAILS**

Stack No.	Point Emission Source	Air Pollution Control Measures	Stack Height from Ground Level in m
1	Induction Furnace 1 - 3 T	Wet scrubber with stack	16
2	Induction Furnace 2 - 3 T	Wet scrubber with stack	16
3	Induction Furnace 3 - 5 T	Wet scrubber with stack	16
4	Sand Recycling Plant	Bag Filters with stack	17
5	Sand Multi Cooler	Bag Filters with stack	8.5
6	IMF No bake Moulding Line Shack Out	Bag Filters with stack	14.6
7	Air Blowing Booth 1	Bag Filters with stack	8.5
8	Paint Booth – 1	Water curtain with stack	7.5
9	Paint Booth – 2	Water curtain with stack	7.5
10	Shot Blasting Machine – 1	Bag Filters with stack	12.5
11	Shot Blasting Machine – 2	Bag Filters with stack	12.5
12	Tum blasting Machine – 1	Bag Filters with stack	12.5
13	Tum blasting Machine – 2	Bag Filters with stack	11




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14	Thermic Oven Senior	Stack	12.5
15	Thermic Oven Junior – 1	Stack	12.5
16	Thermic Oven Old (Hyundai)	Stack	12.5
17	Thermic Oven New (Hyundai)	Stack	12.5
18	Thermic Oven Leg Core	Stack	12.5
19	Thermic Oven Saddle Core	Stack	12.5
20	Thermic Oven IMF Core	Stack	12.5
21	Sand Batch Type Oven	Stack	12.5
22	SNAG Grinder – 1	Cyclone separator with stack	11.5
23	SNAG Grinder – 2	Cyclone separator with stack	8.8
24	SNAG Grinder – 3	Cyclone separator with stack	8.8
25	SNAG Grinder – 4	Cyclone separator with stack	11.8
26	SNAG Grinder – 5	Cyclone separator with stack	11.8
27	SNAG Grinder – 6	Cyclone separator with stack	11.8
28	Swing Frame Grinders - 1 & 2	Common cyclone separator with stack	12.5
29	Swing Frame Grinder - 3	Cyclone separator with stack	12.5
30	Swing Frame Grinder - 4	Cyclone separator with stack	12.5
31	Head Shake Out & Blowing	Cyclone separator with stack	11.5
32	Beaver Sand Mill	Vent filter with stack	12.5
33	New Sand Hopper (Hyundai)	Vent filter with stack	12
34	Induction Furnace 4 - 5 T	Wet scrubber with stack	17.5
35	Induction Furnace 5 - 5 T	Wet scrubber with stack	17.5
36	Sand Recycling Plant 2	Bag Filters with stack	17.5
37	Sand Multi Cooler - 2	Bag Filters with stack	12.5
38	GZ Moulding Line Shake Out	Bag Filters with stack	11.5
39	Air Blowing Booth 2	Cyclone separator with stack	6
40	Paint Booth - 3	Water curtain with stack	6
41	Shot Blasting Machine - 3	Bag Filters with stack	11.8
42	Shot Blasting Machine - 4	Bag Filters with stack	11.8
43	Shot Blasting Machine - 5	Bag Filters with stack	11.8
44	Tum blasting Machine - 3	Bag Filters with stack	10.8
45	Thermic Oven Leg - 1	Stack	13

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46	Thermic Oven Leg - 2	Stack	13
47	Thermic Oven Escorts	Stack	12.5
48	Thermic Oven M/C 32	Stack	11.4
49	Thermic Oven M/C 33	Stack	12.5
50	Thermic Oven Jr. Jacket	Stack	11.4
51	Pre heating Welding Oven	Stack	9.5
52	Post heating Welding Oven	Stack	9.5
53	SNAG Grinder - 7	Cyclone separator with stack	8.6
54	SNAG Grinder - 8	Cyclone separator with stack	8.6
55	Swing Frame Grinders - 5 & 6	Common cyclone separator with stack	9.4
56	Swing Frame Grinders - 7 & 8	Common cyclone separator with stack	9.3
57	Swing Frame Grinder - 9	Cyclone separator with stack	9.5
58	Swing Frame Grinders - 10 & 11	Common cyclone separator with stack	11.8
59	Sand Mill - 1	Vent filter with stack	11.7
60	Sand Mill - 2	Vent filter with stack	11.7
61	WESMAN Stress Relieving Furnace - 1	Stack	9.5
62	WESMAN Stress Relieving Furnace - 2	Stack	11.7
63	GZ Line Pouring Exhaust 1	Stack	11.5
64	GZ Line Pouring Exhaust 2	Stack	11.5

2.8.2 Wastewater Generation and its Management

The quantity of wastewater generation depends on the quantity of water used for various industrial and domestic purposes. Water is mainly used in the plant for cooling tower make-up, sand moulding scrubber make-up, paint booth, DG set cooling tower and domestic usages. The wastewater generation details of the plant before and after expansion are presented in the **Table-2.9**.

After expansion and modernization, the generated sewage (270.0 KLD) will be treated in common STP of capacity 1600 KLD. The agreement for treating the wastewater in the STP is attached as **Annexure XII**. The treated water will be used for nourishing greenbelt. Blowdown from cooling system will be cooled and recycled back to the process. The details of wastewater generation are given in **Table - 2.9**.

**TABLE - 2.9
DETAILS OF WASTEWATER GENERATION**

S. No.	Particulars	Generation (KLD)	
		Existing	After Expansion
1	Effluent	12.0	22.0
2	Domestic sewage	350.0	270.0
Total		362.0	292.0

Source: Ashok Leyland Limited

**TABLE - 2.10
DETAILS OF WASTEWATER MANAGEMENT**

Name of the Treatment unit	Existing	After Expansion
Sewage	Existing Common STP - 1600 KLD	
Blow down	Treated in re-circulation tank and recycled back to process	

Characteristics of Un-treated and treated water from the STP

The characteristics of the untreated and treated water are presented in **Table - 2.11**

**TABLE - 2.11
CHARACTERISTICS OF UNTREATED AND TREATED WATER FROM THE STP**

Sr. No	Parameters	Units	Un-Treated	Treated	TNPCB Desirable Limits
1	BOD	mg/l	300	<10	10
2	COD	mg/l	550	<100	50
3	TSS	mg/l	120	<10	20
4	pH	-	6.5-7.5	7.0-7.5	5.5 - 9.0

2.8.3 Solid Waste Generation and Management

The quantities of the solid waste generation before and after the proposed expansion are presented in **Table - 2.12**.

**TABLE - 2.12
DETAILS OF SOLID WASTE GENERATION**

S. No.	Waste Generation	Quantity (TPM)		Mode of Disposal
		Existing	Expansion	
Non-Hazardous Waste				
1	Used Sand	3250	3675.0	Send out through authorized Contractors
2	Furnace Slag	166.6	330.0	Send out through authorized Contractors
3	Grinding Dust	8.33	12.0	Send out through authorized Contractors
4	Municipal solid waste	7.35	3.10	Will be collected and given to civic bodies
Hazardous Waste				
1	Used/Spent Oil	100	150	Sold to CPCB authorized recyclers
2	Waste/Residues containing oil	2	2.5	Sold to CPCB authorized recyclers
3	Paint Waste/Residues	1.2	2.0	Sold to CPCB authorized recyclers
4	Discarded containers	60	190	Disposed to SPCB authorized recyclers
5	ETP Sludge	2.0	3.0	Disposed to CTSDf

2.8.4 Noise Pollution

The major sources of noise generation from the furnace, knock out, sand plant, moulding sections and external transport movements. The noise generating machineries are blowers, centrifugal pumps and stand by DG set which will be maintained within the standard limits of 70 -75 dB (A). Various measures proposed to reduce the noise pollution include reduction of noise at source, provision of acoustic enclosure like for the equipment like DG set and suction side silencers, selection of low noise equipment like closed type compressor, isolation of noisy equipment from working personnel. Personnel working in noise generation areas will be provided with ear muffler.

All rotary equipment like fans, blowers, pumps & compressors would be of low noise design. The grouting of this equipment will be made free from vibrations. The work zone noise exposure of the operating personnel would be avoided by remote operation from the control rooms. The adequate noise control measures will be adopted and work zone noise levels will be made in the plant premise

The noise levels at the existing plant are listed in **Table - 2.13**. The noise generation sources and noise attenuation measures are presented in *Chapter - 4* of this report

TABLE - 2.13
NOISE LEVEL AT THE EXISTING PLANT

Sr. No	Unit	Type	Noise Level dB (A)
1	Air Compressors	Intermittent	85
2	Cooling tower	Continuous	80
3	Transformer	Intermittent	77
4	Furnace area	Intermittent	68
5	DG Set 1 x 750 KVA	Intermittent	79
6	Sand plant	Intermittent	72
7	Loading & unloading operation	Intermittent	70
8	Fettling area	Continuous	81
9	Vehicular movement (truck)	Intermittent	70

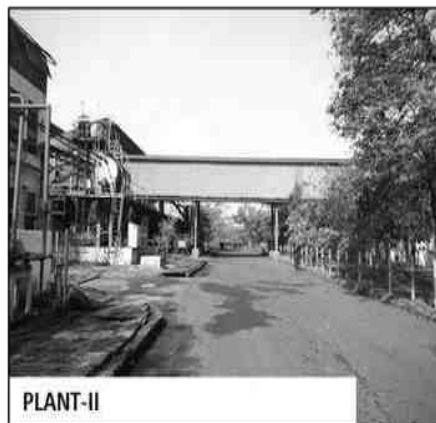
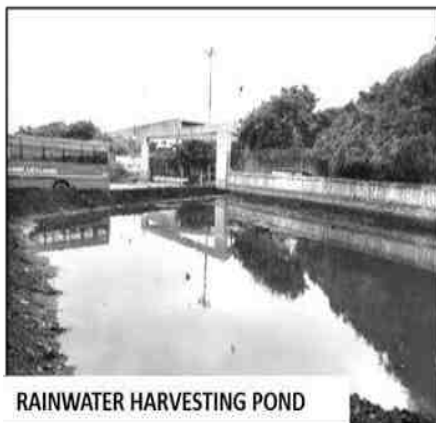
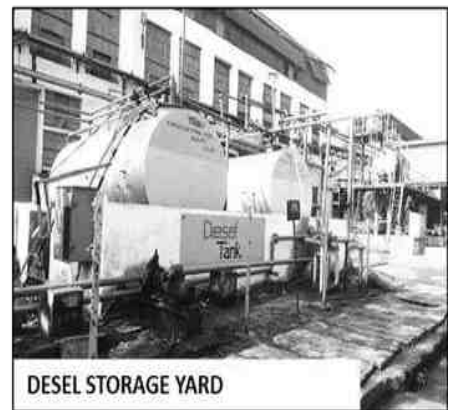
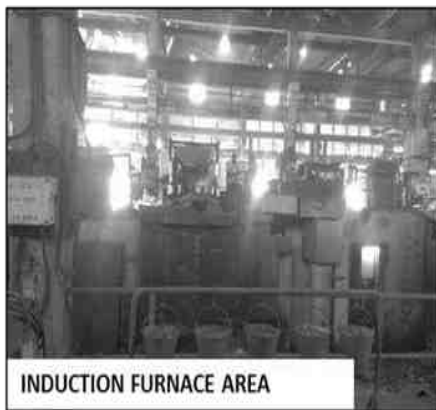
Photographs of the existing plant site are shown in **Figure-2.3**.



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**FIGURE - 2.3
PHOTOGRAPHS OF EXISTING PLANT SITE**



2.9 Greenbelt Maintenance in the Existing Plant

The existing plant has been developed with greenbelt area of 4.90 ha (35.2 % of the total area). The area has been provided with native species in consultation with the horticulturist. Further, in proposed expansion and modernization, the same 4.90 ha has been allocated for greenbelt development which (35.2% of the total area) fulfilling the greenbelt norms of CPCB. Greenbelt was developed along the plant boundary and open spaces. Around 10,000 tree species such as Azadirachta Indica, Polyalthia, Longifolia, Pongamia, Gulmohar are maintained along the periphery of the plant. The photographs of the existing greenbelt are shown in **Figure - 2.4**



**FIGURE - 2.4
PHOTOGRAPHS OF EXISTING GREENBELT**

2.10 Rainwater harvesting

Rainwater harvesting (RWH) system comprises components of various stages-transporting rainwater through pipes or drains, filtration and storage in tanks for reuse or recharge pits. The catchments of a water harvesting system are the surface which directly receives the rainfall and provide water to the rainwater harvesting system. The rainwater run-off from all the un-paved areas shall be routed to rainwater harvesting pits, provided at strategic locations within the project area.

The first flush shall be checked from entering collection system, using diversion valves to ensure that runoff from the first spell of rain is flushed out and does not enter the system. This needs to be done since the first spell of rain carries a relatively larger amount of pollutants from the air and catchments surface. Rainwater from paved and roof areas, landscaped, paved area and rest of the area within project premises will be harvested to ground through rainwater recharge pits. The overflow from the pits will be connected to storm water drainage system of the project area.

Run off from the plant site is calculated using rational formula;

$$Q = C \times I \times A$$

Where,

Q = Run-off (cu.m/hr)

A = Catchments Area (Roof area, Landscaped area, Road & parking area)

C = Coefficient of Runoff

I = Intensity of rainfall = 100 mm/hr = 0.1 m/hr

The constant co-efficient factor of 0.80 (for all situations) for evaporation, spillage and first flush wastage (Source: CPWD Manual, 2002)

Basic Assumptions

- ❖ Average rain fall = 1152 mm (Tiruvallur dt.);
- ❖ No. of rainy days considered = 60;
- ❖ Intensity of rainfall = 100mm/ hr, i.e. 0.025 m for 15 min;

The rainwater harvesting measures and quantity with regards to the various structures in the building are presented in **Table-2.14**.


TABLE-2.14
RAINWATER HARVESTING CALCULATION AS PER CPWD MANUAL, 2002

Sr. No	Category	Area (sq. m)	Impermeability Factor	Harvestable water (Intensity x Area x Imp. Factor) cum/day
1	Roof Area	57991.45	0.9	1304.81
2	Hard paved area	22379.12	0.8	447.58
3	Green belt & open area	58234.26	0.3	436.76
	Total	138604.83		2189.15

The calculated run-off from roof top area, Landscape & Roads / Parking areas is 1304.81, 447.58 and 436.76 m³/day respectively.

Considering the constant co-efficient factor of 0.80 (for all situations) for evaporation, spillage and first flush wastage (Source: CPWD Manual, 2002)

From Building area
= 1304.81 cu.m x 0.80 (for all time)
= 1043.8 cu.m

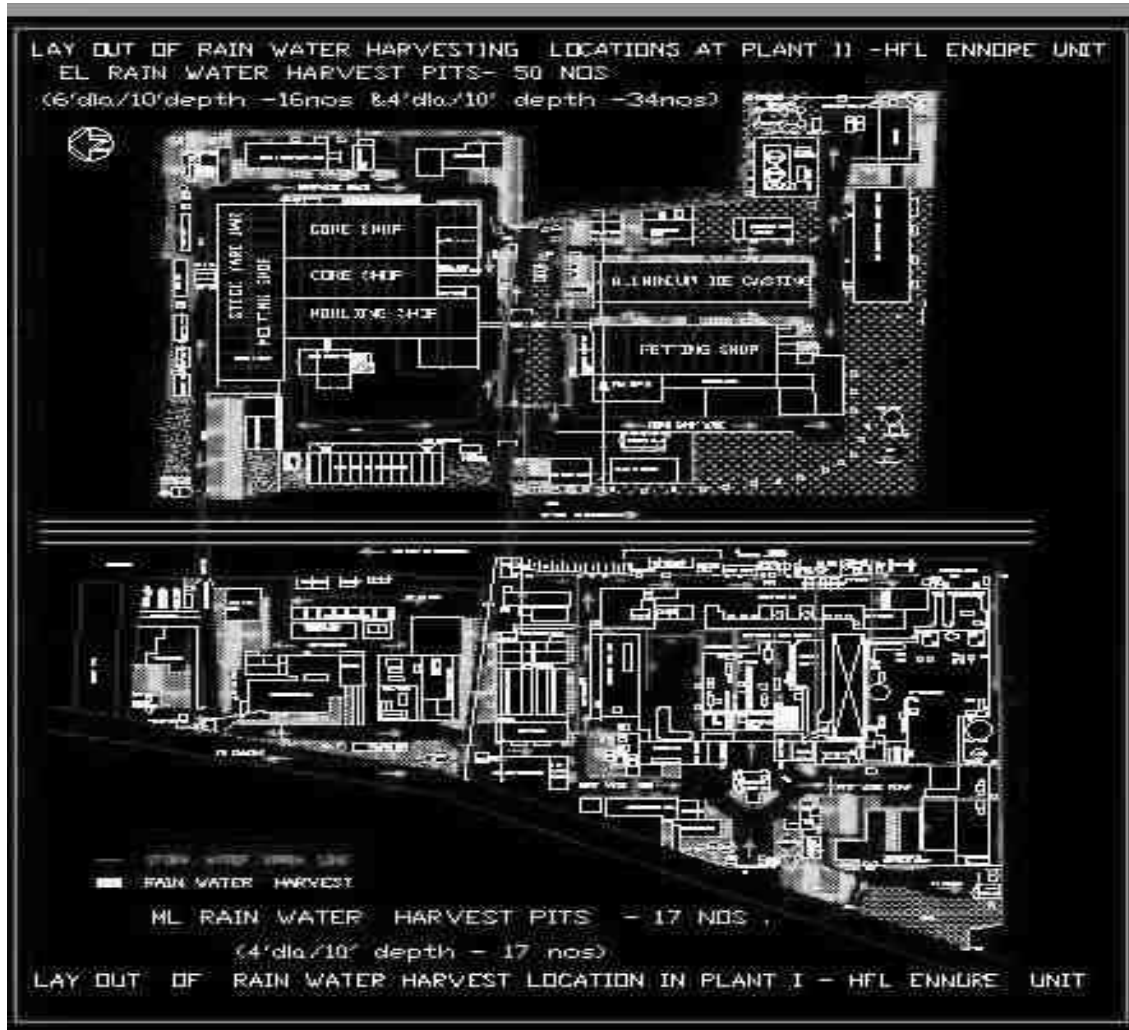
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The water will be collected, treated with sand filter and stored in UG storage tank of 3 x 500 m³. The water will be used for greenbelt and other activities

Storm runoff from open area, greenbelt area and paved area
= 884.34 cu.m x 0.80 (for all time)
= 707.47 cu.m

All the water shall be routed to rainwater harvesting pits


- The run-off from roads, paved area & greenbelt & vacant area will be diverted through storm water network to individual percolation pits proposed along the project periphery and the rain water will be re-charged into underground aquifers;
- A percolation rate of 0.51 is considered with percolation depth as 10m;
- Run-off = 707.47 X (1.0 – 0.51) = 283 m³;
- Size of percolation pit = 1.20 x 1.20 m and 4.0 m depth;
- Storage volume in each pit: 5.76 m³;
- Quantity of storm water run-off: 282 m³;
- No. of storage pits required: 282m³/ 5.76 m³ = 49.12 ~ 50 Nos; and
- Already 50 Nos. of percolation pits has been constructed and maintained along the project site periphery for rain water recharge. Therefore, no additional pits will be required for the rain water harvesting.



**FIGURE - 2.5
LAYOUT OF RAIN WATER HARVESTING**

CHAPTER - 3

DESCRIPTION OF THE ENVIRONMENT

 ASHOK LEYLAND	<i>Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</i>
	<i>Chapter - 3 Description of Environment</i>

3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 Introduction

This chapter illustrates the description of the existing environmental status of the study area with reference to the prominent environmental attributes. The study area covers the area falling within 10 km radius from the center of the existing plant boundary.

The existing environmental setting is considered to adjudge the baseline environmental conditions, which are described with respect to climate, hydro geological aspects, atmospheric conditions, water quality, soil quality, vegetation pattern, ecology, socio- economic profile, land use and places of archaeological importance. The objective of this section is to define the present environmental status, which would help in assessing the environmental impacts due to the proposed expansion and modernization activities.

This report incorporates the baseline data generated through primary surveys for three months from 1st July, 2020 to 30th September, 2020 and secondary data collected from various government, semi-government and public sector organizations.

3.1.1 Methodology

Appropriate methodologies have been followed in developing the EIA/EMP report. The methodology adopted for the study is outlined below:

- Conducting reconnaissance surveys for knowing the study area; and
- Selecting sampling locations for conducting various environment baseline studies.

The sampling locations have been selected on the basis of the following:

- Predominant wind directions recorded by the India Meteorological Department (IMD), Chennai observatory;
- Existing topography;
- Drainage pattern and location of existing surface water bodies like lakes/ponds, rivers and streams;
- Location of villages/towns/sensitive areas; and
- Areas, which represent baseline conditions.

The field observations have been used to:

- Assess the positive and negative impacts due to the proposed expansion and modernization activity;
- Suggest appropriate mitigation measures for negating the adverse environmental impacts, if any;
- Suggesting post-project monitoring requirements and the suitable mechanism for it.

3.2 Geology, Hydrogeology & Drainage

3.2.1 Basin and Sub-basin

The district is part of the composite east flowing river basin having Araniyar-korattalaiyar and Cooum sub basin.

Geomorphology

The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Alluvial Plain 2) Old River Courses 3) Coastal plains 4) Shallow & deep buried Pediments 5) Pediments and 6) Structural Hills.

The elevation of the area ranges from 4-9 m AMSL to sea level in the east. Four cycles of erosion gave rise to a complex assemblage of fluvial, estuarine and marine deposits. The major part of the area is characterised by an undulating topography with innumerable depressions which are used as irrigation tanks.

The coastal tract is marked by three beach terraces with broad inter-terrace depressions. The coastal plains display a fairly lower level or gently rolling surface and only slightly elevated above the local water surfaces or rivers. The straight trend of the coastal tract is resultant of development of vast alluvial plains. There are a number of dunes in the coastal tract.

Study area

The geology of the study area shows that the plant site is located in tidal flat deposit

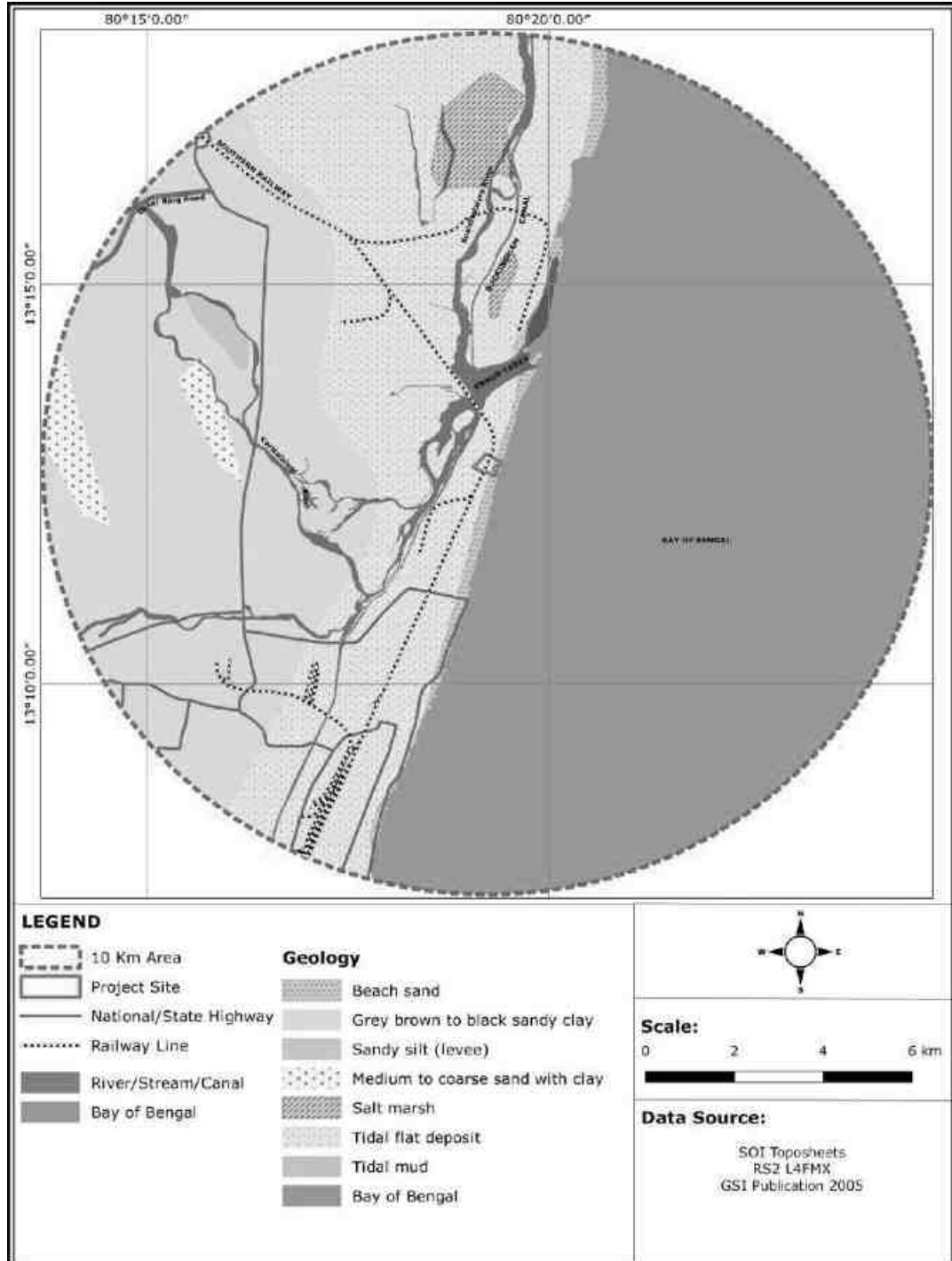
Soils

Soils in the area have been classified into i) Red soil ii) Black soil iii) Alluvial soil and iv) Colluvial soil. The major part is covered by Red soil of red sandy/clay loam type. Ferruginous red soils are also seen at places. Black soils are deep to very deep in occurrence and generally occur in the depressions adjacent to hilly areas, in the western part. Alluvial soils occur along the river courses and eastern part of the coastal areas. Sandy coastal alluvium (arenaceous soil) are seen all along the sea coast as a narrow belt.

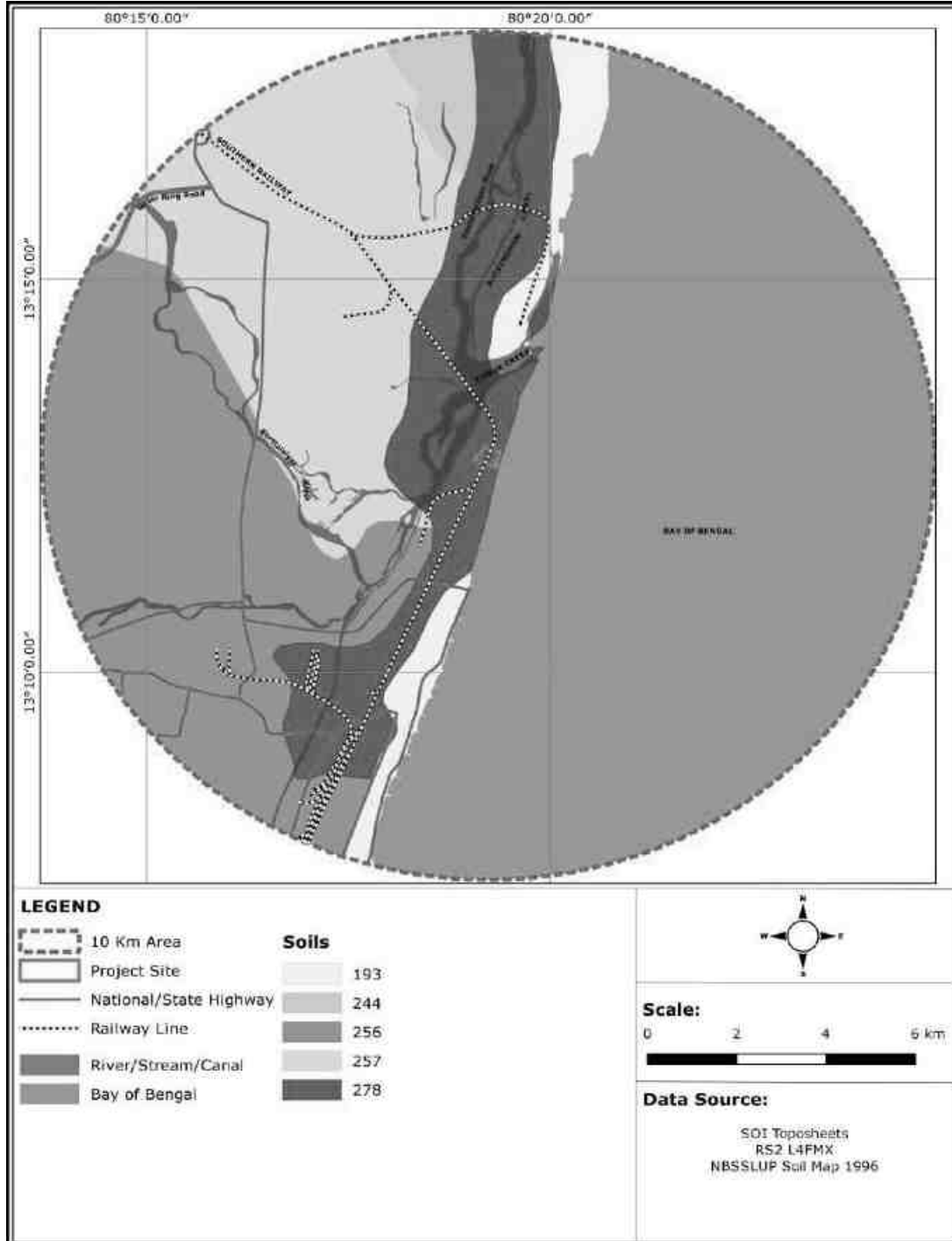
Study area

The plant site is located in the Deep, very poorly drained, clayey soils on nearly level salt pans with strong salinity. Major part of the study area falls in the category of Very deep, well drained, cracking clay soils on nearly level, tank-irrigated lands, slightly eroded; associated with; very deep, well drained, calcareous, clayey soils and Very deep, imperfectly drained, calcareous, cracking clay soils on nearly level tank-irrigated lands, slightly eroded; associated with; very deep, imperfectly drained, clayey soils.

The geology map and soil map of the study area is shown in **Figure-3.1 & in Figure-3.2.**



**FIGURE - 3.1
GEOLOGY IN THE STUDY AREA OF 10 KM RADIUS**



**FIGURE-3.2
SOIL PRESENT IN STUDY AREA OF 10 KM RADIUS**

TABLE-3.
DESCRIPTION OF SOIL CODES

Code	Description
193	Very deep, somewhat excessively drained, sandy soils on very gently sloping plains, slightly eroded
244	Moderately deep, moderately well drained, clayey soils on nearly level lands, slightly eroded; associated with; deep, moderately well drained, clayey soils
256	Very deep, well drained, cracking clay soils on nearly level, tank-irrigated lands, slightly eroded; associated with; very deep, well drained, calcareous, clayey soils
257	Very deep, imperfectly drained, calcareous, cracking clay soils on nearly level tank-irrigated lands, slightly eroded; associated with; very deep, imperfectly drained, clayey soils
278	Deep, very poorly drained, clayey soils on nearly level salt pans with strong salinity

3.2.2 Hydrogeology

3.2.2.1 General

The district is underlain by both porous and fissured formations (Plate-V). The important aquifer systems in the district are constituted by:

- Unconsolidated & semi-consolidated formations and
- Weathered, fissured and fractured crystalline rocks.

The porous formations in the district include sandstones and clays of Jurassic age (Upper Gondwana), marine sediments of Cretaceous age, Sandstones of Tertiary age and Recent alluvial formations. As the Gondwana formations are well-compacted and poorly jointed, the movement of ground water in these formations is mostly restricted to shallow levels. Ground water occurs under phreatic to semi-confined conditions in the inter-granular pore spaces in sands and sandstones and in the bedding planes and thin fractures in shales.

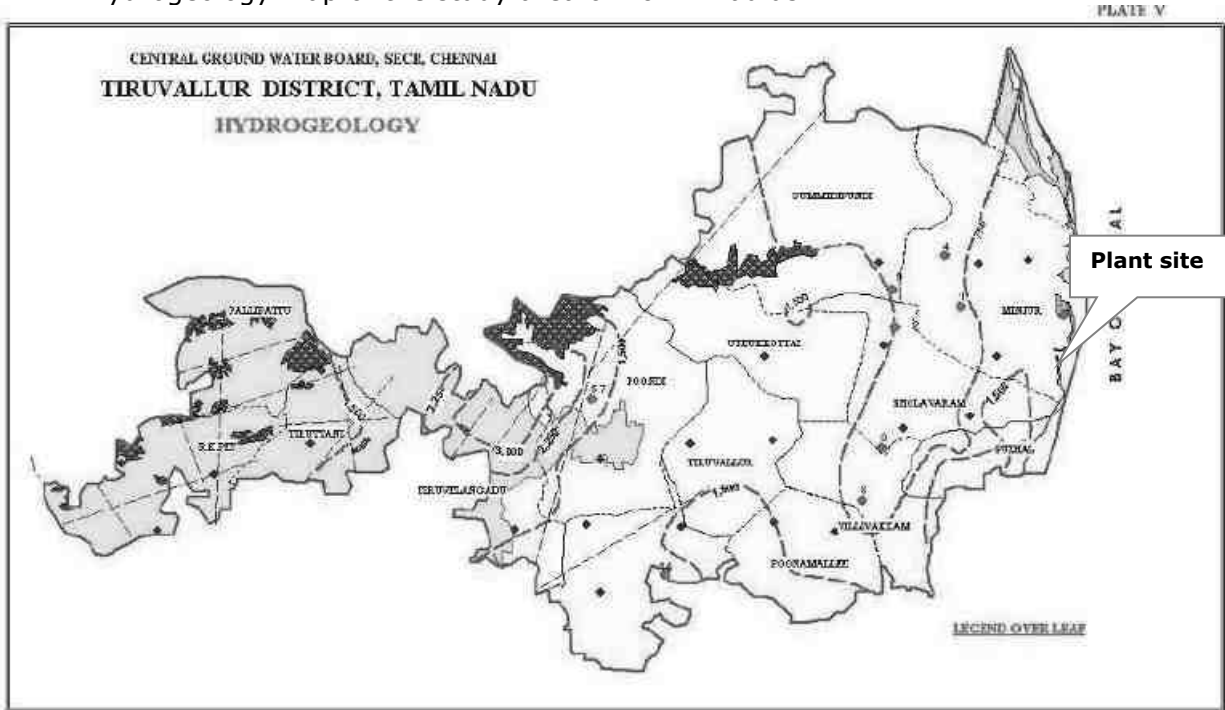
The maximum thickness of alluvium is 30.0 m, whereas the average thickness is about 15 m. Alluvium forms a good aquifer system along the Araniyar and Korattalaiyar river bed which is one of the major sources of water supply to urban areas of Chennai city and also to the industrial units.

The thickness of weathered zone in the district is in the range of 2 to 12 m. The yield of bore wells drilled down to a depth of 50 to 60 m ranges from 20 to 400 lpm. The yield of successful bore wells drilled down to a depth of 150 m bgl during the ground water exploration programme of Central Ground Water Board ranged from 1.2 to 7.6 lpm.

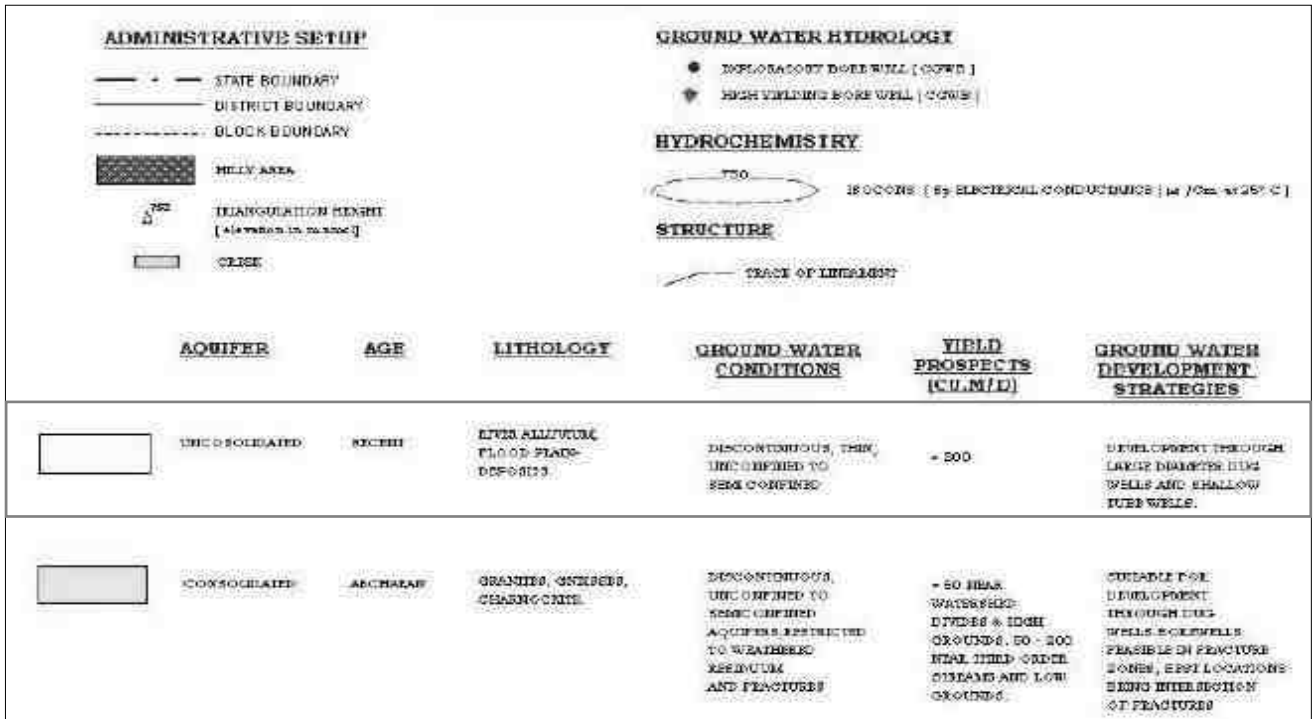
Study area

It has been observed from the hydrogeology map of the study area that the plant site is located in the Quaternary - laterite, ferruginous concretions, lithomargic clay silt, sand, gravel. The hydrogeological conditions in the area are moderately thick, discontinuous unconfined aquifers down to 30 m bgl. They have a prospect of yielding > 200 m³/day.

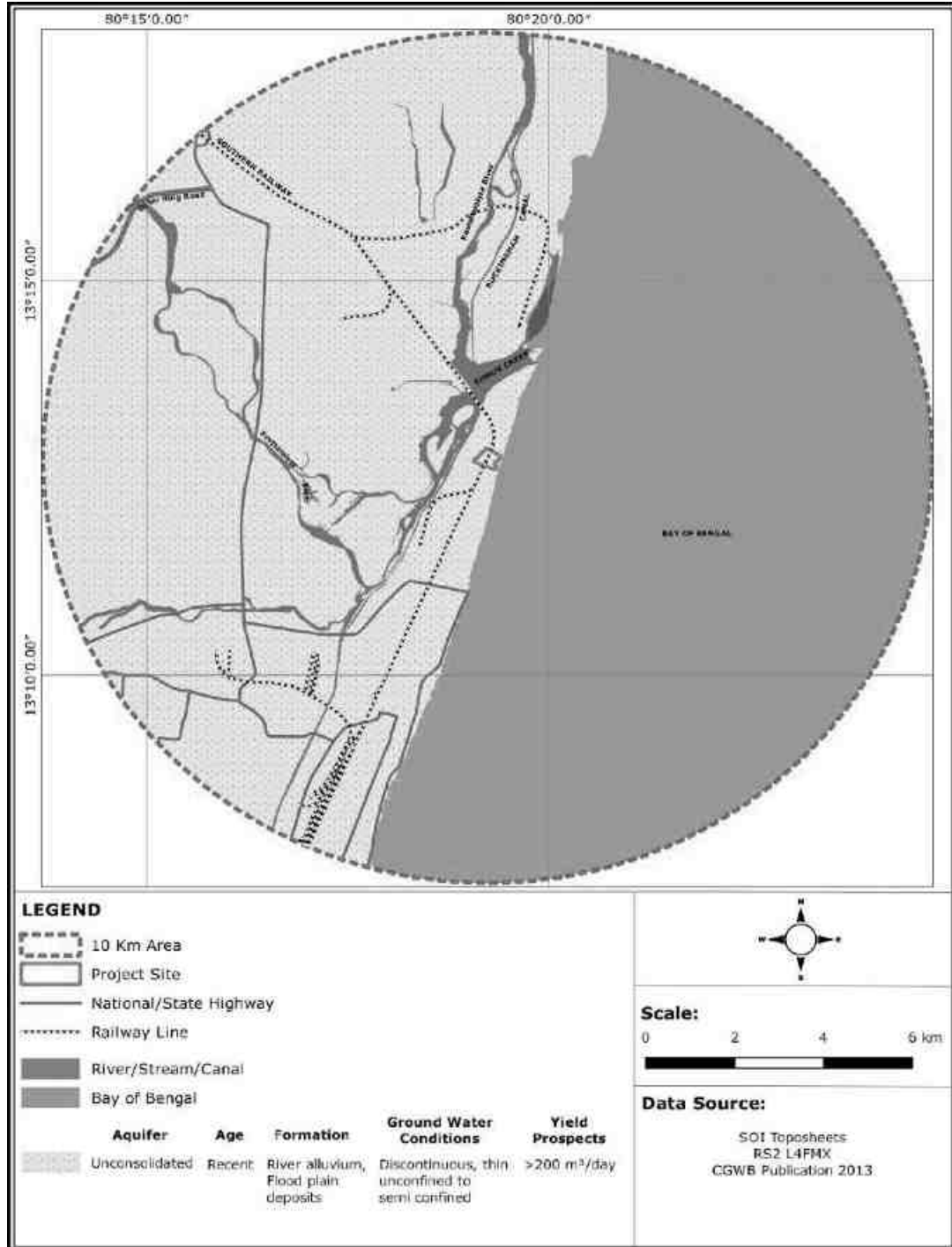
Figure - 3.3 shows the hydrogeology of the Tiruvallur District. **Figure - 3.4** shows the legend for the Hydrogeology of the Tiruvallur District and **Figure - 3.5** shows the hydrogeology map of the study area of 10 km radius.



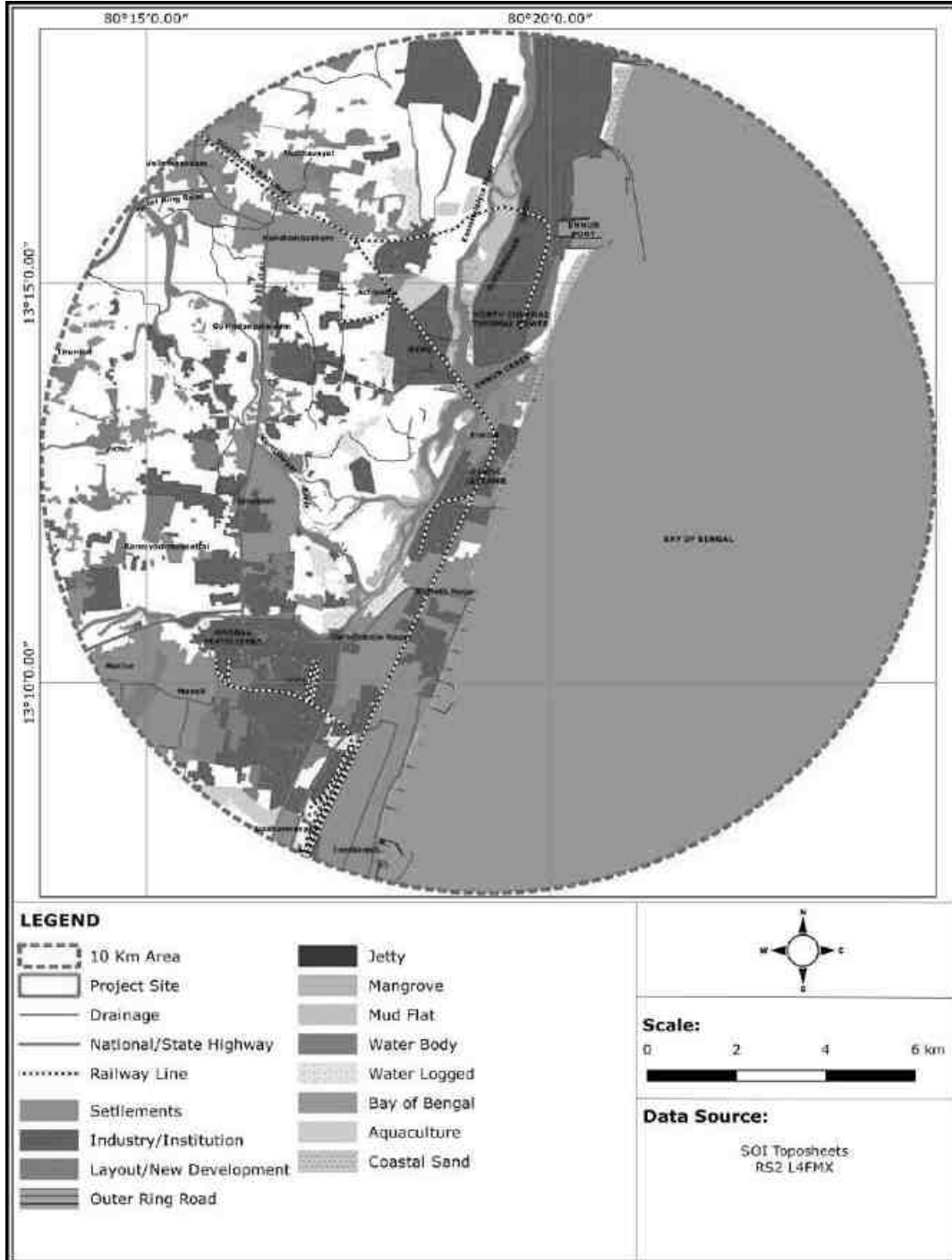
**FIGURE - 3.3
HYDROGEOLOGY OF TIRUVALLUR DISTRICT**



**FIGURE - 3.4
LEGEND FOR HYDROGEOLOGY OF TIRUVALLUR DISTRICT**



**FIGURE-3.5
HYDROGEOLOGY IN STUDY AREA OF 10 KM RADIUS**



**FIGURE-3.6
DRAINAGE IN STUDY AREA OF 10 KM RADIUS**

3.2.3 Drainage

Araniyar, Korattalaiyar, Cooum, Nagari and Nandhi are the important rivers. In general, the drainage patterns are dendritic. All the rivers are seasonal and carry substantial flows during monsoon period. Korattalaiyar river water is supplied to Cholavaram and Red Hill tanks by constructing an Anicut at Vellore Tambarambakkam. After filling a number of tanks on its further course, the river empties into the Ennore creek a few kilometres north of Chennai.

The Cooum River, flowing across the southern part of the district, has its origin in the surplus waters of the Cooum tank in Tiruvallur taluk and also receives the surplus waters of a number of tanks. It feeds the Chembarambakkam tank through a channel. It finally drains into the Bay of Bengal.

Study area

From the drainage map, it was observed that Korattalaiyar river & Bay of Bengal are the nearest water bodies to the plant site.

3.3 **Land Use Studies**

Studies on land use aspects of eco-system play an important role in identifying sensitive issues, if any, and taking appropriate actions for maintaining the ecological balance in the development of the region.

3.3.1 Objectives

The objectives of land use studies are:

- To determine the present land use pattern;
- To analyze the impacts on land use due to the proposed expansion and modernization project in the study area; and
- To give recommendations for optimizing the future land use pattern, vis-à-vis growth of plant activities in the study area and its associated impacts.

3.3.2 Methodology

For the study of land use, the literature review of various secondary sources such as District Census Handbook, regional maps regarding topography, zoning settlements, industry, forest etc., were taken. The data was collected from various sources like District Census Handbook, Revenue records, state and central government offices and Survey of India (SOI) Topo sheets and also through primary field surveys.

3.3.3 Land Use Based on Secondary Data

Based on the Census report, the distance of 10 km radius around the proposed expansion and modernization area has been considered in the study. These areas were studied in detail to get the idea of land use pattern in the study area. The land use pattern of the study area as per 2011 Census is presented in **Table - 3.1**. The village wise land use data is presented in **Annexure XXIII**

TABLE - 3.1
LAND USE PATTERN BASED ON CENSUS DATA

Sr. No.	Particulars of Land Use	0-3 km (ha)	3-7 km (ha)	7-10 km (ha)	0-10 km (ha)
1	Forest land	0	0	0	0
2	Land under Cultivation				
	a) Irrigated land	95.75	1069.63	216.6	1381.98
	b) Un irrigated land	0	628.98	22.3	651.28
3	Cultivable waste land	34.52	285.89	35.2	355.63
4	Area not available for cultivation	536.11	2190.45	272.54	2999.1
	Total	666.38	4174.95	546.64	5387.99

Source :District Census Handbook, Chennai & Tiruvallur, 2011

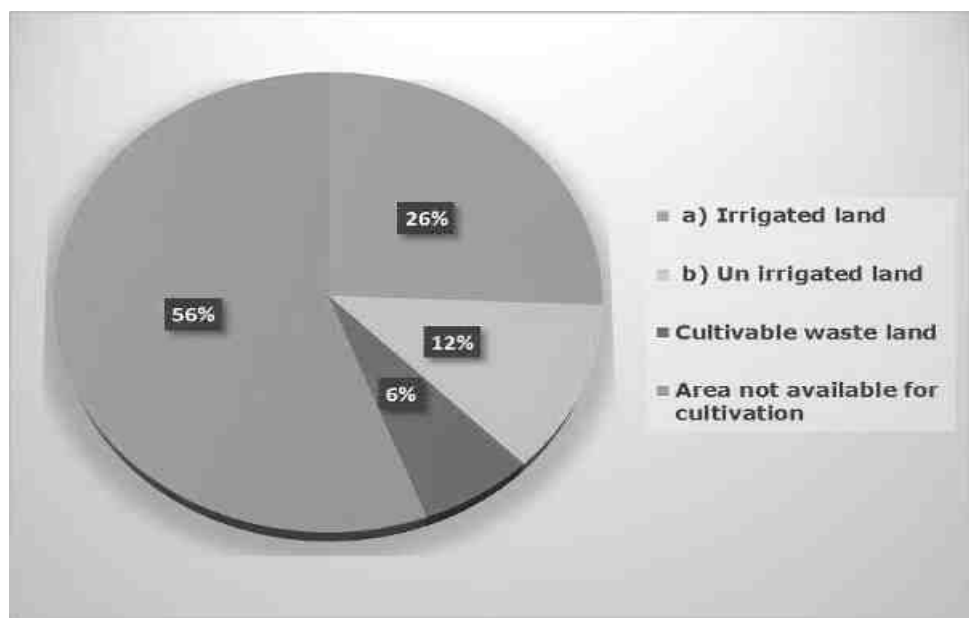


FIGURE-3.7
LANDUSE CLASSIFICATION

- **Forest**

There is no forest area in the 10 Km radius of the plant site

- **Land under cultivation**

In the study area, altogether 2033.26 ha land (irrigated and un-irrigated) is used for cultivation, in which the irrigated land works out to be 1381.98 ha and un-irrigated land to be 651.28 ha.

- **Cultivable waste land**

This land includes that land, which was cultivated sometime back and left vacant during the past 5 years in succession. Such lands may either be fallows or covered with shrubs, which are not put to any use.

Lands under thatching grass, bamboo bushes, other grooves useful for fuel etc., and all grazing lands and village common lands are also included in this category. The study area comprises about 355.63 ha of the cultivable wastelands.

- **Area not available for cultivation**

The land areas under this category work out to be 2999.1 ha of the study area, which includes area of land with scrub, land without scrub, quarry, mining area, rocky/stony and barren area.

3.3.4 Land Use Pattern Based on Remote Sensing Data

Remote sensing satellite imageries were collected and interpreted for the 5 km & 10-km radius study area for analysing the Land use pattern of the study area. Based on the satellite data, Land use/ Land cover maps have been prepared.

- **Methodology**

The land use pattern of the study area has been estimated by interpreting the recent IRS RS-2 LISS IV FX satellite imagery for the year 2015.

3.3.4.1 Land use/Land cover classification system

The present Land use/ Land cover maps were prepared based on the classification system of National standards. For explanation of each of the Land use category, the details are given in **Table - 3.2**. The land use / land cover map of the study area is attached as **Figure-3.8**.

TABLE - 3.2
LAND USE / LAND COVER CLASSIFICATION SYSTEM

Sr. No.	Level-1	Level-2
1	Built-up Land	Town/cities
		Villages
		Institution/Industry/Godown etc
		Plotted Area/Layout
2	Agriculture Land	Double Crop Land/Irrigated Area
		Plantations
		Fallow
3	Forest	Evergreen/Semi evergreen
		Deciduous
		Forest Plantation
4	Wastelands	Rocky/Stony Waste
		Land with /without scrubs
		Saline/sandy & Marshy/swampy
5	Water Bodies	River/Stream
		Lake/Reservoir/Tanks
6	Others	Orchard/Other Plantation
		Shifting cultivation
		Salt Pans, Snow covered/Glacial
		Barren/Vacant Land

Source: IRS RS-2 L4FMX Satellite Imagery

3.3.4.2 Data Requirements

IRS RS-2 of L4FMX Satellite Imagery data was acquired on 21th February 2017 and was used for the mapping and interpretation. Besides, other collateral data as available in the form of maps, charts, census records, other reports and especially topographical survey of India maps are used. In addition to this, ground truth survey was also conducted to verify and confirm the ground features.

3.3.4.3 Methodology

The methodology adopted for preparation of Land use/Land cover thematic map is as follows:

- Digital interpretation of IRS RS-2 of L4FMX Satellite Imagery data using ERDAS software programme; and
- Field observations.

The methodology adopted for preparation of land use/ land cover thematic map is monoscopic visual interpretation of geo coded scenes of IRS Resourcesat-2 satellite and field observations are taken. The various steps involved in the study are preparatory field work, field survey and post field work.

3.3.4.4 Pre field Interpretation of Satellite Data

The False Colour Composite (FCC) of IRS Resourcesat-2 of L4FMX satellite data are used for pre-field interpretation work. Taking the help of toposheets, geology and geomorphology by using the image elements the features are identified and the boundaries are delineated roughly. Each feature is identified on image by their image elements like tone, texture, colour, shape, size, pattern and association. A tentative legend in terms of Land Use/Land Cover, physiography and erosion was formulated. The sample areas for field check are selected covering all the physiography, Land use/Land cover feature cum image characteristics.


- **Ground Truth Collection**

Both toposheets and imagery were taken for field verification and a transverse plan using existing road network was made to cover as many representative sample areas as possible to observe the broad Land use features and to adjust the sample areas according to field conditions. Detailed field observations and investigations were carried out and noted the Land use features on the imagery.

- **Post Field Work**

The base maps of the study area were prepared, with the help of Survey of India toposheets. Preliminary interpreted Land use and the Land cover features boundaries from IRS Resourcesat-2 False Colour Composite were modified in light of field information and the final thematic details were transferred onto the base maps.

The final interpreted and classified thematic map was cartographed. The cartographic map was coloured with standard colour coding and detailed description of feature with standard symbols. All the classes noted and marked by the standard legend on the map.

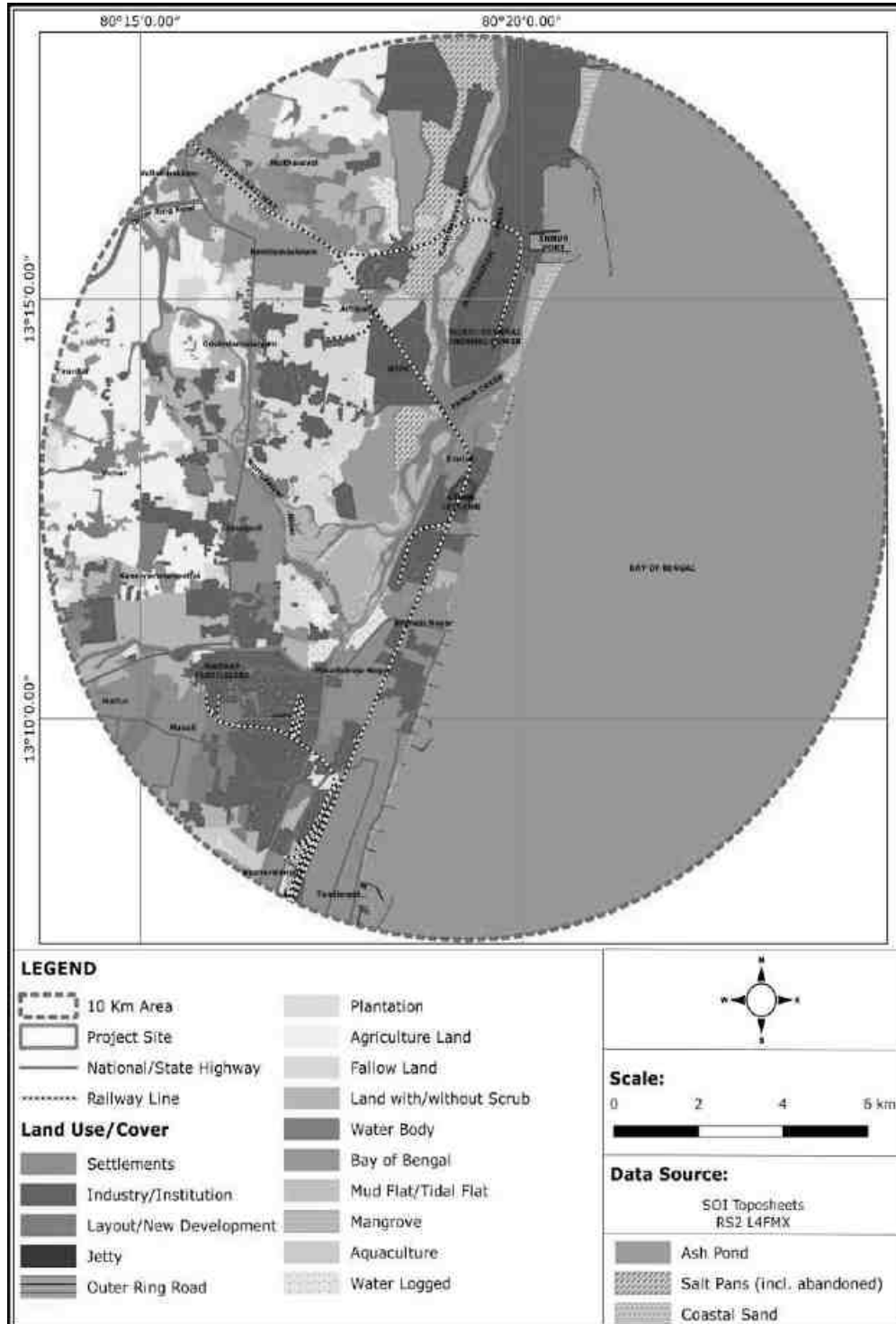
 ASHOK LEYLAND	<p>Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</p> <p style="text-align: right;">Chapter - 3 Description of Environment</p>
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3.3.4.5 Final Output

The final output would be the Land use/Land cover map with numerals given to different colour code for each category as shown in map. Area estimation of all features of Land use/Land cover categories was noted.

3.3.4.6 Observations

The details of various land use classes within 10 km from the plant site are furnished in **Table - 3.3**. The raw satellite imagery of the study area within 5km & 10 km radius on IRS RS-2 L4FMX is presented in **Figure-3.8** respectively.



**FIGURE-3.8
LANDUSE OF STUDY AREA IN 10 KM RADIUS**

TABLE - 3.3
DIFFERENT LAND USE CLASSES IN 10 KM RADIUS OF THE PLANT SITE

Sr.No	Level-I	Level-II	0 -10 km	
			Area (Ha)	Area (%)
1	Built-up Land			
1.1		Settlements	3217.98	9.98
1.2		Industry/Institutional Land	4440.84	13.78
1.3		New Development/Layout	338.18	1.05
1.4		Jetties	48.56	0.15
1.5		Outer Ring Road	25.84	0.08
2	Forest			
2.1		Reserved/Protected Forest	0.00	0.00
3	Agricultural Land			
3.1		Plantation	44.64	0.14
3.2		Agriculture Land	2139.98	6.64
3.3		Fallow Land	1279.79	3.97
4	Waste Land			
4.1		Land with/without Scrub	1976.09	6.13
5	Waterbody			
5.1		Stream/River	803.52	2.49
5.2		Tank/Reservoir/Pond/Lake	616.14	1.91
5.3		Canal	86.70	0.27
5.4		Bay of Bengal	15316.37	47.52
6	Wet Land			
6.1		Mud flat/tidal flat	224.65	0.70
6.2		Mangrove	174.84	0.54
7	Others			
7.1		Aquaculture	151.53	0.47
7.2		Water Logged	297.61	0.92
7.3		Ash Pond	413.57	1.28
7.4		Salt Pans (including abandoned)	524.75	1.63
7.5		Coastal Sand	112.06	0.35
		Total	32233.66	100.00



3.4 Soil Characteristics

It is essential to determine the potential of soil in the area and identify the current status of soil quality and also to predict the impacts that may arise due to the plant operations. Accordingly, a study of assessment of the baseline soil quality has been carried out in the region.

3.4.1 Data Generation

For studying the soil profile of the region, sampling locations were selected to assess the existing soil conditions in and around the project area representing various land use conditions. The physical, chemical, nutrient and heavy metal concentrations were determined. The present study of the soil profile establishes the baseline characteristics and this will help in future in identifying the incremental concentrations if any, due to the operation of the plant.

The sampling locations have been identified with the following objectives:

- To determine the baseline soil characteristics of the study area;
- To determine the impact of industrialization on soil characteristics; and
- To determine the impact on soils more importantly from agricultural productivity point of view.

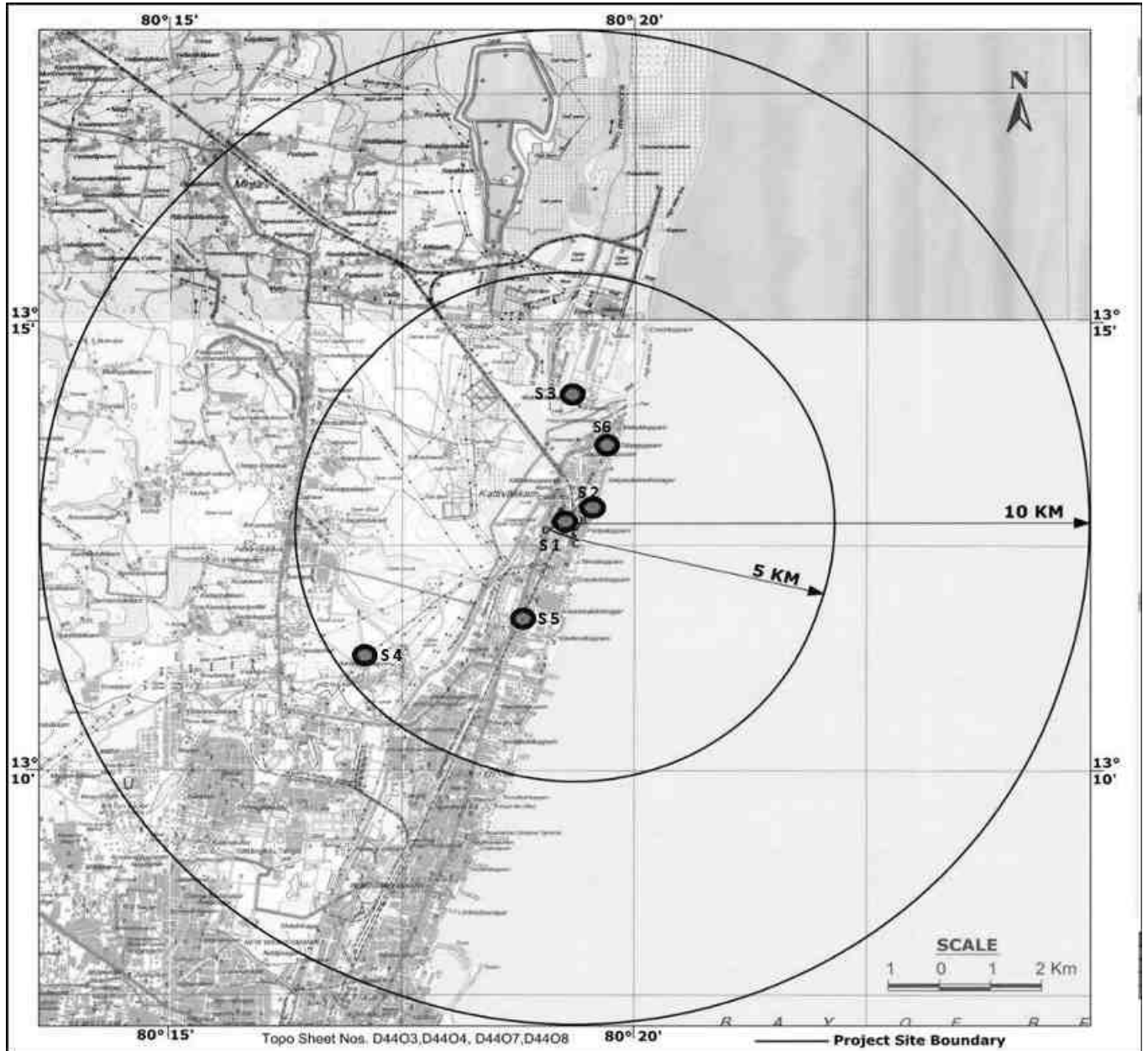
3.4.2 Soil Sampling and Analysis

Six locations within 10-km radius of the plant boundary were collected for the assessment of soil quality. At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm and 90 cm below the surface and were homogenized. This is in line with IS: 2720 and Methods of Soil Analysis, Part-1, 2nd edition, 1986 of (American Society for Agronomy and Soil Science Society of America). The homogenized samples were analysed for physical and chemical characteristics.

The samples have been analysed as per the established scientific methods for physico-chemical parameters. The heavy metals have been analysed by using Atomic Absorption Spectrophotometer and Inductive Coupled Plasma Analyzer. The details of the sampling locations are given in **Table - 3.4** and are shown in **Figure - 3.10**.

**TABLE - 3.4
DETAILS OF SOIL SAMPLING LOCATIONS**

Code	Location	Distance from Plant Boundary (km)	Direction w.r.t Plant Boundary
S1	Plant site	--	--
S2	Periyakuppam	0.3 Km	ENE
S3	kattukuppam	0.9 km	N
S4	Edayanchavadi	4.2 km	WSW
S5	Sivakami Nagar	1.8 km	S
S6	Thulsikuppam	1.3 km	NE



**FIGURE - 3.9
SOIL SAMPLING LOCATIONS IN STUDY AREA OF 10KM RADIUS**

3.4.3 Baseline Soil Status

The results of soil samples collected at all locations within the study area are given in **Table-3.5**. The standard classification of soil is given in **Table - 3.6**. It has been observed that the texture of the soil is mostly "clay soil" in the study area. The common color of the soil is pale brown. The pH of the soil ranged from, indicating that the soil is slightly alkaline in nature. The bulk density of the soil ranges in between 1.2-1.3 gm/cc.



The organic carbon content in the study area is observed as the electrical conductivity of the soil was observed to be in range of 275 $\mu\text{s}/\text{cm}$ - 525 $\mu\text{s}/\text{cm}$ with the minimum value observed in Periyakuppam(S2) and the maximum value observed in Thulsikuppam (S6).

Available nitrogen was observed to be ranging from 297.1 kg/ha to 383.4 kg/ha. A minimum concentration is observed at Kattukuppam(S3) and maximum concentrations are observed at Periyakuppam(S2).

Available phosphorous was observed to be in the range of 187.9 kg/ha -298.5 kg/ha. The minimum value observed at Periyakuppam(S2) and maximum value observed at Thulsikuppam(S6).

Available potassium was observed to be in the range of 69.2kg/ha-98.7 kg/ha in the study region. The minimum value observed at Edayanchavadi(S4) and maximum value observed at Kattukuppam(S3).

Based on above, the soil in the region has been found to have sufficient quantities of nutrients for crop growth.

TABLE - 3.5
SOIL ANALYSIS RESULTS IN THE STUDY AREA

Parameters	S1	S2	S3	S4	S5	S6
pH (1:5 soil water extract)	7.95	7.62	7.47	7.76	7.54	7.91
Electrical Conductivity ($\mu\text{s}/\text{cm}$) (1:5 soil water extract)	310	275	516	423	478	525
Texture	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay
Sand (%)	49	51	46	48	45	52
Silt (%)	12	13	16	15	17	14
Clay (%)	39	36	38	37	35	33
Bulk Density (gm/cc)	1.3	1.2	1.2	1.3	1.2	1.3
Exchangeable Calcium as Ca (mg/kg)	5712	4558	6093	5307	5502	4993
Exchangeable Magnesium as Mg (mg/kg)	1675	1144	1911	1134	1804	1541
Exchangeable Sodium as Na (mg/kg)	314.2	359.2	284.0	351.8	330.2	298.0
Available Potassium as K (kg/ha)	96.1	84.1	98.7	69.2	74.2	87.6
Available Phosphorus as P ₂ O ₅ (kg/ha)	239.6	187.9	261.5	208.5	205.6	298.5
Available Nitrogen as N (kg/ha)	362.2	383.4	297.1	370.3	365.4	346.1
Organic matter (%)	0.76	0.72	0.85	0.55	0.65	0.81
Organic Carbon (%)	0.44	0.42	0.49	0.32	0.38	0.36
Sodium Absorption Ratio	0.42	0.55	0.37	0.52	0.48	0.41

TABLE - 3.6
STANDARD SOIL CLASSIFICATION

Sr. No.	Soil Test	Classification
1	pH	<4.5 Extremely acidic 4.51- 5.00 Very strongly acidic 5.01-6.00 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 Neutral 7.31-7.80 slightly alkaline 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline >9.01 very strongly alkaline
2	Salinity Electrical Conductivity ($\mu\text{S}/\text{cm}$) (1ppm = 640 $\mu\text{S}/\text{cm}$)	Upto 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)
3	Organic Carbon (%)	Upto 0.2: very less 0.21-0.4: less 0.41-0.5 medium, 0.51-0.8: on an average sufficient 0.81-1.00: sufficient >1.0 more than sufficient
4	Nitrogen (kg/ha)	Upto 50 very less 51-100 less 101-150 good 151-300 Better >300 sufficient
5	Phosphorus (kg/ha)	Upto 15 very less 16-30 less 31-50 medium, 51-65 on an average sufficient 66-80 sufficient >80 more than sufficient
6	Potassium (kg/ha)	0 -120 very less 120-180 less 181-240 medium 241-300 average 301-360 better >360 more than sufficient

Source: Handbook of Agriculture

3.5 Meteorology

The meteorological data recorded during the study period is very useful for proper interpretation of the baseline information as well as for developing prediction models for air quality dispersion. Historical data on meteorological parameters will also play an important role in identifying general meteorological regime of the region.

On-site monitoring was undertaken for various meteorological variables in order to record the site-specific data. Data was recorded every hour continuously from 1st July 2020 to 30th September 2020. India Meteorological Department has been monitoring surface observations at Chennai Airport. Temperature, relative humidity, rainfall, wind speed and direction are measured twice a day viz., at 0830 and 1730 hrs. The wind speed and direction data of IMD, Chennai station has been obtained for the past available 10 years. The data for the remaining parameters has been collected for the last 10 years and processed.

3.5.1 Meteorological Data Recorded at site

The meteorological parameters were recorded at site on hourly basis during the study period and consists of parameters like wind speed, wind direction and temperature. The total rainfall was recorded daily once at 0830 hrs. The maximum and minimum values for all the parameters except wind speed and wind direction are presented in **Table - 3.7**.

TABLE - 3.7
SUMMARY OF THE METEOROLOGICAL DATA GENERATED AT SITE

Period	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	
July 2020	38.0	23.2	89.0	36.0	82.6
August 2020	36.1	24.0	96.0	44.0	119.3
September 2020	36.0	23.0	96.0	49.0	106.2

- **Wind speed and Direction**

The summary of the wind pattern for the period 1st July 2020 to 30th September 2020 is given in **Table - 3.8** and graphical presentation of the same is shown in **Figure - 3.10**. The wind rose diagram mentioned below represent the wind blowing to direction. The predominant winds are mostly from.

TABLE - 3.8
SUMMARY OF WIND PATTERN IN STUDY AREA

Period	First predominant Wind direction	Second Predominant Wind direction	Average Wind Speed	Calm (%)
July 2020 – September 2020	WSW	SW	7.0 mph	4.3

*Blowing towards WSW

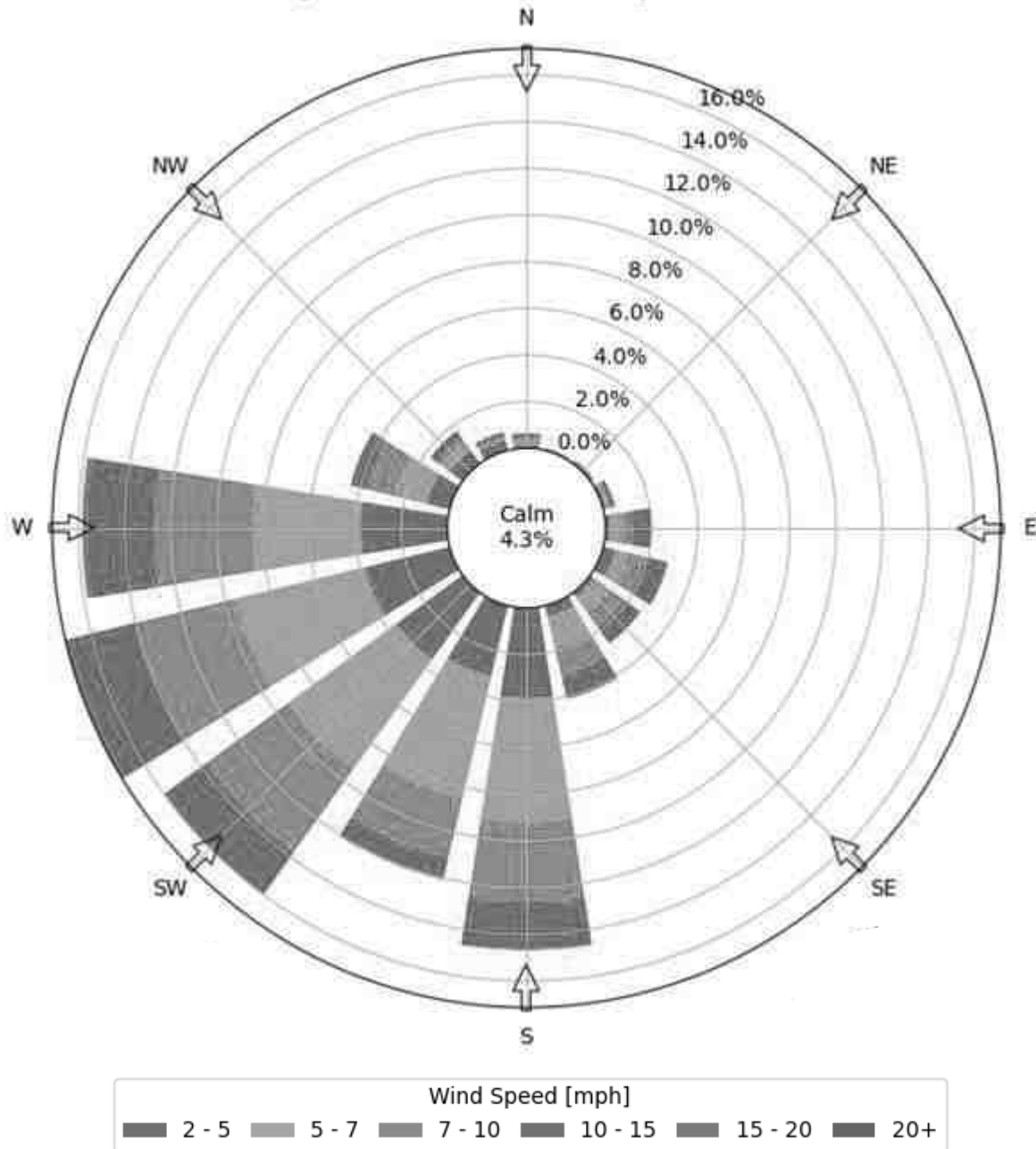


FIGURE - 3.10
SITE SPECIFIC WINDROSE FOR 1st JULY 2020 TO 30th SEPTEMBER 2020

3.5.2 Secondary Data from IMD-Chennai

Secondary meteorological data from IMD-Chennai has been collected for temperature, relative humidity, atmospheric pressure, rainfall, wind speed and wind direction. The data at IMD is usually recorded twice a day viz. at 0830 hr and 1730 hr.

3.5.2.1 Meteorological Data

The nearby India Meteorological Department station that is generating meteorological data is 25 km from the project site i.e, IMD, Chennai. Hence, secondary information on meteorological conditions has been collected from IMD Station at Chennai Airport.

India Meteorological Department – Chennai Airport

India Meteorological Department has been monitoring surface observations at Chennai Airport. Temperature, relative humidity, rainfall, wind speed and direction are measured twice a day viz., at 0830 and 1730 hr. The wind speed and direction data of IMD, Chennai station has been obtained for the past available 10 years. The data for the remaining parameters has been collected for the last 10 years and processed. Data on Cloud cover is compiled from the climatological tables for the IMD station at Chennai. The monthly data for all the parameters except wind speed and wind direction is presented in **Table - 3.9**.

TABLE - 3.9
CLIMATOLOGICAL DATA STATION: IMD, CHENNAI

Month	Atmospheric Pressure (hPa)		Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	0830	1730	Max.	Min.	0830	1730	
January	1016.5	1013.6	33.3	17.0	100	38	23.8
February	1012.2	1009.0	34.9	16.0	95	31	6.8
March	1010.6	1007.1	38.7	18.2	91	28	15.1
April	1008.4	1004.3	42.7	21.0	96	39	24.7
May	1004.5	1000.8	43.4	21.6	100	15	51.7
June	1003.5	999.9	42.8	21.2	100	32	52.6
July	1004.2	1000.7	39.5	22.3	95	35	83.5
August	1004.9	1001.1	39.0	22.0	98	32	124.3
September	1006.3	1002.4	37.8	21.5	97	35	118.0
October	1008.5	1005.3	35.9	22.4	98	46	267.0
November	1010.9	1003.1	34.4	18.0	99	42	308.0
December	1012.9	1010.0	31.7	17.8	100	34	139.1

3.5.2.2 Wind Speed and Direction

Generally, light to moderate winds prevail throughout the year. Winds were light and moderate particularly during the morning hours. While during the afternoon hours the winds were stronger. The seasonal and annual wind roses are shown in **Figure - 3.11 (A & B)** and **Figure - 3.11 (C & D)** and **Figure - 3.12** and also presented in **Table - 3.10**.

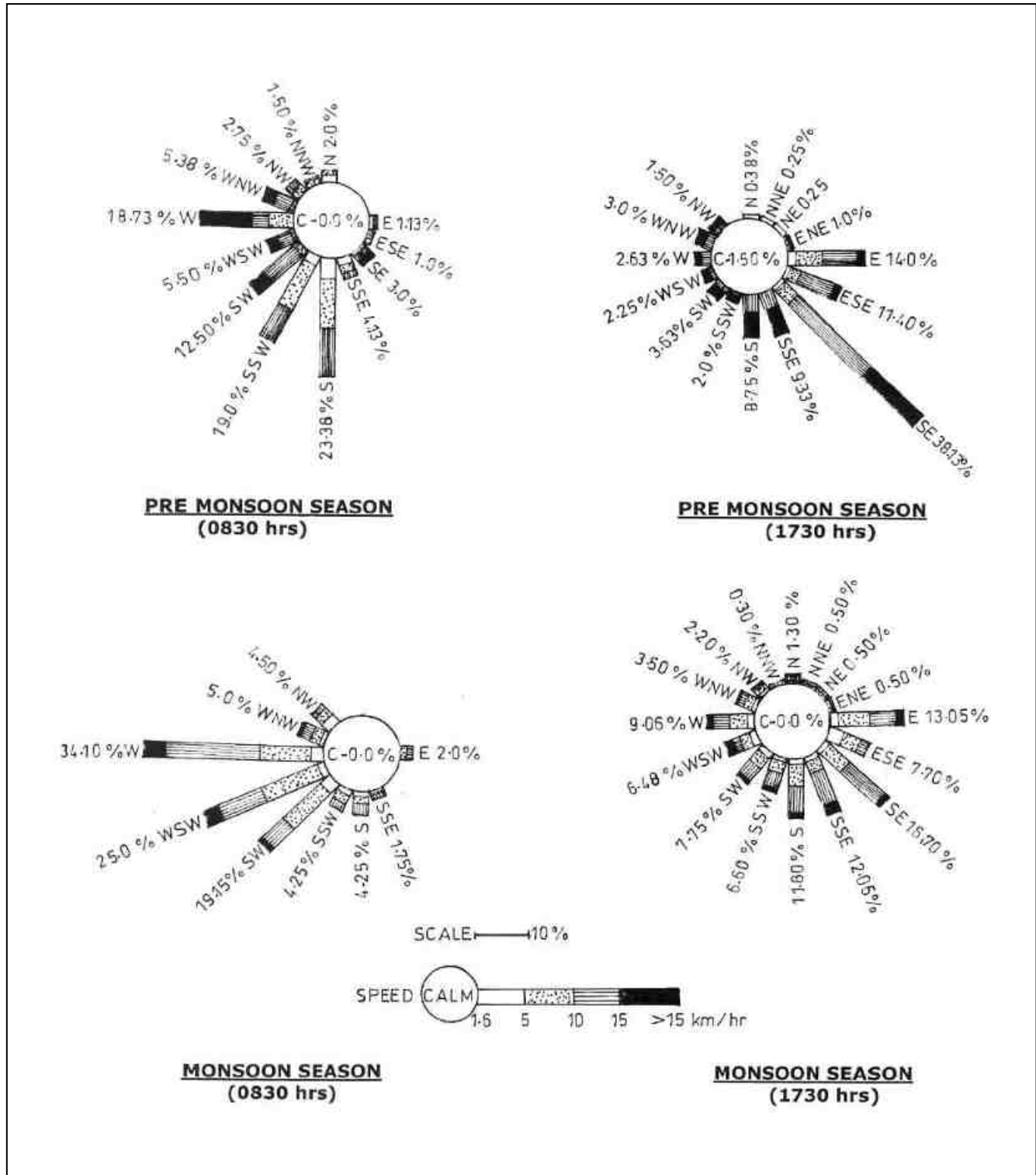
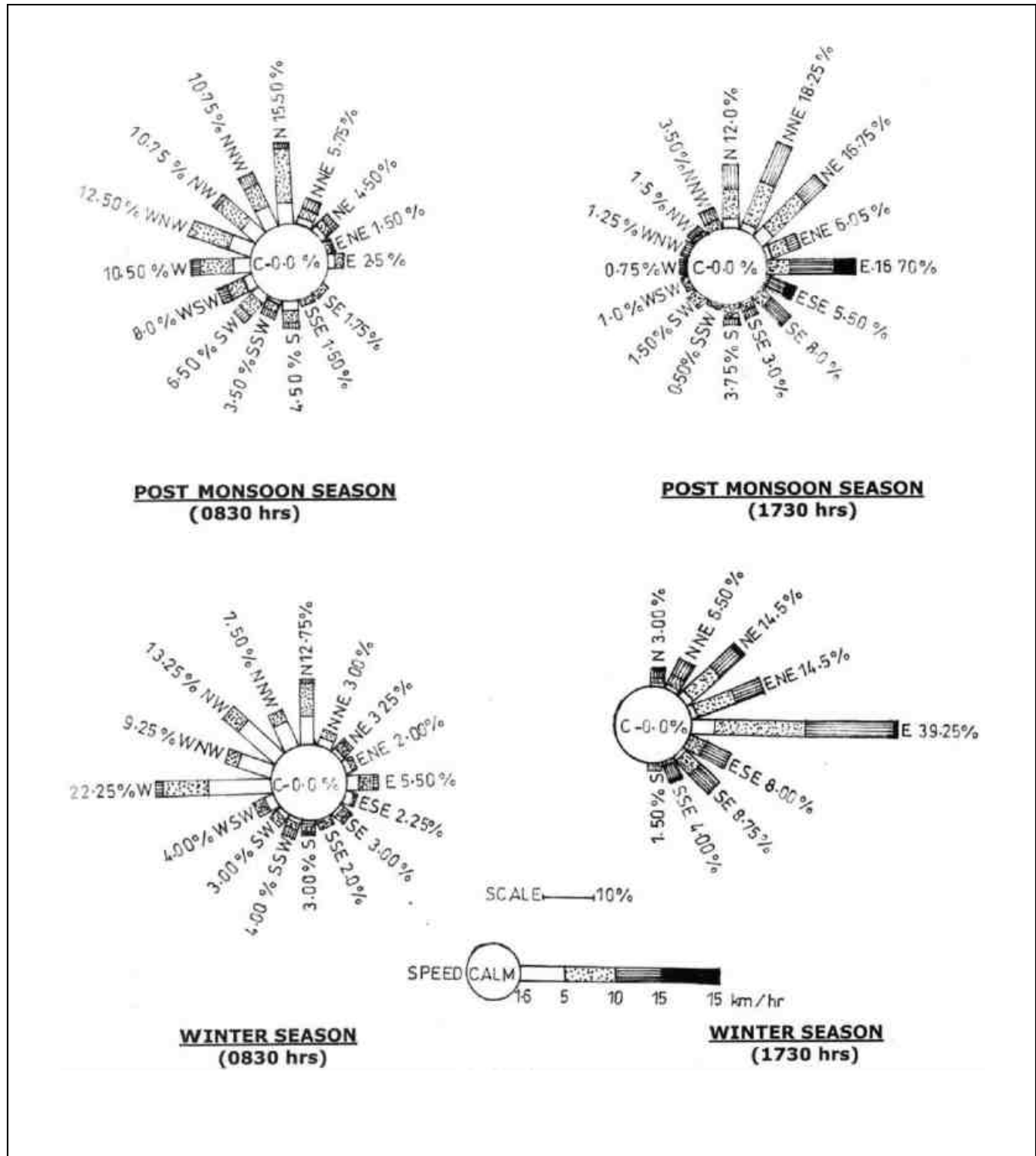
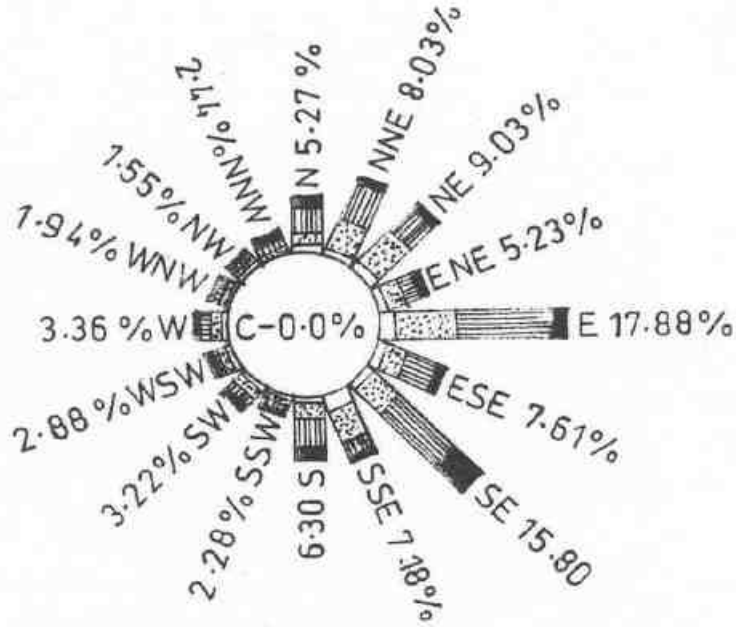


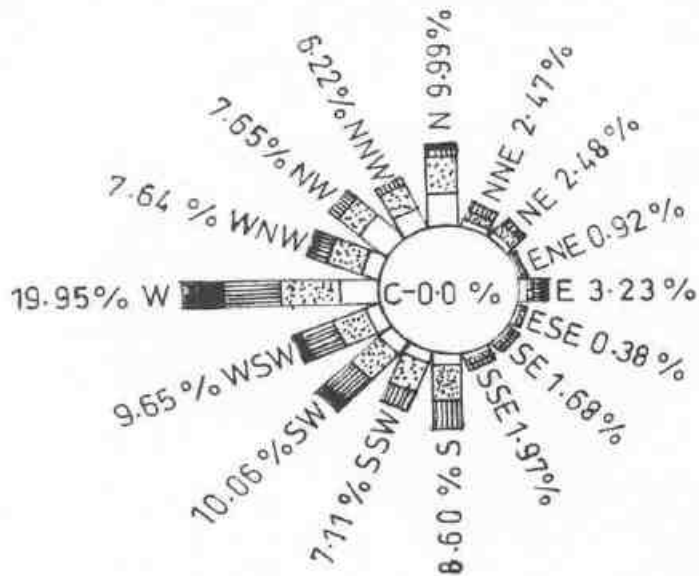
FIGURE - 3.11 (A & B)
WINDROSE DIAGRAM OF PRE-MONSOON & MONSOON SEASON-IMD, CHENNAI



**FIGURE - 3.11 (C & D)
WINDROSE DIAGRAM OF POST MONSOON & WINTER SEASON-IMD, CHENNAI**



17.30 hrs



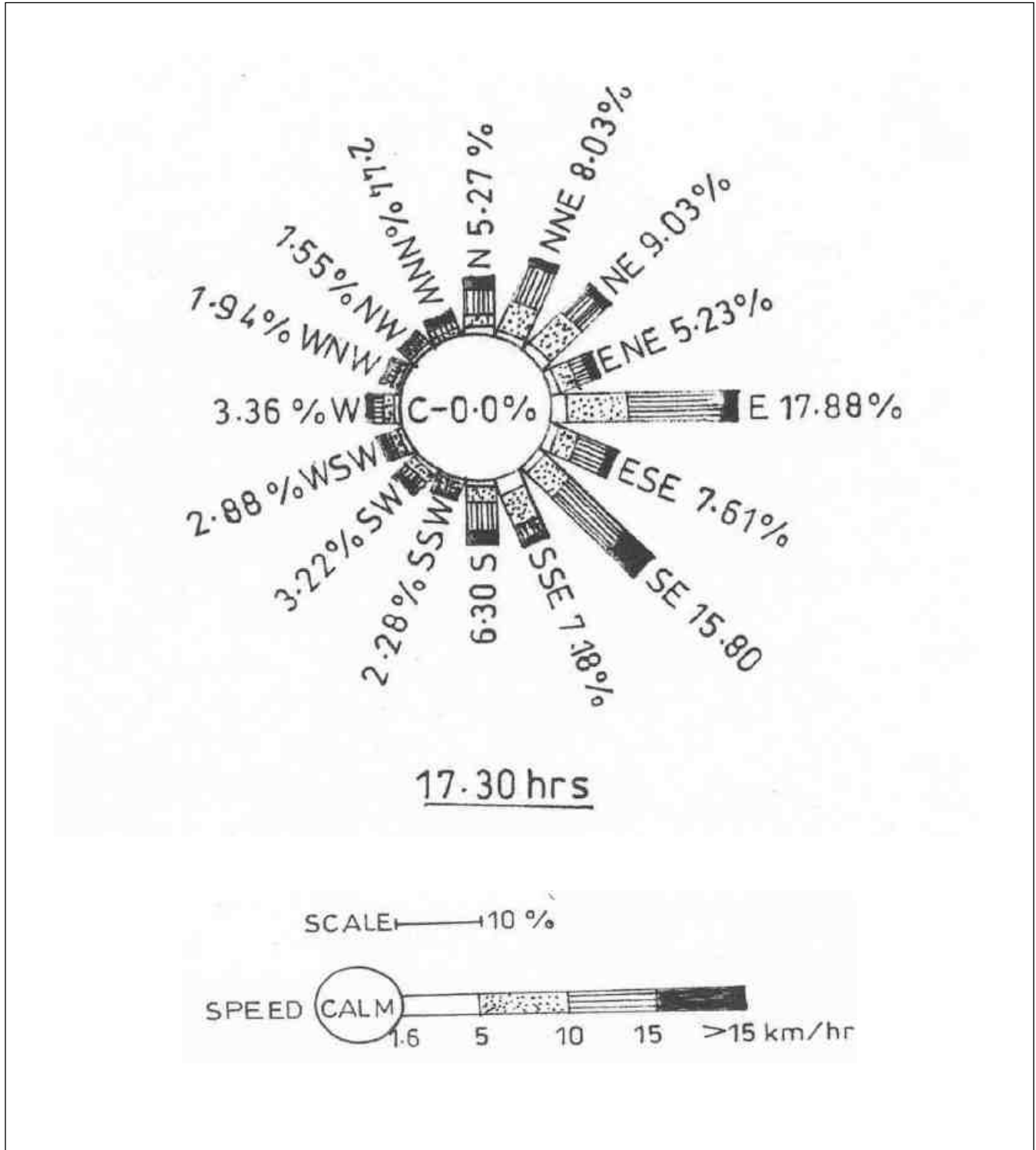


FIGURE - 3.12
ANNUAL WINDROSE-IMD, CHENNAI

TABLE - 3.10
SUMMARY OF WIND PATTERN – IMD, CHENNAI

Sr. No.	Wind Direction		Wind Speed Frequency (%)	
	8.30 hrs	17.30 hrs	8.30 hrs	17.30 hrs
1	Pre-monsoon season			
	S	SE	23.38	38.13
	SSW	E	19.0	14.0
2	Monsoon season			
	W	SE	34.10	16.70
	WSW	E	25.0	13.05
3	Post monsoon season			
	N	NNE	15.50	18.25
	WNW	NE	12.50	16.75
4	Winter season			
	W	E	22.25	39.25
	NW	NE,ENE	13.25	14.5
5	Annual			
	W	E	19.95	17.88
	SW	SE	10.06	15.80

3.5.2.3 Comments

The India Meteorological Department (IMD) records the data two times a day viz. 0830 hr and 1730 hr, while the site-specific data has been recorded at an hourly interval. On comparison of site-specific data generated for study period vis-à-vis the IMD data, slight variations were found. The following observations are brought out:

- Slight variations were found in the temperature, on comparing the data generated at site with IMD data. The maximum and minimum temperatures recorded at site during study period were 38.0°C and 23.0°C, whereas the maximum and minimum values recorded at IMD were 39.5°C and 21.5°C respectively;
- The Relative Humidity was observed to range from 49% to 96% during the study period whereas according to IMD, Chennai the Relative Humidity was observed to be ranging from 32% to 98%. No appreciable variations are found in the RH values in comparison with IMD data; and
- On comparison of the data generated at the continuous monitoring station at project site with the data recorded at IMD, it can be observed that the data generated at the site is broadly compatible with regional meteorology, except minor variations as described above. However, the data cannot be compared on one to one basis as the two stations (IMD and project site) are away and there is elevation difference also.

3.6 Ambient Air Quality

The ambient air quality with respect to the study area zone of 10 km radius around the plant site forms the baseline information. The various sources of air pollution in the region are industrial and vehicular traffic. The prime objective of the baseline air quality study was to assess the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the plant operation.

This section describes the selection of sampling locations, methodology adopted for sampling, analytical techniques and frequency of sampling. The ambient air quality was monitored at

locations in and around the plant site. The monitoring was carried out for study period from 1st July 2020 to 30th September 2020. The air quality monitoring was conducted as per NAAQ standards, 2009.

3.6.1 Methodology Adopted for Air Quality Survey

Selection of Sampling Locations

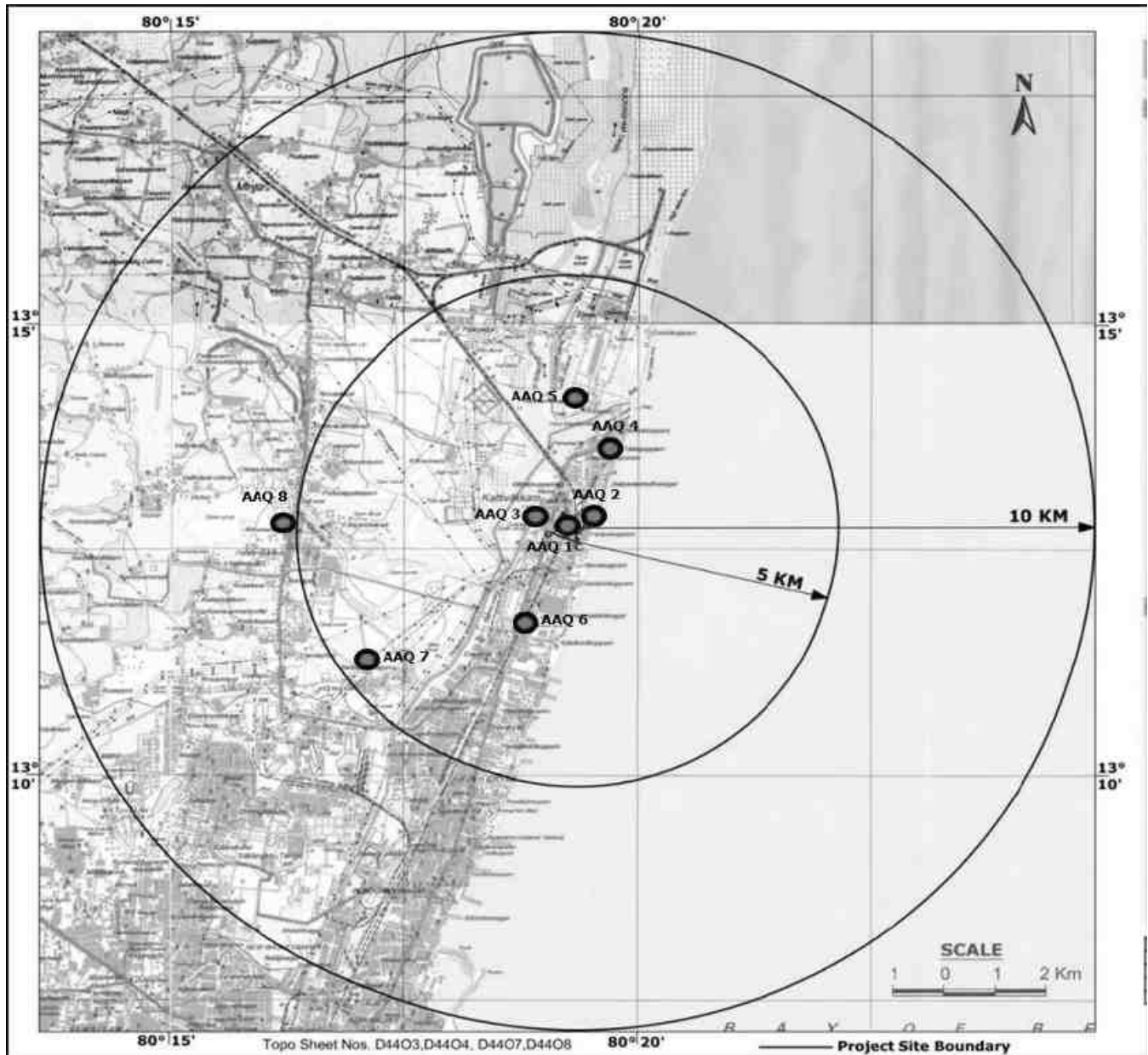
The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality monitoring network. The design of monitoring network in the air quality surveillance programme has been based on the following considerations:

- Meteorological conditions on synoptic basis;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status; and
- Representatives of likely impact areas.

Ambient Air Quality Stations (AAQS) were set up at eight locations with due consideration to the above-mentioned points. **Table-3.11** gives the details of environmental setting around each monitoring station. The location of the selected stations with reference to the plant boundary is shown in **Figure - 3.13**.

TABLE - 3.11
DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

Station Code	Name of the location	Distance w.r.t. Plant boundary (km)	Direction w.r.t. Plant boundary
AAQ1	Plant site	--	--
AAQ2	Periyakuppam	0.4 km	ENE
AAQ3	Kathivakkam	0.3 Km	W
AAQ4	Thulsikuppam	1.2 km	NE
AAQ5	kattukuppam	2.5 km	N
AAQ6	Sivakami Nagar	1.7 km	S
AAQ7	Edayanchavadi	4.2 km	SW
AAQ8	Vichoor	5.6 km	W



**FIGURE - 3.13
AIR QUALITY SAMPLING LOCATIONS IN THE STUDY AREA OF 10KM**

3.6.1.1 Frequency and Parameters for Sampling

Ambient air quality monitoring was carried out at each location. The baseline data of air environment was generated for the following parameters:

- Particulate Matter of size less than 10 µm (PM₁₀);
- Particulate Matter of size less than 2.5 µm (PM_{2.5});
- Chemical Characterization of Particulate Matter;
- Sulphur dioxide (SO₂);
- Oxides of Nitrogen (NO_x);
- Ozone (O₃);
- Ammonia (NH₃);
- Lead (Pb);
- Arsenic (As);
- Nickel (Ni);
- Carbon Monoxide (CO);
- Benzene (C₆H₆); and
- Benzo (a) Pyrene

3.6.1.2 Duration of Sampling

The duration of sampling of Particulate Matter of size less than 10 µm (PM₁₀), Particulate Matter of size less than 2.5 µm (PM_{2.5}), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x) was each twenty-four hourly continuous sampling per day. The monitoring was conducted for three months. This is to allow a comparison with the present revised standards mentioned in the latest Gazette Notification of the Central Pollution Control Board (CPCB) (November 16, 2009). The ambient air quality parameters and standards along with their frequency of sampling are given in **Table - 3.12**.

TABLE - 3.12
MONITORED PARAMETERS AND FREQUENCY OF SAMPLING

Parameters	Sampling Frequency
PM ₁₀	24 hourly sample twice a week for three months
PM _{2.5}	24 hourly sample twice a week for three months
Sulphur dioxide (SO ₂)	24 hourly sample twice a week for three months
Oxides of Nitrogen (NO _x)	24 hourly sample twice a week for three months
Ozone (O ₃)	08 hourly sample twice a week for three months
Ammonia (NH ₃)	24 hourly sample twice a week for three months
Lead (Pb)	24 hourly sample twice a week for three months
Arsenic (As)	24 hourly sample twice a week for three months
Nickel (Ni)	24 hourly sample twice a week for three months
Carbon Monoxide (CO)	08 hourly sample twice a week for three months
Benzene (C ₆ H ₆)	24 hourly sample twice a week for three months
Benzo (a) Pyrene	24 hourly sample twice a week for three months

3.6.1.3 Instruments used for Sampling

Fine Particulate Samplers APM-550 instruments have been used for monitoring Particulate Matter of size less than 10 µm (PM₁₀), Particulate Matter of size less than 2.5-µm (PM_{2.5}) and for gaseous pollutants like SO₂ and NO₂. APM-411TE has been used along with APM-550.

3.6.1.4 Instruments used for Analysis

The make and model of the instruments used for analysis of the samples collected during the field monitoring are given in **Table - 3.13**.

TABLE - 3.13
INSTRUMENTS USED FOR ANALYSIS OF SAMPLES

Sr. No.	Instrument Name	Make	Model	Parameters
1	Spectrophotometer	Systronics	SP 104	SO ₂ , NO ₂ , NH ₃ , Ozone
2	Electronic Balance	Sartorius	CP225D	PM ₁₀ , PM _{2.5}
3	ICP-AES	VARIAN	RLCCD	Heavy Metals
4	NDIR	Envirotech	TELDYNE 510	CO
5	GC-MS	WATERS	QUATTRO Micro mass	Benzene, Benzo(a)

3.6.2 Sampling and Analytical Techniques

The techniques used for ambient air quality monitoring and minimum detectable levels are given in **Table - 3.14**.

TABLE - 3.14
TECHNIQUES USED FOR AMBIENT AIR QUALITY MONITORING

Sr. No	Parameter	Technique	Minimum Detectable Limit
1	PM ₁₀	Respirable Dust Sampling / High Volume Sampling (Gravimetric Method)	5.0 µg/m ³
2	PM _{2.5}	FRM Method/ Low Volume Sampling (Gravimetric Method)	2.0 µg/m ³
3	Sulphur dioxide (SO ₂)	Modified West and Gaeke Method	4.0 µg/m ³
4	Nitrogen di-oxide (NO ₂)	Sodium Arsenite Method	9.0 µg/m ³
5	Carbon monoxide (CO)	Adsorption and Extraction followed by GC-MS Analysis	0.0125 mg/m ³
6	Ozone (O ₃)	Spectrophotometric Method	2.0 µg/m ³
7	Ammonia (NH ₃)	Indo-Phenol Blue Method	20.0 µg/m ³
8	Benzene (C ₆ H ₆)	Adsorption and desorption followed by GC-MS analysis	1 ng/m ³
9	BaP Benzo(a)pyrene	Solvent Extraction followed by GC-MS	1 ng/m ³
10	Arsenic (As)	ICP-MS Method after sampling on EPM Filter Paper	0.2 ng/m ³
11	Nickel (Ni)	ICP-MS Method after sampling on EPM Filter Paper	0.10 ng/m ³
12	Lead (Pb)	ICP-MS Method after sampling on EPM Filter Paper	0.05 ng/m ³

3.6.3 Presentation of Primary Data

The AAQ survey results for the three months study period (1st July 2020 – 30th September 2020) are presented in **Annexure-IX**. Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. The summary of these results for each location is presented in **Table - 3.14**. These are compared with the standards prescribed by CPCB

- **Summary of Observations**

The observations based on summary of ambient air quality results are summarized below:

1) PM₁₀:

The maximum and minimum concentrations for PM₁₀ were recorded at as 88.6 µg/m³ and 59.7 µg/m³ respectively. The maximum concentration was recorded at Plant site (AAQ 1) and the minimum concentration was recorded at Vichoor (AAQ 8). The average concentrations were ranged between 61.6µg/m³ -86.5 µg/m³.

2) PM_{2.5}:

The maximum and minimum concentrations for PM_{2.5} were recorded as 32.8 µg/m³ and 15.1 µg/m³ respectively. The maximum concentration was recorded at Plant site (AAQ 1) and the minimum concentration was recorded at Kattukuppam (AAQ5). The average values were observed to be in the range of 20.3µg/m³-31.3 µg/m³

3) SO₂:

The maximum and minimum concentrations of SO₂ were recorded as 33.4 µg/m³ and 7.1 µg/m³.The maximum concentration was recorded at Plant site (AAQ 1) and the minimum concentration was recorded at Kattukuppam (AAQ5). The average values were observed to be in the range of 8.2 µg/m³ -31.7 µg/m³

4) NO₂:

The maximum concentration of 33.5 µg/m³ was recorded at Tulsikuppam(AAQ4)and minimum concentration was of 8.5 µg/m³ observed at Kattukuppam (AAQ5). The average concentrations were in the range of 11.2 µg/m³-30.3 µg/m³

5) CO:

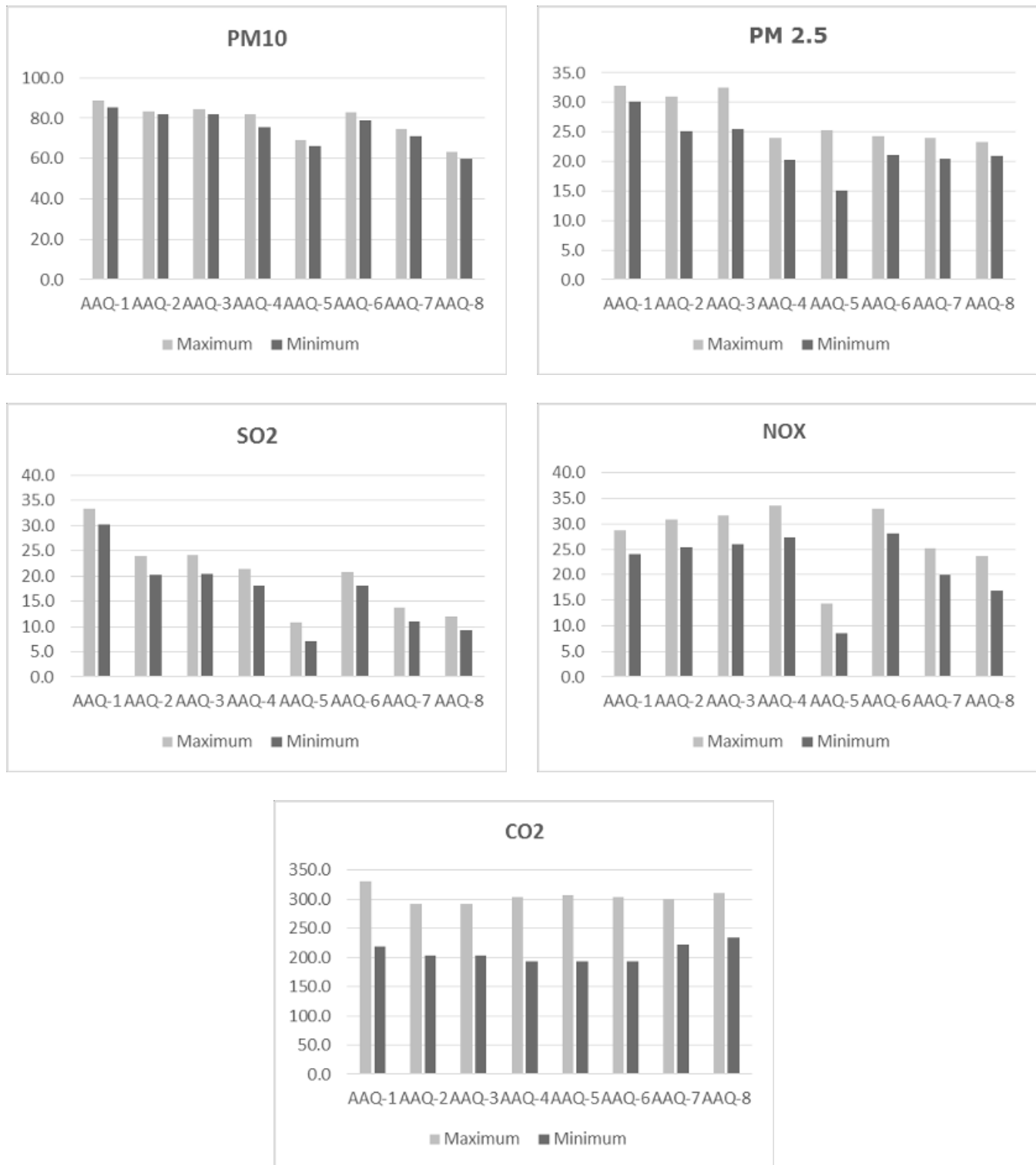
The maximum concentration of 330 µg/m³ was recorded at Plant site (AAQ1) and minimum of 193.0 µg/m³ was observed at Tulsikuppam(AAQ4) and Sivakami Nager(AAQ6). The average concentrations ranged between 244.5 µg/m³- 257 µg/m³.

The concentrations of PM₁₀, PM_{2.5}, SO₂, NO_x and CO are observed to be well within the standards prescribed by Central Pollution Control Board (CPCB) for Industrial, Rural, Residential and Other areas.

TABLE - 3.15
SUMMARY OF AMBIENT AIR QUALITY RESULTS

Parameters		AAQ-1	AAQ-2	AAQ-3	AAQ-4	AAQ-5	AAQ-6	AAQ-7	AAQ-8
PM₁₀ (µg/m³)	Maximum	88.6	83.5	84.5	81.9	69.3	82.9	74.6	63.1
	Minimum	85.2	82.0	82.1	75.6	66.3	79.1	71.2	59.7
	Average	86.5	82.7	82.9	80.1	67.6	80.8	72.7	61.6
	98%tile	88.4	83.5	84.4	81.9	68.9	82.7	74.5	62.9
PM_{2.5} (µg/m³)	Maximum	32.8	30.9	32.5	24.0	25.3	24.3	24.0	23.3
	Minimum	30.1	25.2	25.4	20.3	15.1	21.1	20.5	21.0
	Average	31.3	27.5	27.8	22.2	20.3	22.5	22.6	22.0
	98%tile	32.7	30.3	32.2	23.8	25.2	24.2	23.9	23.2
SO₂ (µg/m³)	Maximum	33.4	23.9	24.1	21.4	10.8	20.8	13.7	11.9
	Minimum	30.2	20.3	20.5	18.1	7.1	18.0	10.9	9.3
	Average	31.7	21.7	21.8	19.2	8.2	19.1	12.5	10.9
	98%tile	33.5	23.8	24.0	20.9	10.5	20.5	13.7	11.9
NO₂ (µg/m³)	Maximum	28.7	30.8	31.5	33.5	14.3	32.9	25.2	23.6
	Minimum	24.1	25.4	25.9	27.4	8.5	28.1	20.0	16.9
	Average	26.2	27.5	27.8	30.2	11.2	30.3	22.9	20.2
	98%tile	28.5	30.2	31.0	33.2	14.1	32.9	25.1	23.6
CO (µg/m³)	Maximum	330.0	292.3	292.0	303	307.0	303.0	300.0	310.0
	Minimum	219.0	203.0	203.0	193	194.0	193.0	223.0	234.0
	Average	256.9	244.5	246.0	257	252.4	255.9	249.0	256.0
	98%tile	306.8	281.7	283.0	301	304.2	301.5	300.0	305.0

Note: Ozone (O₃), Ammonia (NH₃), Lead (Pb), Arsenic (As) (ng/m³), Nickel (Ni) (ng/m³), Mercury (Hg), Benzene (C₆H₆ and Benzo (a) Pyrene(BaP) (ng/m³) are below the Detectable Limit.



**FIGURE - 3.14
SUMMARY OF AAQ RESULTS**

3.7 Water Quality

Selected water quality parameters of ground water resources and surface water resources within the study area has been studied for assessing the water environment and evaluate anticipated impact of the expansion and modernization project. Understanding the water quality is essential in preparation of Environmental Impact Assessment and to identify critical issues with a view to suggest appropriate mitigation measures for implementation.

The purpose of this study is to:

- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity; and
- Predict impact on water quality by this project and related activities.

The information required has been collected through primary surveys and secondary sources.

3.7.1 Methodology

Reconnaissance survey was undertaken and monitoring locations were finalized based on:

- Drainage pattern;
- Location of residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions.

Water sources covering 10-km radial distance were examined for physico-chemical, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on water. The samples were collected and analysed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).

Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO₃. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physico-chemical and bacteriological parameters have been analysed for projecting the existing water quality status in the study area. Parameters like pH and temperature were analysed at the time of sample collection.

3.7.2 Water Sampling Locations

Eight (8) ground water samples and four (4) surface water samples were collected. These samples were taken as grab samples and were analysed for various parameters to compare with the standards for drinking water as per IS: 10500:2012.

The water sampling locations in the study area and the details are given in **Table - 3.16** and shown in **Figure - 3.15** and **Figure - 3.16**.

TABLE - 3.16
DETAILS OF WATER SAMPLING LOCATIONS

Code	Location	Distance from Plant Boundary (km)	Direction w.r.t. Plant Boundary
Ground water			
GW 1	Plant site	--	--
GW 2	Periyakuppam	0.3 km	ENE
GW 3	Kattukuppam	0.9 km	N
GW 4	Edayanchavadi	4.2 km	WSW
GW 5	Vichoor	3.8 km	W
GW 6	Thulsikuppam	1.3 km	NE
GW 7	Sivakami Nagar	1.8 km	S
GW 8	Nandiambakkam	5.6 km	N
Surface water			
SW 1	Kosathalayar River (DS)	0.37 km	WSW
SW 2	Kosathalayar River (US)	0.5 km	NNW
SW 3	Ennore Creek	2.2 km	NNE
SW 4	Sea (Bay of Bengal)	0.2 km	E

3.7.3 Presentation of Results

Ground water quality

The results of the ground water samples are presented in **Table - 3.17** and are compared with the standards for drinking water as per IS: 10500:2012. The analysis results indicate that the pH ranges in between 7.02-8.05, which is well within the specified standard of 6.5 to 8.5. The maximum pH of 8.05 was observed at Kattukuppam (GW3) and the minimum pH of 7.02 was observed at Thulsikuppam (GW6). Total hardness was observed to be ranging from 188.1-559.9 mg/l. The maximum hardness was recorded at Edayanchavadi (GW4) and the minimum hardness was recorded at Kattukuppam (GW3). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 616-2698 mg/l. The maximum TDS was recorded at Edayanchavadi (GW4) and the minimum TDS was recorded at Kattukuppam (GW3).

Chlorides at all the locations were within the permissible limit, ranging in between 158.4-724.6 mg/l. Fluorides are ranging in between 0.6-0.9 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 2.9-9.5 mg/l. The heavy metal content is below detectable limits.

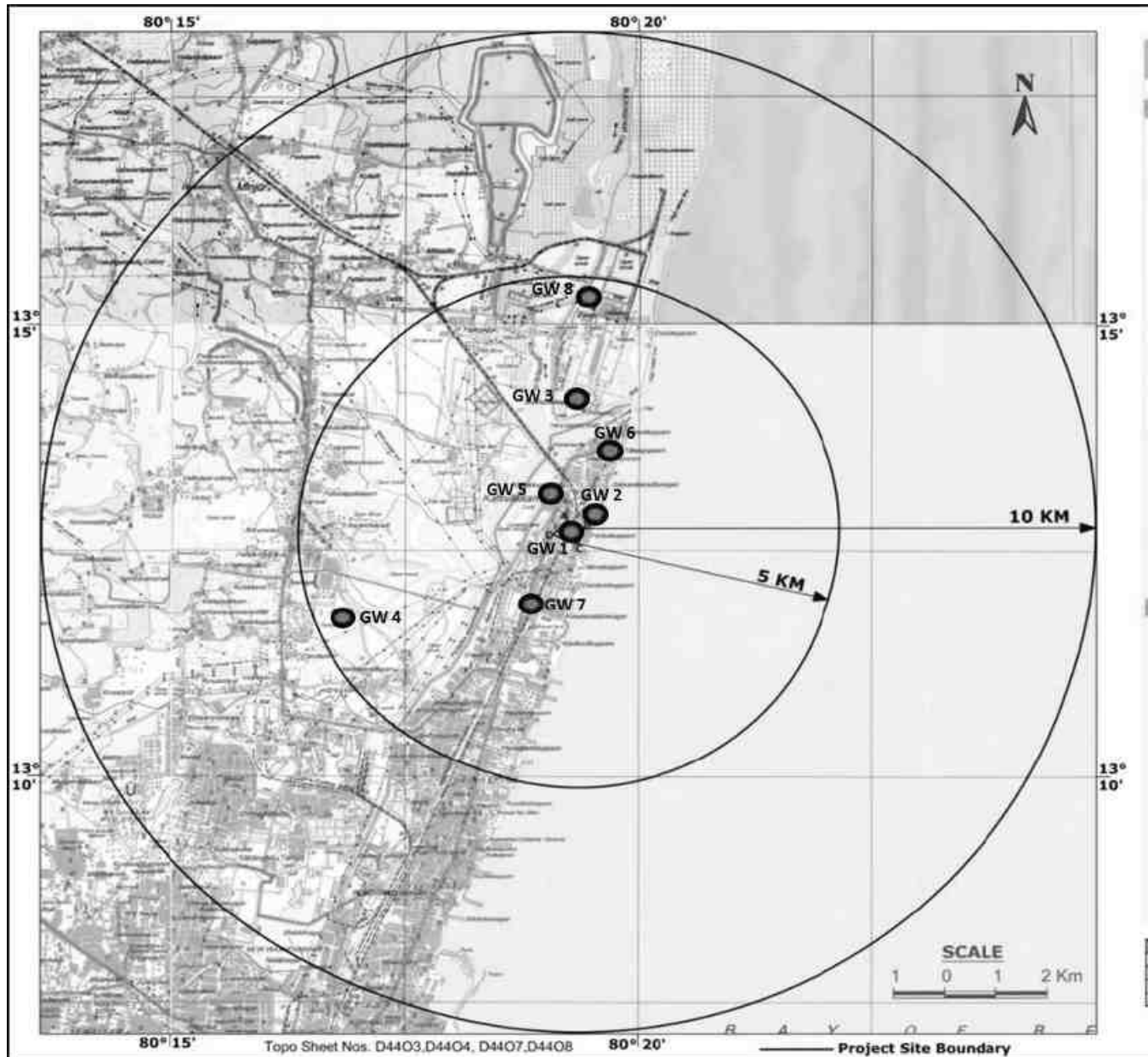
Surface water quality

During the baseline period season, most of the surface water bodies in the study area were dry hence 6 samples were taken for analysis. The results of the parameters analysed for the surface water samples are presented in **Table - 3.18**. The analysis results indicate that the pH ranges in between 7.86-8.03, which is well within the specified standard of 6.5-8.5. The maximum pH of 8.03 was observed at sea (SW4) and the minimum pH of 7.86 was observed at Kosathalayar River (SW1).

Total hardness was observed to be ranging from 1122.3-2010.8 mg/l. The maximum hardness was recorded at Sea (SW4) and the minimum hardness was recorded at Kosathalayar River (SW1). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 1072-31225 mg/l. The maximum TDS was recorded at Ennore Creek

(SW3) and the minimum TDS was recorded at Kosathalayar River (SW1).

Chlorides at all the locations were within the permissible limit, ranging in between 284-15365 mg/l. Fluorides are ranging in between 0.7-1.3 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 4.5-19.7 mg/l. The heavy metal content is below detectable limits.



**FIGURE - 3.15
GROUND WATER SAMPLING LOCATIONS IN STUDY AREA OF 10 KM RADIUS**



FIGURE - 3.16
SURFACE WATER SAMPLING LOCATIONS IN STUDY AREA OF 10 KM RADIUS

**TABLE - 3.17
GROUND WATER QUALITY**

Sr.No.	Parameters	Unit	Perm. Limits IS: 10500:2012	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
1	pH	--	6.5 – 8.5 (NR)	7.63	7.82	8.05	8.02	7.98	7.54	7.02	7.2
2	Colour	Hazen	5 (15)	1	1	1	1	1	1	1	1
3	Taste	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Turbidity	NTU	1 (5)	3	2	3	3	4	3	3	4
6	TDS	mg/l	500 (2000)	779	948	616	2698	2357	2631	2543	2247
7	Total Hardness as CaCO ₃	mg/l	200 (600)	213.2	291.5	188.1	559.9	526.2	523.1	548.0	485.6
8	Total Alkalinity	mg/l	200 (600)	235	268	210	670	665	614	586	630
9	Calcium as Ca	mg/l	75 (200)	48.72	56.7	36.4	135.2	128.7	124.3	132.5	115.6
10	Magnesium as Mg	mg/l	30 (100)	22.2	36.4	23.6	53.9	49.7	38.5	40.5	52.4
11	Boron	mg/l	0.5 (1.0)	0.13	0.26	0.14	0.36	0.25	0.28	0.35	0.28
12	Chloride as Cl	mg/l	250 (1000)	198.6	284.5	158.4	724.6	612.5	352.1	486.2	568.2
13	Sulphates as SO ₄	mg/l	200 (400)	95.6	84.6	67.4	298.6	285.7	254.3	186.2	244.2
14	Fluoride as F	mg/l	1.0 (1.5)	0.6	0.9	0.8	1.0	0.9	1.0	0.8	0.7
15	Nitrates as NO ₃	mg/l	45 (NR)	4.2	3.6	2.9	8.7	9.5	8.2	9.4	7.8
16	Phenolic Compounds	mg/l	0.001 (0.002)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Anionic Detergents	mg/l	0.2 (1.0)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
18	Cadmium as Cd	mg/l	0.003 (NR)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
19	Arsenic as As	mg/l	0.01 (0.05)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20	Copper as Cu	mg/l	0.05 (1.5)	<0.01	<0.01	0.02	0.02	0.01	0.02	0.01	0.01
21	Lead as Pb	mg/l	0.01 (NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
22	Manganese as Mn	mg/l	0.1 (0.3)	0.01	0.02	0.03	0.04	0.03	0.02	0.03	0.04
23	Iron as Fe	mg/l	0.3 (NR)	0.05	0.11	0.16	0.08	0.06	0.04	0.07	0.12
24	Chromium as Cr+6	mg/l	0.05 (NR)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
25	Selenium as Se	mg/l	0.01 (NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Zinc as Zn	mg/l	5 (15)	0.06	0.09	0.15	0.23	0.07	0.06	0.05	0.12
27	Aluminum as Al	mg/l	0.03 (0.2)	0.02	0.01	0.03	0.03	0.02	0.01	0.02	0.03
28	Mercury as Hg	mg/l	0.001 (NR)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
29	Pesticides	mg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
30	E. Coil	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
31	Total Coliforms	MPN/100	10	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

**TABLE - 3.18
SURFACE WATER QUALITY**

Sr.No.	Parameters	Unit	SW1	SW2	SW3	SW4
1	pH	--	7.86	7.94	8.01	8.03
2	Colour	Hazen	2	3	2	2
3	Taste	--	Agreeable	Agreeable	Agreeable	Agreeable
4	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable
5	Turbidity	NTU	10	8	4	3
6	TDS	mg/l	1072	1139	31225	30145
7	Total Hardness as CaCO ₃	mg/l	1122.3	1169.9	2007.7	2010.8
8	Total Alkalinity	mg/l	505	550	125	134
9	Calcium as Ca	mg/l	126.0	139.1	311.4	324.1
10	Magnesium as Mg	mg/l	22.2	36.4	23.6	26.5
11	Boron	mg/l	0.26	0.15	0.08	0.06
12	Chlorides Cl	mg/l	284.7	310.0	15263	15365
13	Fluoride as F	mg/l	0.9	0.7	1.2	1.3
14	Nitrates as NO ₃	mg/l	15.6	19.7	4.6	4.5
15	Phenolic Compounds	mg/l	<0.001	<0.001	<0.001	<0.001
16	Anionic Detergents	mg/l	<0.02	<0.02	<0.02	<0.02
17	Cadmium as Cd	mg/l	<0.003	<0.003	<0.003	<0.003
18	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01
19	Copper as Cu	mg/l	0.01	0.01	0.02	0.02
20	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01
21	Manganese as Mn	mg/l	0.03	0.02	0.04	0.03
22	Iron as Fe	mg/l	0.07	0.09	0.14	0.15
23	Chromium as Cr+6	mg/l	<0.05	<0.05	<0.05	<0.05
24	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01
25	Zinc as Zn	mg/l	0.13	0.24	0.08	0.06
26	Aluminium as Al	mg/l	0.03	0.02	0.02	0.02
27	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001
28	Pesticides	mg/l	<0.01	<0.01	<0.01	<0.01
29	E. Coil	-	15	10	Absent	Absent
30	Total Coliforms	MPN/100	1560	1380	Absent	Absent
31	BOD	mg/l	3.2	3.9	<3	<3
32	COD	mg/l	15	20	<5	<5
33	TSS	mg/l	<1	<1	<1	<1

3.8 Noise Level Survey

The main objective of noise monitoring in the study area is to assess the baseline noise and assess the impact of the total noise, expected to be generated by the proposed expansion and modernization project.

3.8.1 Identification of Sampling Locations

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Noise at different noise generating sources has been identified based on the residential, industrial and commercial activities in the area. The noise monitoring locations are given in **Table - 3.19** and shown in **Figure - 3.17**.

TABLE - 3.19
DETAILS OF NOISE MONITORING LOCATIONS

Station Code	Name of the location	Distance w.r.t. Plant boundary (km)	Direction w.r.t. Plant boundary
N1	Plant site	--	--
N2	Periyakuppam	0.4 km	ENE
N3	Kathivakkam	0.3 Km	W
N4	Thulsikuppam	1.2 km	NE
N5	kattukuppam	2.5 km	N
N6	Sivakami Nagar	1.7 km	S
N7	Edayanchavadi	4.2 km	SW
N8	Vichoor	5.6 km	W

3.8.2 Methodology of Data Generation

Sound Pressure Level (SPL) measurements were measured at all locations. The readings were taken for every hour for 24 hours. The day noise levels have been monitored during 6 am to 10 pm and night levels during 10 pm to 6 am at all the locations in the study area.

3.8.3 Instruments used for Monitoring

Noise levels were measured using integrated sound level meter manufactured by Quest Technologies, USA (Model No.2900). The integrating sound level meter is an integrating / logging type with Octave filter attachment (model OB-100) with frequency range of 31.5 to 16000 Hz. This instrument is capable of measuring the Sound Pressure Level (SPL), L_{eq} and octave band frequency analysis.

3.8.4 Parameters measured during Monitoring

For noise levels measured over a given period of time interval, it is possible to describe important features of noise using statistical quantities. This is calculated using the percent of the time certain noise levels are exceeding the time interval. The notation for the statistical quantities of noise levels are described below:

- L_{10} is the noise level exceeded by 10 per cent of the time;
- L_{50} is the noise level exceeded by 50 per cent of the time; and
- L_{90} is the noise level exceeded by 90 per cent of the time.

Equivalent Sound Pressure Level (L_{eq})

The L_{eq} is the equivalent continuous sound level which is equivalent to the same sound energy as the actual fluctuating sound measured in the same period. This is necessary because sound from noise source often fluctuates widely during a given period of time.

This is calculated from the following equation:

$$L_{eq} = L_{50} + \frac{(L_{10} - L_{90})^2}{60}$$

L_{day} is defined as the equivalent noise level measured over a period of time during day (6 am to 10 pm).

L_{night} is defined as the equivalent noise level measured over a period of time during night (10 pm to 6 am). A noise rating developed by Environmental protection Agency (EPA) for specification of community noise from all the sources is the Day-Night Sound Level, (L_{dn}).

Day-Night Sound Level (L_{dn})

The noise rating developed for community noise from all sources is the Day-Night Sound Level (L_{dn}). It is similar to a 24 hr equivalent sound level except that during night time period (10 pm to 6 am) a 10 dB (A) weighting penalty is added to the instantaneous sound level before computing the 24 hr average.

This night time penalty is added to account for the fact that noise during night when people usually sleep is judged as more annoying than the same noise during the day time. The L_{dn} for a given location in a community may be calculated from the hourly L_{eq} , by the following equation.

$$L_{dn} = 10 \log \left\{ \frac{1}{24} [16(10^{L_d/10}) + 8(10^{(L_n+10)/10})] \right\}$$

Where L_d is the equivalent sound level during the daytime (6 am to 10 pm) and L_n is the equivalent sound level during the night time (10 pm to 6 am).

3.8.5 Presentation of results

The statistical analysis is done for measured noise levels at ten locations. The parameters are analysed for L_{10} , L_{50} , L_{90} , L_{eq} , L_{day} , L_{night} and L_{dn} . The statistical analysis results monitored during the study period (i.e. July to September 2020) are given in **Table - 3.20**

TABLE - 3.20
NOISE LEVELS IN THE STUDY AREA

Code	Location	Land use	L_{10}	L_{50}	L_{90}	L_{eq}	L_{day}	L_{night}	L_{dn}
N1	Plant site	Industrial	63.0	62.8	60.7	62.1	63.2	59.4	61.3
N2	Periyakuppam	Industrial	61.5	60.3	57.2	59.6	60.2	55.3	57.7
N3	Kathivakkam	Industrial	64.7	62.8	58.4	61.9	49.2	44.6	46.9
N4	Thulsikuppam	Residential	50.6	46.8	44.5	47.3	48.1	43.2	45.6
N5	kattukuppam	Residential	51.2	48.5	45.1	48.2	48.2	44.2	46.2

N6	Sivakami Nagar	Residential	50.4	48.1	44.9	47.8	47.8	43.8	45.8
N7	Edayanchavadi	Residential	51.8	47.2	44.2	47.7	47.9	43.6	45.7
N8	Vichoor	Commercial	60.5	59.8	58.1	59.4	57.6	45.2	51.4

TABLE - 3.21
AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE

Category of Area/Zone	Limits in dB(A)	
	Day time (6.00 am to 10.00 pm)	Night time (10.00 pm to 6.00 am)
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

3.8.6 Observation of Results

- **Daytime Noise Levels (L_{day})**

Residential Zone: The daytime noise levels in all the residential & other locations were observed to be in the range of 47.8 dB (A) to 48.2 dB (A). The noise levels at all the locations were below the permissible limits of 55 dB (A).

Commercial Zone: The daytime noise level in the industrial location was observed to be as 57.6 dB (A), which was below the permissible limits of 65 dB (A).

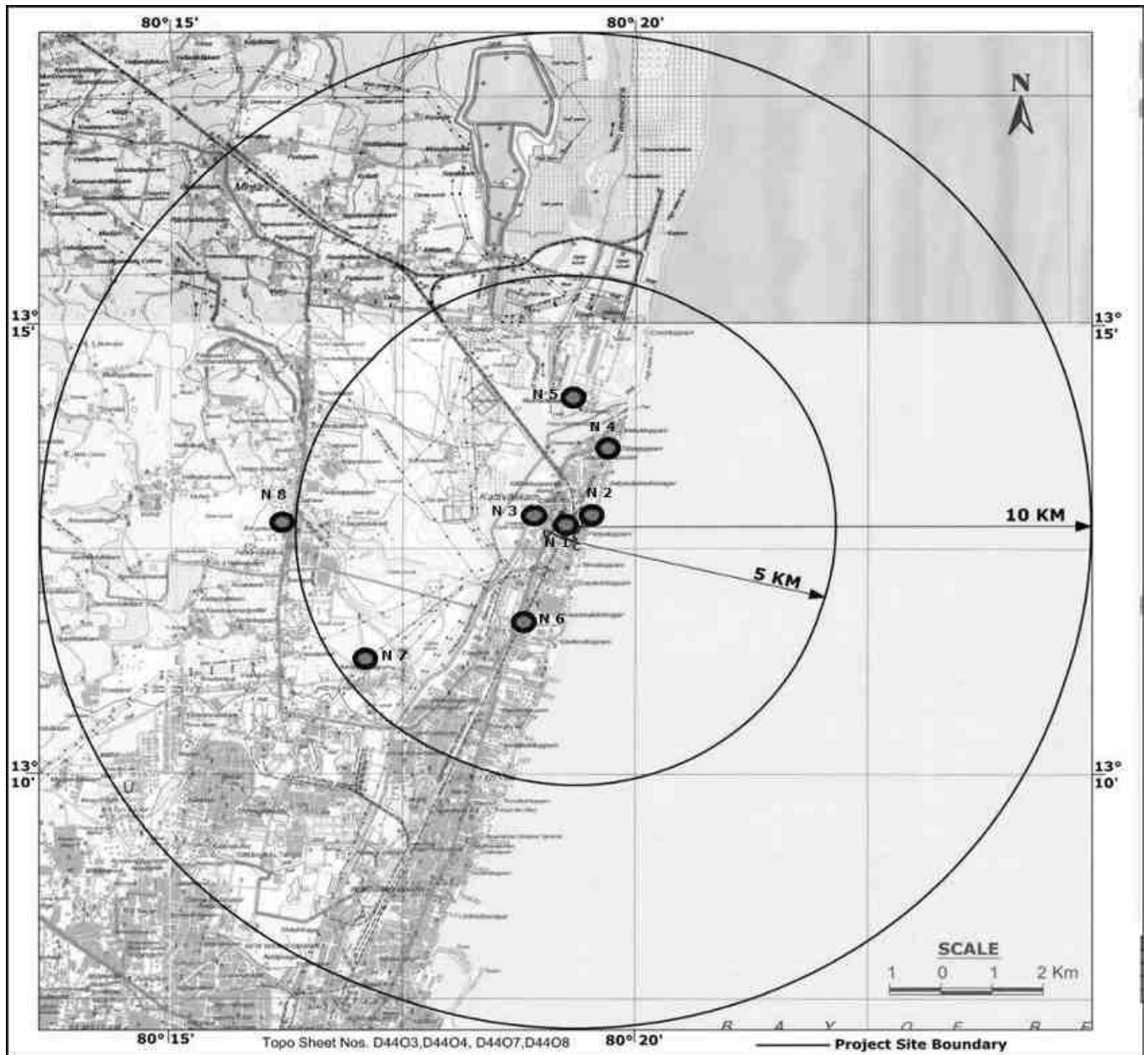
Industrial Zone: The daytime noise level in the industrial location was observed to be as 63.2 dB (A), which was below the permissible limits of 75 dB (A).

- **Night Noise Levels (L_{night})**

Residential & other Zone: The daytime noise levels in all the residential & other locations were observed to be in the range of 43.2 to 44.2 dB (A). The noise levels at all the locations were below the permissible limits of 45 dB (A).

Commercial Zone: The daytime noise level in the industrial location was observed to be as 45.2 dB (A), which was below the permissible limits of 55 dB (A).

Industrial Zone: The daytime noise level in the industrial location was observed to be as 59.4 dB (A), which was below the permissible limits of 70 dB (A).



**FIGURE - 3.17
NOISE SAMPLING LOCATIONS**

3.9 Ecological Survey

3.9.1 Introduction

Ecological evaluation aims at developing and applying methodologies to assess the relevance of an area for nature conservation. As such, it is to support the assessment of the impact of a proposed development by providing guidance on how to describe the ecological features within the area affected, how to value them, and how to predict the value of losses caused by the development. The evaluation of the ecological significance of an area can be undertaken from different perspectives and consequently with different objectives. One of such perspectives focuses on the conservation of the biological diversity or biodiversity. Among the human activities that pose the highest threat to the conservation of biodiversity are the developmental projects in particular. Such projects represent artificial elements that cut through the landscape and interfere with the natural habitat and its conditions by emissions that may be solid, liquid and/or gaseous. This in turn influences the abundance and distribution of plant and animal species, i.e., the biodiversity of the area is impacted.

Most of the background data needs to be acquired from the governmental agencies or the scientific literature. This information is typically complemented by field visit, site surveys and sample collection. The description of the actual ecological assessment provided by the ecological baseline study serves to set a reference for the subsequent impact analysis. Moreover, it helps decision-makers and EIA reviewers to become familiar with the environmental features and the needs of the study area.

The present report gives the review of published secondary data and the results of field sampling conducted during the study period.

3.9.2 General Ecology of the Study Area

There are no reserved forests in the study area, if the Mangroves of Kosasthalaiyar Wetland or Ennore Creek is considered as a Reserve forest. There is significant ecosystem diversity in the buffer zone comprising of urban ecosystem, freshwater ecosystem, estuarine and marine ecosystems. However, the study under report doesn't deal with the marine ecosystem.

From the plant site, Kosisttalayar River is situated approximately 0.37 km, towards West Northwest of the project site. There are no reserve forests in the 10km radius of the study area.

Mangroves of Kosasthalaiyar Wetland or Ennore Creek

The Kosisttalayar River Wetland is located at a distance of 0.37 Km towards West Northwest of the project site. There is a raging controversy and dispute about the Ennore Creek and the project proponent prefers to keep away from the raging controversy. The maps of the Kosasthalaiyar Wetland and Ennore Creek between 2004 and 2016 speaks the truth and the change in landscape that took place.

Kosasthalaiyar sub basin covers an area of 2013.58 sq.km. The river Kosasthalaiyar originates from Panappakam reserve forest of Andhra Pradesh state. After entering Tamil Nadu, it flows through Tiruthani, Tiruvallur, Saidapet and Ponneri taluks and empties into

the Bay of Bengal near Ennore. The Nagari and Nandi rivers are the main tributaries to this river. Kesavaram anicut is situated at about the 38 Km from Kosasthalaiyar. Natural hazards and disaster prone areas: Ennore Creek: The River Kosasthalayar discharges into the Bay of Bengal through Ennore Creek. The Ennore port is located on the north of this river mouth. The breakwaters of Ennore port are acting as permanent littoral barriers and hence trapping the sediments, which have choked the river mouth. However, during the tsunami of December 2004, the mouth of this river was opened due to the penetration of water mass from the ocean. The dredging to keep the river mouth open was done and the dredged soil was being disposed on the south of the mouth of the Ennore creek, according to ENVIS.



FIGURE - 3.18
KOSASTHALAIYAR WETLAND OR ENNORE CREEK IN 2004 AND 2016.

Vegetation and flora of the project site (Core area):

Primary survey of the Ecology and Biodiversity of the project site and its buffer extending up to 10 km was carried out during the study period. The core area is rich in plant diversity. There are block and avenue plantations of different trees and shrubs. When the plant was established in 1961, there was no EIA, EC and the PCBs. Greenbelt of 1500 to 2500 trees per Ha covering an area of 33% of the total plant area was not mandatory. There was no condition that there should be a thick greenbelt on all sides along the boundary. But yet the project proponents showed great interest in greenery and they have

block plantations for every unit / division within the plant site. They also have a small medicinal plants garden. A few sample pictures of the existing greenbelt are shown in **Figure 3.18**. There are also avenue plantations along the road sides in the project site. A list of all Trees, shrubs and climbers grown within the core area is shown in **Table 3.22**. The list does not include the weeds in lawns and gardens since they are common to the buffer zone also. None of the plant species listed in Table is going to be lost or damaged on account of the proposed expansion and modernization. In addition, a few more shall be added to reinforce the existing greenbelt.



**FIGURE - 3.19
EXISTING GREEN BELT IN PLANT PREMISES**



**TABLE - 3.22
LIST OF TREES, SHRUBS AND PERENNIAL CLIMBERS GROWN / GROWING IN THE
PROJECT SITE (CORE AREA)**

Botanical Name	Common / Local Name	Family
<i>Acacia auriculiformis</i>	Australian wattle	Mimosaceae
<i>Acalypha wilkesiana</i>	Garden Acalypha	Euphorbaceae
<i>Albizia lebeck</i>	Siris / Vagai	Mimosaceae
<i>Allamanda cathartica</i>	Golden Trumpet Wine	Apocynaceae
<i>Alstonia scholaris</i>	Indian Tree of Heaven	Apocynaceae
<i>Andrographis paniculata</i>	Nilavempu	Acanthaceae
<i>Annona squamosa</i>	Clustered Apple	Annonaceae
<i>Araucaria columnaris</i>	Christmas tree	Araucariaceae
<i>Artocarpus heterophyllus</i>	Jackfruit	Moraceae
<i>Azadirachta indica</i>	Neem	Meliaceae
<i>Bambusa vulgaris</i>	Yellow Bamboo	Poaceae
<i>Bauhinia 49acemose</i>	Atti / Tataki	Caesalpiniaceae
<i>Bauhinia variegata</i>	Kachnar	Caesalpiniaceae
<i>Bombax malabaricum</i>	Silk cotton tree	Bombacaceae
<i>Borassus flabellifer</i>	Palmyra palm	Arecaeae
<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae
<i>Caesalpinia pulcherrima</i>	Peacock Flower	Caesalpiniaceae
<i>Callistemon lanceolatus</i>	Bottle brush tree	Myrtaceae
<i>Calophyllum inophyllum</i>	Punnai	Clusiaceae
<i>Calotropis gigantea</i>	Erukku	Asclepiadaceae
<i>Calotropis procera</i>	Sodom Apple	Asclepiadaceae
<i>Carica papaya</i>	Papaya	Caricaceae
<i>Caryota mitis</i>	Clustered Fishtail Palm	Arecaceae
<i>Caryota urens</i>	Fishtail Palm	Arecaceae
<i>Cascabela thevetia</i>	Yellow Oleander	Apocynaceae
<i>Cassia fistula</i>	Golden Shower Cassia	Caesalpiniaceae
<i>Cassia siamea</i>	Siamese Cassia	Caesalpiniaceae
<i>Chamaedorea sefritzii</i>	Bamboo palm	Arecaceae
<i>Chromolaena odorata</i>	Siam weed	Asteraceae
<i>Clerodendrum inerme</i>	Glory tree	Verbenaceae
<i>Cocos nucifera</i>	Coconut	Arecaceae
<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae
<i>Cordia sebestena</i>	Scarlet Cassia	Boraginaceae
<i>Costus speciosus</i>	Kostam	Costaceae
<i>Cycas revoluta</i>	Sago palm	Cycadaceae
<i>Delonix elata</i>	Gulmohar	Caesalpiniaceae
<i>Dendrocalamus strictus</i>	Bamboo	Poaceae
<i>Duranta repens</i>	Golden Duranta	Verbenaceae
<i>Dyopsis lutescens</i>	Areca palm	Arecaceae
<i>Erythrina suberosa</i>	Corky coral tree	Fabaceae
<i>Eucalyptus tereticornis</i>	Red Gum	Myrtaceae
<i>Ficus benghalensis</i>	Banyan tree	Moraceae
<i>Ficus benjamina</i>	Weeping fig	Moraceae
<i>Ficus elastica</i>	Rubber plant	Moraceae
<i>Ficus religiosa</i>	Peepal	Moraceae



<i>Gmelina arborea</i>	White Teak	Verbenaceae
<i>Hibiscus rosasinensis</i>	China Rose	Malvaceae
<i>Hyophorbe lagenicaulis</i>	Bottle palm	Arecaceae
<i>Ipomoea carnea</i>	Pink Morning glory	Convolvulaceae
<i>Jacaranda mimosaeifolia</i>	Jacaranda	Mimosaceae
<i>Lagerstroemia parviflora</i>	Common crape myrtle	Lythraceae
<i>Lantana camara</i>	Lantana	Verbenaceae
<i>Leucaena leucocephala</i>	Subabul	Mimosaceae
<i>Mangifera indica</i>	Mango	Anacardiaceae
<i>Manilkara zapota</i>	Sapodilla	Sapotaceae
<i>Millingtonia hortensis</i>	Indian Cork Tree	Bignoniaceae
<i>Mimusops elengi</i>	Spanish Cherry	Sapotaceae
<i>Muntingia calabura</i>	Singapore cherry	Muntingiaceae
<i>Musa paradisiaca</i>	Banana	Musaceae
<i>Nerium odorum</i>	Nerium	Apocynaceae
<i>Pedilanthus tithymaloides</i>	Slipper surge	Euphorbiaceae
<i>Peltophorum pterocarpum</i>	Copper pod	Caesalpiniaceae
<i>Pentalinon luteum</i>	Yellow Mandevilla	Apocynaceae
<i>Phoenix sylvestris</i>	Wild date	Aesthetic
<i>Phyllanthus acidus</i>	Star Gooseberry	Euphorbiaceae
<i>Phyllanthus emblica</i>	Indian Gooseberry	Euphorbiaceae
<i>Pisonia alba</i>	Lettuce Tree	Nyctaginaceae
<i>Pithecellobium dulce</i>	Seema hunase	Mimosaceae
<i>Plumeria alba</i>	Kaadusampige	Apocynaceae
<i>Plumeria rubra</i>	Kaadusampige	Apocynaceae
<i>Polyalthia longifolia</i>	Ashok	Annonaceae
<i>Polyalthia pendula</i>	Ashok	Annonaceae
<i>Pongamia pinnata</i>	Punnai	Fabaceae
<i>Psidium guajava</i>	Guava	Myrtaceae
<i>Pterospermum acerifolium</i>	Vennangu	Sterculiaceae
<i>Punica granatum</i>	Pomegranate	Punicaceae
<i>Quisqualis indica</i>	Rangoon Creeper	Combretaceae
<i>Ravenala madagascariensis</i>	Traveller's Palm	Strelitziaceae
<i>Roystonea regia</i>	Royal palm	Arecaceae
<i>Samanea saman</i>	Rain Tree	Mimosaceae
<i>Spathodea companulata</i>	African tulip tree	Bignoniaceae
<i>Sterculia foetida</i>	Wild almond	Sterculiaceae
<i>Syzygium cumini</i>	Jamun /Naaval	Myrtaceae
<i>Tabebuia pallida</i>	White Cedar	Bignoniaceae
<i>Tamarindus indica</i>	Tamarind	Caesalpiniaceae
<i>Tecoma stans</i>	Yellow bells	Bignoniaceae
<i>Tectona grandis</i>	Teak / Tekku	Verbenaceae
<i>Terminalia arjuna</i>	Arjun	Combretaceae
<i>Terminalia catappa</i>	Almond	Combretaceae
<i>Thespesia populnea</i>	Portia tree	Malvaceae
<i>Thubergia grandiflora</i>	Bengal Clock vine	Acanthaceae
<i>Wodyetia bifurcata</i>	Fox tail palm	Arecaceae

Vegetation and Flora of The Buffer Zone:

The buffer zone is not eco-sensitive. There are no National Parks, Wildlife Sanctuaries, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridors or

IBAs within 10 km of the project site. There are also no reserve forests within the study area, if the Mangroves of Kosasthalaiyar Wetland or Ennore Creek is considered as a Reserve forest. There is significant ecosystem diversity in the buffer zone comprising of urban ecosystem, freshwater ecosystem, estuarine and marine ecosystems. However, the study under report doesn't deal with the marine ecosystem. A list of trees, shrubs and climbers found in the buffer zone is given in **Table 3.23**. A list of herbs found in the study area is given in **Table 3.24**.

**TABLE - 3.23
LIST OF TREES, SHRUBS, AND PERENNIAL CLIMBERS FOUND IN THE
BUFFER ZONE OF THE PROJECT SITE.**

Botanical Name	Common / Local name	Family
<i>Acacia catechu</i>	Khair	Mimosaceae
<i>Acacia leucophloea</i>	White babul	Mimosaceae
<i>Acacia nilotica</i>	Black babul	Mimosaceae
<i>Acacia auriculiformis</i>	Australian wattle	Mimosaceae
<i>Adenantha pavonia</i>	Red bead tree	Mimosaceae
<i>Aegle marmelos</i>	Bilva	Rutaceae
<i>Agave americana</i>	Agave	Agavaceae
<i>Ailanthus excelsa</i>	Maha Neem	Simaroubaceae
<i>Alangium salvifolium</i>	Azhinji	Alangiaceae
<i>Albizia lebbek</i>	Siris / Vagai	Mimosaceae
<i>Allamanda cathartica</i>	Golden Trumpet Wine	Apocynaceae
<i>Alstonia scholaris</i>	Indian Tree of Heaven	Apocynaceae
<i>Anthocephalus cadamba</i>	Kadamb	Rubiaceae
<i>Araucaria columnaris</i>	Christmas tree	Araucariaceae
<i>Artabotrys odoratissimus</i>	Champak	Annonaceae
<i>Artocarpus heterophyllus</i>	Jackfruit	Moraceae
<i>Asclepias currasavica</i>	Milk weed	Asclepiadaceae
<i>Avicennia marina</i>	White Mangrove	Acanthaceae
<i>Azadirachta indica</i>	Neem	Meliaceae
<i>Bambusa vulgaris</i>	Yellow Bamboo	Poaceae
<i>Barringtonia 51rellana51ar</i>	Barringtonia	Lecythidaceae
<i>Bauhinia purpurea</i>	Purple Orchid Tree	Caesalpiniaceae
<i>Bauhinia variegata</i>	Mandaarai	Caesalpiniaceae
<i>Beaucarnea recurvata</i>	Ponytail Palm	Arecaeae
<i>Bixa 51rellana</i>	Lipstick tree	Bixaceae
<i>Bombax malabaricum</i>	Silk Cotton Tree	Bombacaceae
<i>Borassus flabellifer</i>	Palmyra palm	Arecaeae
<i>Bougainvillea glabra</i>	Bougainvillea	Nyctaginaceae
<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae
<i>Brassaia actinophylla</i>	Octopus tree	Araliaceae
<i>Brugmansia sp.</i>	Tree Datura	Solanaceae
<i>Butea monosperma</i>	Palas	Fabaceae
<i>Caesalpinia pulcherrima</i>	Peacock Flower	Caesalpiniaceae
<i>Callistemon lanceolatus</i>	Bottle brush tree	Myrtaceae
<i>Calophyllum inophyllum</i>	Alexandrian laurel	Clusiaceae
<i>Calotropis gigantea</i>	Crown flower	Asclepiadaceae
<i>Calotropis procera</i>	Apple of Sodom	Asclepiadaceae
<i>Cananga odorata</i>	Kattu Chempakam	Annonaceae
<i>Canavalia rosea</i>	Beach Bean	Fabaceae



<i>Capparis zeylanica</i>	Indian Caper	Capparaceae
<i>Careya arborea</i>	Wild Guava	Lecythidaceae
1. <i>Carissa spinarum</i>	Bush Plum	Apocynaceae
<i>Caryota urens</i>	Fishtail Palm	Arecaceae
<i>Cassia alata</i>	Candle Bush	Caesalpiniaceae
<i>Cassia fistula</i>	Golden Shower Tree	Caesalpiniaceae
<i>Cassia javanica</i>	Java Cassia	Caesalpiniaceae
<i>Cassia siamea</i>	Siamese Cassia	Caesalpiniaceae
<i>Cassia spectabilis</i>	Golden Cassia	Caesalpiniaceae
<i>Castanospermum australe</i>	Black Bean	Fabaceae
<i>Casuarina equisetifolia</i>	Casuarina	Casuarinaceae
<i>Chamaedorea sefritzii</i>	Bamboo palm	Arecaceae
<i>Chromolaena odorata</i>	Siam weed	Asteraceae
<i>Citrus aurantifolia</i>	Orange	Rutaceae
<i>Citrus limonum</i>	Lemon	Rutaceae
<i>Citrus sinensis</i>	Sweet orange	Rutaceae
<i>Clematis paniculata</i>	Flower of the skies	Ranunculaceae
<i>Clerodendrum splendens</i>	Flaming glory	Verbenaceae
<i>Cochlospermum gossypium</i>	Butter cup tree	Bixaceae
<i>Cocos nucifera</i>	Coconut	Arecaceae
<i>Colvillea racemosa</i>	Colville's Glory	Caesalpiniaceae
<i>Conocarpus lancifolius</i>	Gulf Tree	Combretaceae
<i>Cordia sebestena</i>	Scarlet Cordia	Boraginaceae
<i>Couroupita guianensis</i>	Cannon Ball tree	Lecythidaceae
<i>Cryptostegia grandiflora</i>	Rubber Wine	Asclepiadaceae
<i>Cycas revoluta</i>	Sago palm	Cycadaceae
<i>Cymbopogon citratus</i>	Lemon grass	Poaceae
<i>Daemia extensa</i>	Uttamani	Asclepiadaceae
<i>Dalbergia sissoo</i>	Shisham	Fabaceae
<i>Decalepis hamiltonii</i>	Peru Nannari	Periplocaceae
<i>Delonix elata</i>	Gulmohar	Caesalpiniaceae
<i>Delonix regia</i>	Gulmohar	Caesalpiniaceae
<i>Dendrocalamus strictus</i>	Bamboo	Poaceae
<i>Dodonaea viscosa</i>	Hop Bush	Sapindaceae
<i>Dolichandrone platycalyx</i>	Nile Tulip Tree	Bignoniaceae
<i>Duranta plumieri</i>	Golden dew drops	Shrub
<i>Dyopsis decaryi</i>	Triangle Palm	Arecaceae
<i>Dyopsis lutescens</i>	Areca palm	Arecaceae
<i>Enterolobium cyclocarpum</i>	Elephant Ear Pod Tree	Mimosaceae
<i>Erythrina crista-galli</i>	Cockspur Coral Tree.	Fabaceae
<i>Erythrina indica</i>	Indian Coral tree	Fabaceae
<i>Erythrina suberosa</i>	Corky coral tree	Fabaceae
<i>Eucalyptus citriodora</i>	Lemon Scented Gum	Myrtaceae
<i>Eucalyptus globulus</i>	Blue gum	Myrtaceae
<i>Eucalyptus tereticornis</i>	Red Gum	Myrtaceae
<i>Euphorbia nivulia</i>	Leafy Milk Hedge	Euphorbiaceae
<i>Ficus benghalensis</i>	Banyan Tree	Moraceae
<i>Ficus benjamina</i>	Weeping fig	Moraceae
<i>Ficus elastica</i>	Rubber plant	Moraceae
<i>Ficus hispida</i>	Hairy Fig	Moraceae
<i>Ficus racemosa</i>	Cluster fig	Moraceae



<i>Ficus religiosa</i>	<i>Arali mara</i>	<i>Moraceae</i>
<i>Filicium decipiens</i>	<i>Fern tree</i>	<i>Sapindaceae</i>
<i>Firmiana colorata</i>	<i>Coloured Sterculia</i>	<i>Sterculiaceae</i>
<i>Furcraea foetida</i>	<i>Mauritius hemp</i>	<i>Agavaceae</i>
<i>Gardenia jasminoides</i>	<i>Cape Jasmine</i>	<i>Rubiaceae</i>
<i>Geranium sp.</i>	<i>Geranium</i>	<i>Geraniaceae</i>
<i>Gliricidia sepium</i>	<i>Mata Raton</i>	<i>Fabaceae</i>
<i>Golphimia gracilis</i>	<i>Rain of Gold</i>	<i>Malpighiaceae</i>
<i>Grevellia robusta</i>	<i>Silver oak</i>	<i>Proteaceae</i>
<i>Guazuma ulmifolia</i>	<i>West Indian Elm</i>	<i>Sterculiaceae</i>
<i>Heterophragma roxburghii</i>	<i>Bara Kalagoru</i>	<i>Bignoniaceae</i>
<i>Hiptage benghalensis</i>	<i>Vasantakaala Malligai</i>	<i>Malpighiaceae</i>
<i>Holoptelea integrifolia</i>	<i>Kaladri</i>	<i>Ulmaceae</i>
<i>Hyophorbe lagenicaulis</i>	<i>Bottle palm</i>	<i>Arecaceae</i>
<i>Ipomoea biloba</i>	<i>Rubber wine</i>	<i>Convolvulaceae</i>
<i>Ipomoea carnea</i>	<i>Pink Morning glory</i>	<i>Convolvulaceae</i>
<i>Ipomoea palmata</i>	<i>Railway Creeper</i>	<i>Convolvulaceae</i>
<i>Ixora singaporensis</i>	<i>Ixora</i>	<i>Rubiaceae</i>
<i>Jacaranda mimosaefolia</i>	<i>Jacaranda</i>	<i>Bignoniaceae</i>
<i>Jacaranda mimosaefolia</i>	<i>Jacaranda</i>	<i>Mimosaceae</i>
<i>Jasminum grandiflorum</i>	<i>Jasmine</i>	<i>Oleaceae</i>
<i>Jasminum sambac</i>	<i>Jasmine</i>	<i>Oleaceae</i>
<i>Jatropha curcas</i>	<i>Wild Castor</i>	<i>Euphorbiaceae</i>
<i>Jatropha gossypifolia</i>	<i>Siria Amanakku</i>	<i>Euphorbiaceae</i>
<i>Kigelia pinnata</i>	<i>Sasega mara</i>	<i>Bignoniaceae</i>
<i>Lagerstroemia flos-reginae</i>	<i>Pride of India</i>	<i>Lythraceae</i>
<i>Lagerstroemia speciosa</i>	<i>Pride of India</i>	<i>Lythraceae</i>
<i>Lantana camara</i>	<i>Lantana</i>	<i>Verbenaceae</i>
<i>Lawsonia inermis</i>	<i>Mehendi</i>	<i>Lythraceae</i>
<i>Leucaena leucocephala</i>	<i>Subabul</i>	<i>Mimosaceae</i>
<i>Limonia acidissima</i>	<i>Wood apple / Vilam</i>	<i>Rutaceae</i>
<i>Mangifera indica</i>	<i>Mango</i>	<i>Anacardiaceae</i>
<i>Manilkara hexandra</i>	<i>Ceylon Iron wood</i>	<i>Sapotaceae</i>
<i>Manilkara zapota</i>	<i>Sapota</i>	<i>Sapotaceae</i>
<i>Markhamia lutea</i>	<i>Nile Tulip Tree</i>	<i>Bignoniaceae</i>
<i>Michelia champaka</i>	<i>Champak</i>	<i>Magnoliaceae</i>
<i>Millingtonia hortensis</i>	<i>Tree Jasmine</i>	<i>Bignoniaceae</i>
<i>Mimosa rubicaulis</i>	<i>Rasne / Urisige</i>	<i>Mimosaceae</i>
<i>Mimusops elengi</i>	<i>Maghizham</i>	<i>Sapotaceae</i>
<i>Morinda pubescens</i>	<i>Nuna / Ivory Wood</i>	<i>Rubiaceae</i>
<i>Muntingia calabura</i>	<i>Singapore cherry</i>	<i>Muntingiaceae</i>
<i>Murraya paniculata</i>	<i>Vengarai</i>	<i>Rutaceae</i>
<i>Mussanda frondosa</i>	<i>Paper chase tree</i>	<i>Rubiaceae</i>
<i>Nerium odorum</i>	<i>Oleander</i>	<i>Apocynaceae</i>
<i>Nyctanthes arbor-tristis</i>	<i>Paarijatham</i>	<i>Oleaceae</i>
<i>Ochna obtusata</i>	<i>Golden Champak</i>	<i>Ochnaceae</i>
<i>Parkia biglandulosa</i>	<i>Shivalinga</i>	<i>Mimosaceae</i>
<i>Pelargonium graveolens</i>	<i>Rose Geranium</i>	<i>Geraniaceae</i>
<i>Peltophorum pterocarpum</i>	<i>Copper Pod</i>	<i>Caesalpiniaceae</i>
<i>Pentas lanceolata</i>	<i>Pentas</i>	<i>Rubiaceae</i>
<i>Petrea volubilis</i>	<i>Purple wreath</i>	<i>Verbenaceae</i>



<i>Phoenix acaulis</i>	Dwarf Date Palm	Arecaceae
<i>Phoenix sylvestris</i>	Wild date	Arecaceae
<i>Phyllanthus acidus</i>	Star Gooseberry	Euphorbiaceae
<i>Phyllanthus emblica</i>	Nelli	Euphorbiaceae
<i>Phyllanthus reticulatus</i>	Karu Nelli	Euphorbiaceae
<i>Pithecellobium dulce</i>	Madras Thorn	Mimosaceae
<i>Plumeria alba</i>	Champa	Apocynaceae
<i>Plumeria pudica</i>	White Frangipani	Apocynaceae
<i>Plumeria rubra</i>	Champa	Apocynaceae
<i>Poinsettia pulcherrima</i>	Poinsettia	Euphorbiaceae
<i>Polyalthia longifolia</i>	Ashoka	Annonaceae
<i>Polyalthia pendula</i>	Ashoka	Annonaceae
<i>Pongamia pinnata</i>	Honge	Fabaceae
<i>Prosopis juliflora</i>	Mesquite	Mimosaceae
<i>Prosopis spicigera</i>	Banni	Mimosaceae
<i>Psidium guajava</i>	Guava	Myrtaceae
<i>Pterospermum acerifolium</i>	Naradu	Sterculiaceae
<i>Punica granatum</i>	Pomegranate	Punicaceae
<i>Putranjiva roxburghii</i> (= <i>Drypetes roxburghii</i>)	Indian Amulet Tree / Karupala	Putranjivaceae
<i>Pyrostegia purpurea</i>	Flaming trumpet	Bignoniaceae
<i>Pyrostegia venusta</i>	Golden Shower	Bignoniaceae
<i>Quisqualis indica</i>	Rangoon Creeper	Combretaceae
<i>Rhizophora mucronata</i>	Asiatic Mangrove	Rhizophoraceae
<i>Ricinus communis</i>	Castor	Euphorbiaceae
<i>Roystonea regia</i>	Royal palm	Arecaceae
<i>Russelia equisetiformis</i>	Coral Plant	Srophulariaceae
<i>Samanea saman</i>	Rain Tree	Mimosaceae
<i>Santalum album</i>	Sandal wood	Santalinaceae
<i>Saraca indica</i>	Seetha Ashok	Caesalpiniaceae
<i>Solanum trilobatum</i>	Thoodhuvalai	Solanaceae
<i>Spathodea companulata</i>	Nirukai mara	Bignoniaceae
<i>Sterculia foetida</i>	Wild almond	Sterculiaceae
<i>Syzygium cumini</i>	Jamun /Naaval	Myrtaceae
<i>Tabebuia argentea</i>	Tree of Gold	Bignoniaceae
<i>Tabebuia avellanedae</i>	Pink Tabebuia	Bignoniaceae
<i>Tabebuia rosea</i>	Pink Trumpet Tree	Bignoniaceae
<i>Tabernaemontana coronaria</i>	Moon beam	Apocynaceae
<i>Talipariti tiliaceum</i>	Sea or Beach Hibiscus	Malvaceae
<i>Tamarindus indica</i>	Tamarind	Caesalpiniaceae
<i>Tecoma stans</i>	Yellow oleander	Bignonaceae
<i>Tecomella undulata</i>	Tecomella	Bignonaceae
<i>Tectona grandis</i>	Teak / Tekku	Verbenaceae
<i>Terminalia arjuna</i>	Arjun / Neer Marudhu	Combretaceae
<i>Terminalia catappa</i>	Almond	Combretaceae
<i>Terminalia mantaly</i>	Madagascar Almond	Combretaceae
<i>Thespesia populnea</i>	Indian Tulip Tree	Malvaceae
<i>Thevetia peruviana</i>	Yellow oleander	Apocynaceae
<i>Thunbergia grandiflora</i>	Heavenly blue	Acanthaceae
<i>Trachelospermum jasminoides</i>	Star Jasmine	Apocynaceae
<i>Turbina corymbosa</i>	Christmas Vine	Convolvulaceae



<i>Tylophora indica</i>	<i>Naippalai</i>	<i>Assclepiadaceae</i>
<i>Vallis solanacea</i>	<i>Bread Flower</i>	<i>Apocynaceae</i>
<i>Vernonia elaeagnifolia</i>	<i>Curtain creeper</i>	<i>Asteraceae</i>
<i>Vitex negundo</i>	<i>Nirgundi</i>	<i>Verbenaceae</i>
<i>Vitex trifolia</i>	<i>Caru-nocci / Nili</i>	<i>Verbenaceae</i>
<i>Wattakaka volubilis</i>	<i>Sneeze Wort</i>	<i>Asclepiadaceae</i>
<i>Wisteria sinensis</i>	<i>Chinese Wisteria</i>	<i>Fabaceae</i>
<i>Wodyetia bifurcata</i>	<i>Fox tail palm</i>	<i>Arecaceae</i>
<i>Woodfordia fruticosa</i>	<i>Red bell bush</i>	<i>Lythraceae</i>
<i>Wrightia tinctoria</i>	<i>Sweet Indrajao</i>	<i>Apocynaceae</i>
<i>Zamia furfuracea</i>	<i>Cardboard Palm</i>	<i>Cycadaceae</i>
<i>Ziziphus mauritiana</i>	<i>Yalachi</i>	<i>Rhamnaceae</i>

**TABLE - 3.24
LIST OF HERBS AND HERBACEOUS SPECIES FOUND IN THE CORE AREA AS WELL AS IN THE BUFFER ZONE**

Scientific Name	Family
<i>Abutilon indicum</i>	Malvaceae
<i>Acalypha indica</i>	Euphorbiaceae
<i>Acalypha lanceolata</i>	Euphorbiaceae
<i>Achyranthes aspera</i>	Amaranthaceae
<i>Aerva lanata</i>	Amaranthaceae
<i>Aerva tomentosa</i>	Amaranthaceae
<i>Ageratum conyzoides</i>	Asteraceae
<i>Alternanthera pungens</i>	Amaranthaceae
<i>Alternanthera philoxeroides</i>	Amaranthaceae
<i>Alternanthera sessilis</i>	Amaranthaceae
<i>Alternanthera triandra</i>	Amaranthaceae
<i>Alysicarpus monilifer</i>	Fabaceae
<i>Ammania baccifera</i>	Lythraceae
<i>Andrographis echinoides</i>	Acanthaceae
<i>Apluda mutica</i>	Poaceae
<i>Argemone mexicana</i>	Papaveraceae
<i>Asystasia gangetica</i>	Acanthaceae
<i>Blepharis maderaspatensis</i>	Acanthaceae
<i>Blepharis repens</i>	Acanthaceae
<i>Blumea lacera</i>	Asteraceae
<i>Boerhavia chinensis</i>	Nyctaginaceae
<i>Boerhavia erecta</i>	Nyctaginaceae
<i>Cassia occidentalis</i>	Caesalpinaceae
<i>Cassia tora</i>	Caesalpinaceae
<i>Cenchrus ciliaris</i>	Poaceae
<i>Cenchrus setifera</i>	Poaceae
<i>Chloris barbata</i>	Poaceae
<i>Chrozophora rottleri</i>	Euphorbiaceae
<i>Chrysopogon fulvus</i>	Poaceae
<i>Cleome gynandra</i>	Cleomaceae
<i>Cleome viscosa</i>	Cleomaceae



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<i>Crotalaria medicaginea</i>	Fabaceae
<i>Crotalaria verrucosa</i>	Fabaceae
<i>Croton bonplandianum</i>	Euphorbiaceae
<i>Cuscuta reflexa</i>	Cuscutaceae
<i>Cyanodon dactylon</i>	Poaceae
<i>Cymbopogon caesius</i>	Poaceae
<i>Cymbopogon coloratus</i>	Poaceae
<i>Cynodon dactylon</i>	Poaceae
<i>Cyperus rotundus</i>	Cyperaceae
<i>Cyperus triceps</i>	Cyperaceae
<i>Dactyloctenium aegyptium</i>	Poaceae
<i>Datura alba</i>	Solanaceae
<i>Datura metel</i>	Solanaceae
<i>Desmodium triflorum</i>	Fabaceae
<i>Dichanthium annulatum</i>	Poaceae
<i>Digera muricata</i>	Amaranthaceae
<i>Digitaria bicornis</i>	Poaceae
<i>Digitaria setacea</i>	Poaceae
<i>Echinops echinatus</i>	Asteraceae
<i>Eclipta alba</i>	Asteraceae
<i>Eclipta prostrata</i>	Asteraceae
<i>Eragrostis tenella</i>	Poaceae
<i>Eremopogon foveolatus</i>	Poaceae
<i>Euphorbia hirta</i>	Euphorbiaceae
<i>Euphorbia thymifolia</i>	Euphorbiaceae
<i>Evolvulus alsinoides</i>	Convolvulaceae
<i>Gomphrena globosa</i>	Amaranthaceae
<i>Hedyotis corymbosa</i>	Rubiaceae
<i>Hedyotis puberula</i>	Rubiaceae
<i>Heliotropium indicum</i>	Boraginaceae
<i>Hyptis suaveolens</i>	Labiatae
<i>Ischaemum rugosum</i>	Poaceae
<i>Justicia diffusa</i>	Acanthaceae
<i>Kyllinga triceps</i>	Cyperaceae
<i>Leucas aspera</i>	Lamiaceae
<i>Leucas indica</i>	Lamiaceae
<i>Leucas longifolia</i>	Lamiaceae
<i>Lippia nodiflora</i>	Verbenaceae
<i>Malvastrum coramandelianum</i>	Malvaceae
<i>Merremia emerginata</i>	Convolvulaceae
<i>Merremia gangetca</i>	Convolvulaceae
<i>Merremia tridentata</i>	Convolvulaceae
<i>Mollugo hirta</i>	Aizoaceae
<i>Ocimum americanum</i>	Lamiaceae
<i>Ocimum basilicum</i>	Lamiaceae
<i>Ocimum canum</i>	Lamiaceae
<i>Ocimum sanctum</i>	Lamiaceae
<i>Oldenlandia herbacea</i>	Rubiaceae
<i>Oldenlandia umbellata</i>	Convolvulaceae



<i>Oldenlandia corymbosa</i>	Rubiaceae
<i>Oxalis corniculata</i>	Oxalidaceae
<i>Panicum psilopodium</i>	Poaceae
<i>Panicum repens</i>	Poaceae
<i>Parthenium hysterophorus</i>	Asteraceae
<i>Peristrophe bicalyculata</i>	Acanthaceae
<i>Phyllanthus niruri</i>	Euphorbiaceae
<i>Physalis minima</i>	Solanaceae
<i>Polygala arvensis</i>	Polygalaceae
<i>Polygala erioptera</i>	Polygalaceae
<i>Portulaca oleracea</i>	Portulacaceae
<i>Saccharum munja</i>	Poaceae
<i>Saccharum officinarum</i>	Poaceae
<i>Scilla hyacinthina</i>	Liliaceae
<i>Senna uniflora</i>	Caesalipiniaceae
<i>Sida acuta</i>	Malvaceae
<i>Sida cordifolia</i>	Malvaceae
<i>Sida orientalis</i>	Malvaceae
<i>Sida rhombifolia</i>	Malvaceae
<i>Sida vernonicaefolia</i>	Malvaceae
<i>Solanum nigrum</i>	Solanaceae
<i>Solanum surattense</i>	Solanaceae
<i>Spermacoce hispida</i>	Rubiaceae
<i>Spermacoce articularis</i>	Rubiaceae
<i>Spermacoce stricta</i>	Rubiaceae
<i>Stachytarpetta indica</i>	Verbenaceae
<i>Themeda ciliata</i>	Poaceae
<i>Themeda quadrivalvis</i>	Poaceae
<i>Tragus biflorus</i>	Poaceae
<i>Trianthema decandra</i>	Aizoaceae
<i>Trianthema portulacastrum</i>	Aizoaceae
<i>Tribulus terrestris</i>	Zygophyllaceae
<i>Tridax procumbens</i>	Asteraceae
<i>Trigonella corniculata</i>	Fabaceae
<i>Vernonia cinerea</i>	Asteraceae
<i>Xanthium strumarium</i>	Asteraceae
<i>Zornia gobbosa</i>	Asteraceae

3.9.3 Terrestrial Fauna of the Study Area

The core area is under the existing industry since 1961 and it is subjected to frequent disturbances on account of movement of men, materials, vehicles and operation of equipment and machinery. Hence, it is not conducive for any major wildlife other than those which are found in human environment. Rodents including rats, mice, shrews, bandicoots, squirrels and Bats among the mammals; crows, pigeons, doves, parrots, sparrows, common minas among birds occur in the project site. Reptiles other than lizards, common geckos are rare. Snakes were rarely reported and there were cases of snake bites in the core area.

A large part of the 10 km buffer zone of the project site is covered by the Bay of Bengal. Rest of the land area is under dense human settlements and hence it is unsuitable for any major wildlife. A list of the vertebrate species that occur in the buffer zone is given in **Table 3.25**. Among the birds, a couple Spot-billed Pelicans (*Pelecanus philippensis*), Painted Storks (*Mycteria leucocephala*), Oriental darter (*Anhinga melanogaster*), Cattle egret (*Bubulcus ibis*) and Little egret (*Egretta garzetta*) were seen feeding in the wetlands of Kosasthalaiyar. Crows, pigeons, doves, parrots, sparrows, common minas were common. A list of birds reported from the surroundings of the project site is given in **Table 3.26**. There are no rare or endangered or threatened (RET) or Schedule I species in the study area.

**TABLE - 3.25
LIST OF VERTEBRATES OTHER THAN BIRDS EITHER SPOTTED OR REPORTED
FROM THE STUDY AREA**

Scientific Name	Common Name	IUCN / WPA
MAMMALS		
<i>Bandicota bengalensis</i>	Indian mole rat	LC / IV
<i>Bandicota indica</i>	Bandicoot rat	LC / IV
<i>Cynopterus sphinx</i>	Short-nosed Fruit Bat	LC / IV
<i>Funambulus palmarum</i>	Three-striped palm squirrel	LC / IV
<i>Golunda ellioti</i>	Indian bush rat	LC / IV
<i>Herpestes edwardsii</i>	Common mongoose	LC / IV
<i>Herpestes javanicus</i>	Small Indian mongoose	LC / IV
<i>Mus booduga</i>	Indian field mouse	LC / IV
<i>Rattus rattus</i>	Common house rat	LC / IV
<i>Soriculus leucops</i>	Indian long-tailed shrew	LC / IV
<i>Suncus murinus</i>	Asian house shrew	LC / IV
REPTILES (P=Poisonous)		
<i>Ahaetulla nasutus</i>	Vine snake	LC / II
<i>Ahaetulla prasina</i>	Green whip snake	LC / II
<i>Amphiesma stolata</i>	Buff striped keel back	LC / II
<i>Bungarus caeruleus</i>	Common krait (P)	LC / II
<i>Calotes versicolor</i>	Garden lizard	LC / IV
<i>Chameleon zeylanicum</i>	Chameleon	LC / IV
<i>Coelognathus helena</i>	Trinket snake	LC / II
<i>Daboia russelii</i>	Russell's viper (P)	LC / II
<i>Dendrelaphis tristis</i>	Bronze backed tree snake	LC / II
<i>Echis carinatus</i>	Saw scaled viper (P)	LC / II
<i>Eutropis carinata</i>	Indian Mabuya	LC / IV
<i>Hemidactylus flaviviridis</i>	Wall lizard	LC / IV
<i>Hemidactylus frenatus</i>	Small wall lizard	LC / IV
<i>Lycodon aulicus</i>	Pond Wolf snake	LC / II
<i>Macropisthodon plumbicolor</i>	Green keel back	LC / II
<i>Naja naja</i>	Cobra (P)	LC / II
<i>Oligodon arnensis</i>	Common kukri	LC / II
<i>Ptyas mucosa</i>	Rat snakes	LC / II
<i>Ramphotyphlops braminus</i>	Blind snake	LC / II
AMPHIBIANS		
<i>Bufo melanostictus</i>	South Indian Toad	LC / IV



<i>Sphaerotheca breviceps</i>	Burrowing frog	LC / IV
<i>Polypedates maculatus</i>	Tree Frog	LC / IV
<i>Rana hexadactyla.</i>	Pond frog	LC / IV
<i>Rana tigrina</i>	Tiger Frog	LC / IV

**TABLE - 3.26
LIST OF BIRDS EITHER SPOTTED OR REPORTED FROM THE STUDY AREA**

Scientific Name	Common Name	Family	IUCN / WPA
<i>Accipiter badius</i>	Shikra	Accipitridae	LC / IV
<i>Acridotheres qingnianus</i>	Bank Myna	Sturnidae	LC / IV
<i>Acridotheres tristis</i>	Common Myna	Sturnidae	LC / IV
<i>Acrocephalus agricola</i>	Paddy field Warbler	Sylviidae	LC / IV
<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	Sylviidae	LC / IV
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	Sylviidae	LC / IV
<i>Actitis hypoleucos</i>	Common Sandpiper	Scolopacidae	LC / IV
<i>Aegithina tiphia</i>	Common Iora	Aegithinidae	LC / IV
<i>Alcedo atthis</i>	Common Kingfisher	Alcedinidae	LC / IV
<i>Anas acuta</i>	Northern Pintail	Anatidae	LC / IV
<i>Anas clypeata</i>	Northern Shoveler	Anatidae	LC / IV
<i>Anas crecca</i>	Common Teal	Anatidae	LC / IV
<i>Anas penelope</i>	Eurasian Wigeon	Anatidae	LC / IV
<i>Anas poecilorhyncha</i>	Spot-billed Duck	Anatidae	LC / IV
<i>Anas querquedula</i>	Garganey	Anatidae	LC / IV
<i>Anas strepera</i>	Gadwall	Anatidae	LC / IV
<i>Anser indicus</i>	Bar-headed Goose	Anatidae	LC / IV
<i>Anthus trivialis</i>	Tree Pipit	Motacillidae	LC / IV
<i>Apus affinis</i>	Little Swift	Apodidae	LC / IV
<i>Ardea cinerea</i>	Grey Heron	Ardeidae	LC / IV
<i>Ardea purpurea</i>	Purple Heron	Ardeidae	LC / IV
<i>Ardeola grayii</i>	Indian Pond Heron	Ardeidae	LC / IV
<i>Athene brama</i>	Spotted Owlet	Strigidae	LC / IV
<i>Aythya ferina</i>	Common Pochard	Anatidae	LC / IV
<i>Bubulcus ibis</i>	Cattle Egret	Ardeidae	LC / IV
<i>Butastur teesa</i>	White-eyed Buzzard	Accipitridae	LC / IV
<i>Buteo rufinus</i>	Long-legged Buzzard	Accipitridae	LC / IV
<i>Calidris ferruginea</i>	Curlew Sandpiper	Scolopacidae	LC / IV
<i>Calidris minuta</i>	Little Stint	Scolopacidae	LC / IV
<i>Calidris ruficollis</i>	Red-necked Stint	Scolopacidae	LC / IV
<i>Calidris temminckii</i>	Temminck's Stint	Scolopacidae	LC / IV
<i>Caprimulgus asiaticus</i>	Indian Nightjar	Caprimulgidae	LC / IV
<i>Caprimulgus indicus</i>	Grey Nightjar	Caprimulgidae	LC / IV
<i>Carpodacus erythrinus</i>	Common Rosefinch	Fringillidae	LC / IV
<i>Celeus brachyurus</i>	Rufous Woodpecker	Picidae	LC / IV
<i>Centropus sinensis</i>	Greater Coucal	Cuculidae	LC / IV
<i>Ceryle rudis</i>	Pied Kingfisher	Alcedinidae	LC / IV
<i>Charadrius alexandrinus</i>	Kentish Plover	Charadriidae	LC / IV
<i>Charadrius dubius</i>	Little Ringed Plover	Charadriidae	LC / IV
<i>Chlidonias hybrida</i>	Whiskered Tern	Laridae	LC / IV



<i>Chrysomma sinense</i>	Yellow-eyed Babbler	Timaliidae	LC / IV
<i>Cinnyris asiaticus</i>	Purple Sunbird	Nectariniidae	LC / IV
<i>Columba livia</i>	Rock pigeon	Columbidae	LC / IV
<i>Copsychus saularis</i>	Oriental Magpie-Robin	Muscicapidae	LC / IV
<i>Coracias benghalensis</i>	Indian Roller	Coraciidae	LC / IV
<i>Coracina macei</i>	Large Cuckoo-shrike	Campephagidae	LC / IV
<i>Coracina melanoptera</i>	Black-headed Cuckoo-shrike	Campephagidae	LC / IV
<i>Coracina melaschistos</i>	Black-winged Cuckoo-shrike	Campephagidae	LC / IV
<i>Corvus macrorhynchos</i>	Large-billed Crow/Jungle Crow	Corvidae	LC / IV
<i>Corvus splendens</i>	House Crow	Corvidae	LC / V
<i>Cuculus canorus</i>	Common Cuckoo	Cuculidae	LC / IV
<i>Cuculus micropterus</i>	Indian Cuckoo	Cuculidae	LC / IV
<i>Cuculus varius</i>	Common Hawk-Cuckoo	Cuculidae	LC / IV
<i>Cypsiurus balasiensis</i>	Asian Palm Swift	Apodidae	LC / IV
<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Anatidae	LC / IV
<i>Dicrurus caerulescens</i>	White-bellied Drongo	Dicruridae	LC / IV
<i>Dicrurus leucophaeus</i>	Ashy Drongo	Dicruridae	LC / IV
<i>Dicrurus macrocercus</i>	Black Drongo	Dicruridae	LC / IV
<i>Dinopium benghalense</i>	Black-rumped Woodpecker	Picidae	LC / IV
<i>Egretta garzetta</i>	Little Egret	Ardeidae	LC / IV
<i>Egretta intermedia</i>	Intermediate Egret	Ardeidae	LC / IV
<i>Emberiza melanocephala</i>	Black-headed Bunting	Emberizidae	LC / IV
<i>Eremopterix griseus</i>	Ashy-crowned Sparrow-Lark	Alaudidae	LC / IV
<i>Eudynamis scolopaceus</i>	Common Koel	Cuculidae	LC / IV
<i>Francolinus francolinus</i>	Black Francolin	Phasianidae	LC / IV
<i>Francolinus pondicerianus</i>	Grey Francolin	Phasianidae	LC / IV
<i>Fulica atra</i>	Common Coot	Rallidae	LC / IV
<i>Gallinago gallinago</i>	Common Snipe	Scolopacidae	LC / IV
<i>Gallinago stenura</i>	Pintail Snipe	Scolopacidae	LC / IV
<i>Gymnoris xanthocollis</i>	Yellow-throated Sparrow	Passeridae	LC / IV
<i>Halcyon pileata</i>	Black-capped Kingfisher	Alcedinidae	LC / IV
<i>Halcyon smyrnensis</i>	White-throated Kingfisher	Alcedinidae	LC / IV
<i>Haliastur indus</i>	Brahminy Kite	Accipitridae	LC / IV
<i>Hemiprocne coronata</i>	Crested Treeswift	Hemiprocnidae	LC / IV
<i>Himantopus himantopus</i>	Black-winged Stilt	Recurvirostridae	LC / IV
<i>Hirundo rustica</i>	Barn Swallow	Hirundinidae	LC / IV
<i>Hirundo smithii</i>	Wire-tailed Swallow	Hirundinidae	LC / IV
<i>Hydrophasianus chirurgus</i>	Pheasant-tailed Jacana	Jacanidae	LC / IV
<i>Lanius cristatus</i>	Brown Shrike	Laniidae	LC / IV
<i>Lanius schach</i>	Long-tailed Shrike	Laniidae	LC / IV
<i>Lanius vittatus</i>	Bay-backed Shrike	Laniidae	LC / IV
<i>Larus ridibundus</i>	Common Black-headed Gull	Laridae	LC / IV



<u><i>Leptocoma zeylonica</i></u>	Purple-rumped Sunbird	Nectariniidae	LC / IV
<u><i>Lonchura malacca</i></u>	Black-headed Munia	Estrildidae	LC / IV
<u><i>Lonchura punctulata</i></u>	Scaly-breasted Munia	Estrildidae	LC / IV
<u><i>Lonchura striata</i></u>	White-rumped Munia	Estrildidae	LC / IV
<u><i>Luscinia brunnea</i></u>	Indian Blue Robin	Muscicapidae	LC / IV
<u><i>Megalaima haemacephala</i></u>	Coppersmith Barbet	Ramphastidae	LC / IV
<u><i>Megalaima zeylanica</i></u>	Brown-headed Barbet	Ramphastidae	LC / IV
<u><i>Merops leschenaulti</i></u>	Chestnut-headed Bee-eater	Meropidae	LC / IV
<u><i>Merops orientalis</i></u>	Green Bee-eater	Meropidae	LC / IV
<u><i>Merops philippinus</i></u>	Blue-tailed Bee-eater	Meropidae	LC / IV
<u><i>Metopidius indicus</i></u>	Bronze-winged Jacana	Jacanidae	LC / IV
<u><i>Milvus migrans</i></u>	Black Kite	Accipitridae	LC / IV
<u><i>Monticola cinclorhynchus</i></u>	Blue-capped Rock Thrush	Muscicapidae	LC / IV
<u><i>Monticola solitarius</i></u>	Blue Rock Thrush	Muscicapidae	LC / IV
<u><i>Motacilla cinerea</i></u>	Grey Wagtail	Motacillidae	LC / IV
<u><i>Motacilla flava</i></u>	Yellow Wagtail	Motacillidae	LC / IV
<u><i>Motacilla maderaspatensis</i></u>	White-browed Wagtail	Motacillidae	LC / IV
<u><i>Muscicapa dauurica</i></u>	Asian Brown Flycatcher	Muscicapidae	LC / IV
<u><i>Mycteria leucocephala</i></u>	Painted - Stork	Ciconiidae	NT / IV
<u><i>Oriolus chinensis</i></u>	Black-naped Oriole	Oriolidae	LC / IV
<u><i>Oriolus oriolus</i></u>	Eurasian Golden Oriole	Oriolidae	LC / IV
<u><i>Oriolus xanthornus</i></u>	Black-hooded Oriole	Oriolidae	LC / IV
<u><i>Passer domesticus</i></u>	House Sparrow	Passeridae	LC / IV
<u><i>Pelecanus philippensis</i></u>	Spot-billed Pelican	Pelecanidae	NT / IV
<u><i>Pericrocotus cinnamomeus</i></u>	Small Minivet	Campephagidae	LC / IV
<u><i>Phalacrocorax fuscicollis</i></u>	Indian Cormorant	Phalacrocoracidae	LC / IV
<u><i>Phalacrocorax niger</i></u>	Little Cormorant	Phalacrocoracidae	LC / IV
<u><i>Pitta brachyura</i></u>	Indian Pitta	Pittidae	LC / IV
<u><i>Ploceus manyar</i></u>	Streaked Weaver	Ploceidae	LC / IV
<u><i>Ploceus philippinus</i></u>	Baya Weaver	Ploceidae	LC / IV
<u><i>Prinia inornata</i></u>	Plain Prinia	Cisticolidae	LC / IV
<u><i>Prinia socialis</i></u>	Ashy Prinia	Cisticolidae	LC / IV
<u><i>Pseudibis papillosa</i></u>	Indian Black Ibis	Threskiornithidae	LC / IV
<u><i>Psittacula cyanocephala</i></u>	Plum-headed Parakeet	Psittacidae	LC / IV
<u><i>Psittacula krameri</i></u>	Rose-ringed Parakeet	Psittacidae	LC / IV
<u><i>Pycnonotus cafer</i></u>	Red-vented Bulbul	Pycnonotidae	LC / IV
<u><i>Pycnonotus jocosus</i></u>	Red-whiskered Bulbul	Pycnonotidae	LC / IV
<u><i>Pycnonotus leucogenys</i></u>	White-cheeked Bulbul	Pycnonotidae	LC / IV
<u><i>Recurvirostra avosetta</i></u>	Pied Avocet	Recurvirostridae	LC / IV
<u><i>Rhipidura albicollis</i></u>	White-throated Fantail	Rhipiduridae	LC / IV
<u><i>Rhipidura aureola</i></u>	White-browed Fantail	Rhipiduridae	LC / IV
<u><i>Saxicola torquatus</i></u>	Common Stonechat	Muscicapidae	LC / IV
<u><i>Saxicoloides fulicatus</i></u>	Indian Robin	Muscicapidae	LC / IV
<u><i>Stachyris ruficeps</i></u>	Rufous-capped Babbler	Timaliidae	LC / IV
<u><i>Streptopelia chinensis</i></u>	Spotted-necked Dove	Columbidae	LC / IV
<u><i>Streptopelia decaocto</i></u>	Eurasian Collared Dove	Columbidae	LC / IV



<i>Streptopelia orientalis</i>	Oriental Turtle Dove	Columbidae	LC / IV
<i>Sturnus malabaricus</i>	Chestnut-tailed Starling	Sturnidae	LC / IV
<i>Sturnus pagodarum</i>	Brahminy Starling	Sturnidae	LC / IV
<i>Surniculus lugubris</i>	Asian Drongo-Cuckoo	Cuculidae	LC / IV
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Anatidae	LC / IV
<i>Tringa erythropus</i>	Spotted Redshank	Scolopacidae	LC / IV
<i>Tringa glareola</i>	Wood Sandpiper	Scolopacidae	LC / IV
<i>Turdoides affinis</i>	Yellow-billed Babbler	Timaliidae	LC / IV
<i>Turdoides caudata</i>	Common Babbler	Timaliidae	LC / IV
<i>Tyto alba</i>	Barn Owl	Tytonidae	LC / IV
<i>Upupa epops</i>	Common Hoopoe	Upupidae	LC / IV
<i>Vanellus cinereus</i>	Grey-headed Lapwing	Charadriidae	LC / IV
<i>Vanellus indicus</i>	Red-wattled Lapwing	Charadriidae	LC / IV
<i>Vanellus malabaricus</i>	Yellow-wattled Lapwing	Charadriidae	LC / IV
<i>Zoothera citrina</i>	Orange-headed Thrush	Turdidae	LC / IV
<i>Zosterops palpebrosu</i>	Oriental White-eye	Zosteropidae	LC / IV

Note: LC Means Least Concern and NT Means Near Threaten As Per IUCN.

Aquatic Flora and Fauna

The aquatic ecosystems in the study area are represented by the Bay of Bengal (0.12 km towards east), Kosasthalaiyar River (0.37 Km towards West Northwest), Kadapakkam Panchayat Lake (7.1 towards West) and Vichoor Lake (8.27 Km towards West). Bay of Bengal is not considered for the study under report. A brief account of Kosasthalaiyar wetlands is described earlier. Other wetlands are extensively colonized by aquatic macrophytes. A list of aquatic and semi aquatic macrophytes found in the lakes is given in **Table 3.27**. A list of freshwater fishes caught and or introduced in to the water bodies is given in **Table 3.28**. There are no RET or Schedule I species.

TABLE - 3.27
LIST OF AQUATIC AND SEMIAQUATIC MACROPHYTES FOUND DURING THE SURVEY IN THE LAKES, RIVERS

Scientific name	Family	Life form
<i>Alternanthera sessilis</i>	Amaranthaceae	Semi aquatic
<i>Ammania baccifera</i>	Lythraceae	Emergent anchored
<i>Aponogeton natans</i>	Aponogetonaceae	Floating
<i>Chloris barbata</i>	Poaceae	Emergent anchored
<i>Cynodon dactylon</i>	Poaceae	Emergent anchored
<i>Cyperus rotundus</i>	Cyperaceae	Emergent anchored
<i>Dactyloctenium aegyptium</i>	Poaceae	Emergent anchored
<i>Echinochloa colona</i>	Poaceae	Emergent anchored
<i>Eichornia crassipes</i>	Pontederiaceae	Floating
<i>Enicostemma axillare</i>	Gentianaceae	Emergent anchored
<i>Hygrophila auriculata</i>	Acanthaceae	Emergent anchored
<i>Ipomoea aquatica</i>	Convolvulaceae	Floating
<i>Ipomoea carnea</i>	Convolvulaceae	Emergent anchored
<i>Kyllinga bulbosa</i>	Cyperaceae	Emergent anchored
<i>Lemna gibba</i>	Lemnaceae	Floating
<i>Ludwigia perennis</i>	Onagraceae	Emergent anchored
<i>Najas graminea</i>	Najadaceae	Submerged anchored
<i>Najas indica</i>	Najadaceae	Submerged anchored

<i>Najas minor</i>	Najadaceae	Submerged anchored
<i>Nelumbo nucifera</i>	Nymphaeaceae	Floating leaved anchored
<i>Neptunia prostrata</i>	Mimosaceae	Floating
<i>Nymphaea nouchali</i>	Nymphaeaceae	Floating leaved anchored
<i>Nymphaea pubescens</i>	Nymphaeaceae	Floating leaved anchored
<i>Nymphaea rubra</i>	Nymphaeaceae	Floating leaved anchored
<i>Ottelia alismoides</i>	Hydrocharitaceae	Submerged anchored
<i>Pistia stratiotes</i>	Aponogetonaceae	Floating
<i>Polygala arvensis</i>	Polygalaceae	Emergent anchored
<i>Polygala chinensis</i>	Polygalaceae	Emergent anchored
<i>Polygala erioptera</i>	Polygalaceae	Emergent anchored
<i>Polygonum glabrum</i>	Polygonaceae	Emergent anchored
<i>Polygonum hydropiper</i>	Polygonaceae	Emergent anchored
<i>Scirpus articulatus</i>	Cyperaceae	Emergent anchored
<i>Sporobolus coromandelianus</i>	Poaceae	Emergent anchored
<i>Typha angustifolia</i>	Typhaceae	Emergent anchored

TABLE - 3.28
LIST OF FRESH WATER FISHES REPORTED FROM THE STUDY AREA

Scientific Name	Common Name	Family
<i>Amblypharyngodon mola</i>	Mola carplet	Cyprinidae
<i>Anguilla bengalensis</i>	Indian mottled eel	Anguillidae
<i>Badis badis</i>	Badis	Badidae
<i>Bangana ariza</i>	Reba	Cyprinidae
<i>Catla catla</i>	Catla	Cyprinidae
<i>Chanda nama</i>	Elongate glass perchlet	Ambassidae
<i>Channa marulius</i>	Great snakehead	Channidae
<i>Channa punctata</i>	Spotted snakehead	Channidae
<i>Channa striata</i>	Striped snakehead	Channidae
<i>Cirrhinus cirrhosus</i>	Mrigal Carp	Cyprinidae
<i>Cirrhinus mrigala</i>	Mrigal	Cyprinidae
<i>Cirrhinus reba</i>	Reba Carp	Cyprinidae
<i>Ctenopharyngodon idella</i>	Grass Carp	Cyprinidae
<i>Cyprinus carpio</i>	Common Carp	Cyprinidae
<i>Danio rerio</i>	Zebra Danio	Cyprinidae
<i>Gambusia affinis</i>	Mosquito fish	Poeciliidae
<i>Labeo bata</i>	Bata	Cyprinidae
<i>Labeo boga</i>	Boga Labeo	Cyprinidae
<i>Labeo rohita</i>	Rohu	Cyprinidae
<i>Oreochromis aureus</i>	Blue tilapia	Cichlidae
<i>Oreochromis mossambicu</i>	Mozambique tilapia	Cichlidae
<i>Oreochromis niloticus</i>	Nile tilapia	Cichlidae

3.9.4 Conclusion

From the field observations it can be concluded that there are no reserve forests in the 10km radius of the study area. As per MoEF and Forest Department of Tamil Nadu state, there are no National Parks, Wildlife Sanctuaries, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridors or IBAs within 10 km of the project site.

As per the records of the Botanical Survey of India, there are no plants of conservation

importance in the study area. It can be concluded There are no rare or endangered or threatened (RET) or Schedule I species in the study area and rest of the species belongs to Sch-II, Sch-IV and Sch-V of Wildlife Protection Act, 1972.

3.10 Demography and Socio-Economics

The demographic and socio-economic conditions prevailing in the 10 km radius of study area is analysed. The socio-economic data forms the basis for developing a suitable enterprise social responsibility plan to address the needs of the population.

The project proponent is committed to take up the socio-economic development initiatives not only to minimize the negative impact on the population but also to improve the socio-economic status of population living in 10 km radius of the plant as its sustained effort as part of enterprise social responsibility.

3.10.1 Methodology adopted for the study

The methodology adopted for the study mainly includes review of published secondary data (District Census Statistical Handbooks-2011 and Primary Census Abstract of Census-2011) with respect to population, density, household size, sex ratio, social stratification, literacy rate and occupational structure for the 10 km radius study area.

3.10.2 Review of Demographic and Socio-Economic Profile-2011

The sociological aspects of this study include human settlements, demography and scheduled category of population and literacy levels in addition to infrastructure facilities available in the study area. The economic aspects include occupational structure of workers. The village wise demographic data is given in **Annexure XXIII**. The salient features of the demographic and socio-economic conditions are analysed and described in the following sections.

3.10.3 Demography

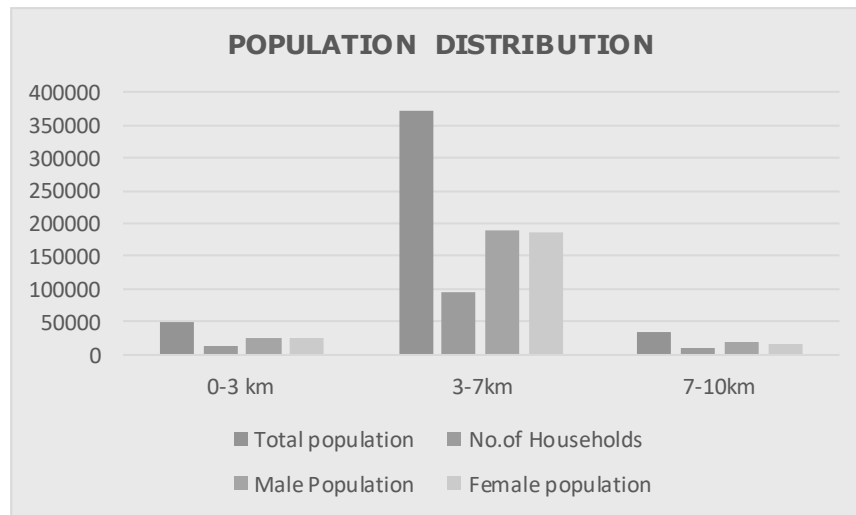
3.10.3.1 *Distribution of Population*

As per 2011 census, the study area consists 4,55,972 persons inhabited in the 10 km radial distance from the periphery of the plant. The distribution of the population in the study area is given in **Table - 3.29**.

TABLE - 3.29
DISTRIBUTION OF POPULATION

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
No of households	12496	95535	151776	116414
Male population	24508	188092	16984	229584
Female population	24228	185602	16558	226388
Total population	48736	373694	33542	455972
% of male population	50.28	50.3	50.56	50.3
% of female population	49.71	49.66	49.4	49.6
Average Households Size	3.9	3.91	3.95	3.93

Source: District Primary Census Handbook – Tiruvallur & Chennai District, 2011



**FIGURE-3.20
POPULATION DISTRIBUTION OF THE STUDY AREA**

3.10.3.2 Average Households Size

The study area has an average family size of 4 persons per household in 2011. This is a moderate family size and is in comparison with the other parts of the district.

3.10.3.3 Sex Ratio

The configuration of male and female indicates that the male constitutes to about 50.3% and female 49.6% of total population. The sex ratio i.e. the number of females per 1000 males indirectly reveals certain sociological aspects in relation with female birth, infant mortality among female children and single-family structure, a resultant of migration of industrial workers. The study area on an average has 1000 females per 1000 males as per 2011 census.

3.10.4 Social Structure

As per census, in the study area, about 20.6% population belong to Scheduled Castes (SC) and 0.44% belong to Scheduled Tribes (ST) indicating that the about 21.1% of the total population in the study area belongs to socially weaker section. The distribution of population in the study area by social structure is shown in **Table - 3.30**.

**TABLE - 3.30
DISTRIBUTION OF POPULATION BY SOCIAL STRUCTURE**

Particulars	0-3 Km	3-7 km	7-10 km	0-10 km
Scheduled Castes	7120	79355	7850	94325
% to total population	14.6	21.2	23	20.6
Scheduled Tribes	141	1669	109	1919
% to total population	0.28	0.44	0	0.44
Total SC and ST	7261	81024	7959	96244
% to total population	14.89	21.64	24	21.1
Other castes	41475	292670	25583	359728
% to total population	85.1	78.3	76	78.8

Source: District Primary Census Handbook – Tiruvallur & Chennai District, 2011

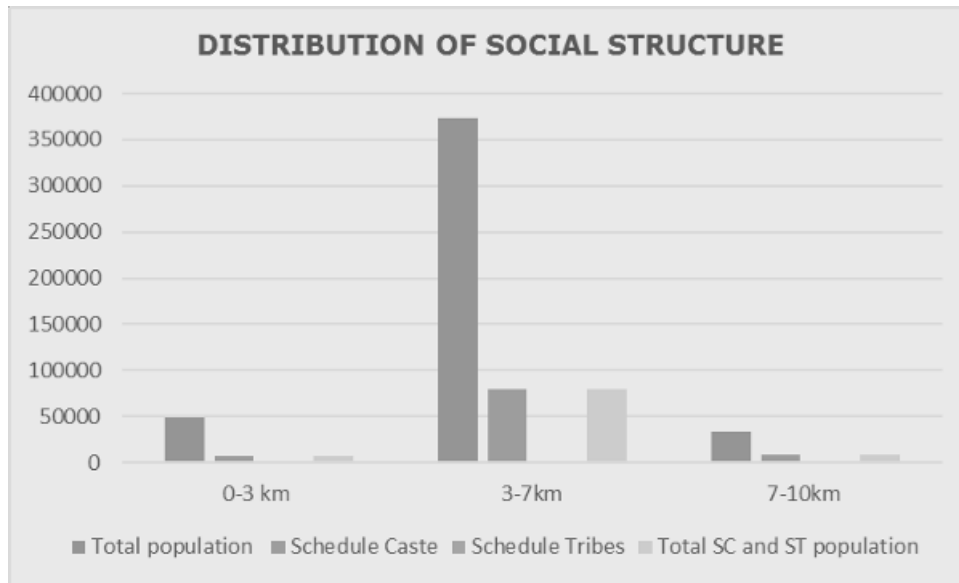


FIGURE-3.21
SOCIAL STRUCTURE DISTRIBUTION OF THE STUDY AREA

3.10.5 Literacy Levels

The literacy rate of the study area is found to be 77%. The male literate to the male population was found to be 81.5% in the study area. The female literate to the total population was found to be 73.82% in the study area. In the study area, the male literacy is found to be 41.0%, whereas the female literacy rate, which is observed to be 36.5% in the study area as per census, 2011.

The distribution of literate and literacy rate in the study area is given in **Table - 3.31**.

TABLE - 3.31
DISTRIBUTION OF LITERATE AND LITERACY RATES

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
Total Literate	36619	291077	26143	353839
Male population	24508	188092	16984	229584
Female population	24228	185602	16558	226388
Average literacy (%)	75.13	77.89	78	77
Male literate	19661	153540	13949	187150
% to study area literate	53.69	52.27	53	41.0
% to study male population	80.22	81.6	82.13	81.5
Female Literate	16958	137537	12194	166689
% to study area literate	46.3	47.25	47	36.5
% to study female population	69.9	74.10	74	73.62

Source: District Primary Census Handbook – Tiruvallur & Chennai District, 2011

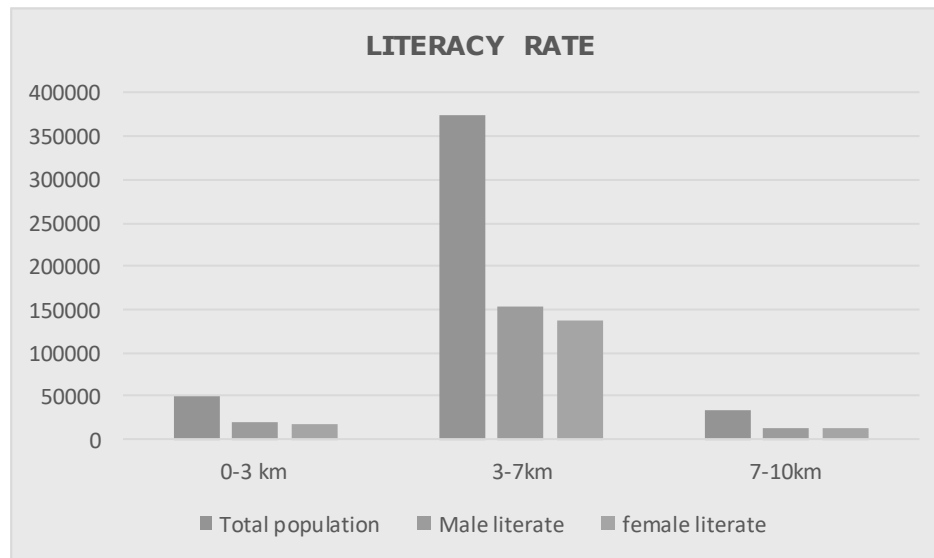


FIGURE-3.22
LITERACY RATE OF STUDY AREA

3.10.6 Occupational Structure

The occupational structure in the study area is studied with reference to main workers, marginal workers and non-workers. The main workers include 10 categories of workers defined by the Census Department consisting of cultivators, agricultural labourers, those engaged in live-stock, forestry, fishing, mining and quarrying; manufacturing, processing and repairs in household industry; and other than household industry, construction, trade and commerce, transport and communication and other services.

The marginal workers are those workers engaged in some work for a period of less than six months during the reference year prior to the census survey. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars, vagrants etc.; institutional inmates or all other non-workers who do not fall under the above categories.

As per census 2011, records the main workers were found to be 31% of the total population. The marginal workers and non-workers constituted 5% and 62% of the total population. The occupational structure indicates that the non-workers are the predominant population in the present study area. The occupational structure of the study area is given in **Table - 3.32**.

TABLE - 3.32
OCCUPATIONAL STRUCTURE

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
Total main workers	14375	120220	9418	144013
% to Total population	29.49	32.17	34	31
Marginal Workers	3117	21049	3036	27202
% to total population	6.3	5.63	9	5
Non-Workers	31244	232425	21088	284757
% to Total population	64.10	62.19	63	62
Total Population	48736	373694	33542	455972

Source: District Primary Census Handbook – Tiruvallur & Chennai District, 2011

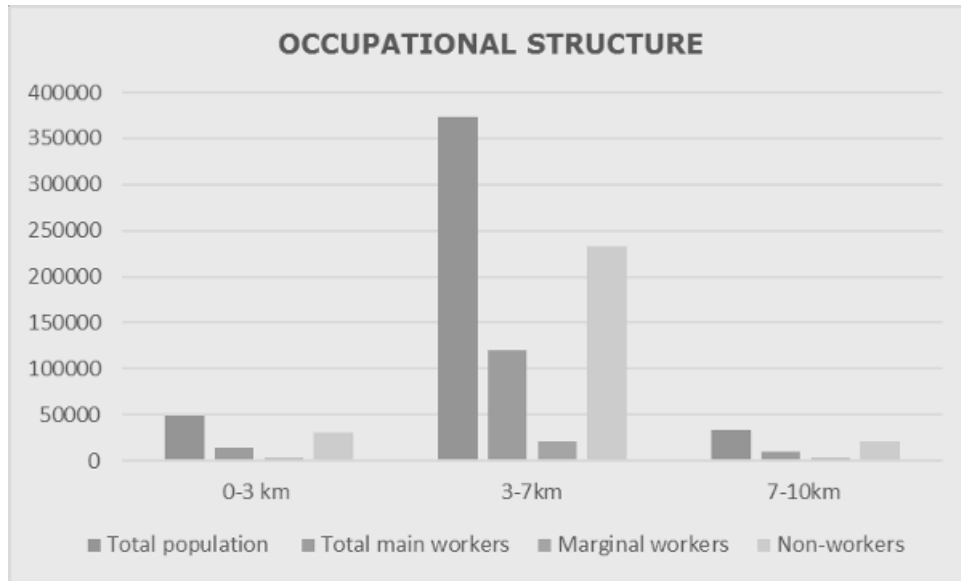


FIGURE-3.23
OCCUPATIONAL STRUCTURE IN THE STUDY AREA

CHAPTER - 4

**ANTICIPATED ENVIRONMENTAL IMPACTS AND
MITIGATION MEASURES**

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Introduction

This chapter presents identification and appraisal of various impacts due to the proposed expansion and modernization of the existing foundry unit during construction and operational phases.

The environmental impacts can be categorized as either primary or secondary. Primary impacts are those, which are attributed directly by the project and secondary impacts are those, which are indirectly induced and typically include the associated investment and changes in the pattern of social and economic activities by the proposed expansion and modernization activities.

The impacts have been assessed for the proposed expansion and modernization project assuming that the pollution due to the existing manufacturing activities with their present capacities has already been covered under baseline environmental monitoring and continue to remain same till the operation of the project.

Various impacts during the construction and operation phase on the environment parameters have been studied to estimate the impacts on the environment due to the implementation of the project and discussed in the subsequent sections.

4.2 Impacts during Construction Phase

This includes the activities related to leveling of site, construction of related structures and installation of related equipment.


Impact on Land Use

The existing plant of Ashok Leyland operates in owned land area of 13.86 ha (34.25 acres) at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu. The proposed expansion and modernization activity will take place within the existing plant premises itself thus, no additional land will be acquired. The activity involves erection of machineries & a small scale of civil works within the project premises.

The land area used for expansion and modernization will not be a part of environmental or socio-economic sensitive area such as forest, ecologically sensitive area, habitation area hence likely there wouldn't be any issues in deforestation, wild life dislocation, resettlement and rehabilitation of people.

The impacts generated during erection phase would be temporary and are expected to gradually stabilize by the time of commissioning of proposed expansion and modernization activity. There are no sensitive locations such as national parks, critical pollution areas etc., within 10 km radial distance around the existing plant site.

No major changes in land use pattern of study area (region) will occur due to the plant expansion and modernization activities. Hence, no major impact is envisaged on land use pattern of the plant site.

 ASHOK LEYLAND	<i>Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</i>
	<p style="text-align: right;">Chapter-4</p> <p style="text-align: center;"><i>Anticipated Environmental Impacts and Mitigation Measures</i></p>

Impact on Soil

The soil at the plant site consists of clayey soil. The sub-strata of this area consist of slight rocks and as such no blasting is envisaged for either levelling or during foundation work since the site is plain and needs very little grading, filling and leveling. Apart from localized construction impact at the plant site, no adverse impacts on the soil in the surrounding area are anticipated.

Mitigation Measures

The following mitigation measures shall be adopted for soil environment:


- After completion of the construction phase, the surplus earth shall be utilized to fill up the low-lying areas, the rubble shall be cleared and all unbuilt surfaces will be reinstated;
- Greenbelt development and related activities shall be taken up during construction phase itself so that plantation will grow to adequate height by the time of plant commissioning. Thus, greenbelt will be effective in containing the fugitive emissions during operation, if any;
- Species selected in this plantation shall be fast growing and they shall be adaptable to local conditions. Their ability to combat localized pollution is the prime factor for their selection and placement in the planting grid/pattern.
- Most of the varieties shall be eco-friendly i.e., generate lot of oxygen while helping reduce/absorb gases and dust;
- Entire plant shall be aesthetically landscaped and as much as possible natural gradient shall be maintained;
- There shall be minimum concreting of the top surfaces so that there is a scope for maximum groundwater recharge due to rainfall; and
- Plantation outside the plant premises, in the nearby villages shall be encouraged by supplying free saplings to the villagers.

Impact on Topography

It is proposed to level the allocated area for the expansion and modernization activities and to use the earthen material excavated, for the proposed additional construction itself. There will not be any tall structures except the stack for dispersion. Also, the contours of natural drainage will not be disturbed. In view of the above, there will not be any major impacts on the topography of the project site.

Impact on Air Quality

There will not be any major construction activities in the proposed expansion and modernization project. The main sources of emission during the construction phase are the movement of equipment at site and dust emitted during the levelling, grading, earthwork, foundation works and exhaust emissions from vehicles. Equipment deployed during the construction phase is also likely to result in marginal increase in the levels of SO₂, NO_x, PM and CO. The impact will be for short duration and confined within the project boundary and is expected to be negligible outside the plant boundaries. The impact will however, be marginal and temporary in nature. Proper maintenance of vehicles and construction equipment will help in controlling the gaseous emissions. Water sprinkling on roads and construction site will prevent fugitive dust.

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	Chapter-4 Anticipated Environmental Impacts and Mitigation Measures

Air Pollution Control Measures

There will not be major leveling operation required as the entire plant site is already leveled. Hence, no significant excavation of the area is needed. However, during dry weather conditions, it is necessary to control the dust generated by excavation and transportation activities. This will be achieved by regular water sprinkling.

Ambient air quality levels of SO₂ and NO_x does not change much as there will not be any operation of construction machinery such as bulldozers, pay loaders, trucks etc. However, these levels are expected to be significant. Since, these machines will be operated intermittently. More over most of the items are movable.

Hence, there will not be any concentration of emissions at any single point. It shall be ensured that both gasoline and diesel-powered construction vehicles are properly maintained to minimize smoke in the exhaust emissions.

Additional recommendations include the following:

- Sprinkling of water at frequent intervals by preferably using truck-mounted sprinklers;
- Sprinkling of water will be done along the roads and work zone areas to reduce the fugitive dust;
- Green belt area has been grown with evergreen trees helps to reduce the fugitive emissions generated in the industrial premise; and
- Company owned / Private vehicles are being used for transporting raw material and end products. The vehicles are maintained with good management practices to reduce the air pollution in the premise.


Impact on Water Quality

Impact on water quality during construction phase may be due to the non-point discharge of solids from the soil loss and sewage generated from the construction workforce stationed at the site. Further, the construction will be more related to mechanical fabrication, assembly and erection; hence the water requirement would be small.

The overall impact on water environment during construction phase is likely to be short term and insignificant.

Mitigation Measures

- The earthwork (cutting and filling) will be avoided during the rainy season and will be completed during the summer season. Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken; and
- Soil binding and fast-growing vegetation will be grown within the plant premises to arrest the soil erosion.

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Noise Environment

Vehicular traffic, loading and unloading of construction material, handling of equipment and materials are likely to cause an increase in the ambient noise levels. The areas affected are those close to the site. However, the noise will be temporary and will be restricted mostly to plant area.

Mitigation Measures

Equipments are maintained appropriately to keep the noise level within 80-85 dB (A). Wherever possible, equipment has been provided with silencers and mufflers. Construction activities will be restricted to day time only. Further, workers working in high noise areas has been provided with necessary protective devices e.g. ear-plug, ear-muffs etc.

Ecology

The ecology of the area does not have much impact due to the proposed expansion and modernization. The expansion activities will be carried out within the existing plant premises itself. In addition, the topographical map shows that the surroundings of the plant area are barren lands which may not be fit for cultivation. Therefore, it's envisaged that the construction activities do not make a significant impact on the biotic and abiotic environment.

Demography and Socio-Economics

As per census 2011 data, non-workers constitute about 62% of the total population in 10 km radius study area. Some of them will be available for employment in the proposed expansion and modernization project during the construction activities. As the labours are generally un-skilled, the locals would get opportunities for employment during the construction activities.

In addition to the opportunity of getting employment as construction labours, the local population will also have employment opportunities in related service activities like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc. Consequently, this will contribute to economic upliftment of the area.

Facilities for Construction Work force

First Aid: At work place, first aid facilities shall be maintained at a readily accessible place with necessary appliances including sterilized cotton wool etc. shall be available. Ambulance facilities shall be kept readily available at workplace to take injured person to the nearest hospital.

Potable Water: Sufficient supply of cold water fit for drinking shall be provided at suitable places.

Sanitary Facility: Within the precinct of work place, latrines and urinals shall be provided at accessible place. These shall be cleaned at least twice during working hours and kept in a good sanitary condition. The contractor shall conform to the sanitary requirements of local medical and health authorities at all times.

Canteen: A canteen on a moderate scale shall be provided for the benefit of workers.

Security: Ashok Lay Land shall provide necessary security to work force in co-ordination with state authorities

4.3 Impacts during Operational Phase

The proposed expansion and modernization project deals with increasing the manufacturing capacity of ferrous castings from 2790 TPM to 6125 TPM. The projected production will be achieved by the existing 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace and other supporting equipment's.

Various grades of scrap, pig iron, borings, mild steel and additives like Ferro silicon, Ferro manganese, etc., are added in the induction furnace. They are introduced in to a Medium Frequency where heated to about 1500°C and the molten metal is poured in to ladles and then mould caster. When the scrap is melted in to fluid, certain additives are added based on the composition. For the purpose of impact assessment during the operational phase, the following components have been separately considered;

- Topography and Climate;
- Soil Quality;
- Air Quality;
- Traffic Density;
- Water resources and quality;
- Solid Waste generation;
- Noise levels;
- Terrestrial and Aquatic Ecology;
- Demography and Socio-Economics; and
- Public Health and Safety.

4.3.1 Topography

The plant site is partially plain with slight undulations. There will be no tall structures except stacks in the plant. The topography of the plant will not be changed significantly during the operational period. The exit temperatures from the stack and vents will be maintained in the range 65°C to 120°C, which is not likely to have any significant impact on the local over regional climate.

4.3.2 Impact on Soil Quality

The soil quality remains the same as the proposed expansion and modernization does not involve a change in land use pattern. The probable sources of degradation of soil quality will be due to generation and disposal of ash and fugitive dust emission. The airborne fugitive dust from the plant is likely to be deposited on the topsoil in the immediate vicinity of the plant boundary. However, the fugitive emissions are likely to be controlled to a great extent through pollution control measures like water sprinkling and the greenbelt development. Hence, no impact is envisaged on soil quality of the project site

4.3.3 Impact on Air Quality

Being a foundry unit, the major air pollutants are Particulate Matter (PM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x). The fugitive dust and gaseous emissions expected are from raw material handling area, sand plant, moulding area, melting unit, casting area, transportation of fuel and solid waste.

The dust emissions, if any from the above areas will be fugitive in nature and maximum during summer season (when the wind velocities are likely to be high) and almost nil during the monsoon season. The dust emissions are likely to be confined to the place of generation only. The quantification of these fugitive emissions from the area sources is difficult as it depends on lot of factors such as dust particles size, specific gravity of dust particles, wind velocity, moisture content of the material and ambient temperature etc. Also, there is a high level of variability in these factors. Hence, these are not amenable for mathematical dispersion modeling. However, by proper usage of dust suppression measures, dust generation and dispersion will be reduced.

Prediction of impacts on air environment has been carried out by employing mathematical model based on a steady state Gaussian Plume Dispersion model designed for multiple point sources for short term. In the present case, AERMOD- designed for multiple point sources for short term and developed by United States Environmental Protection Agency (USEPA) has been used for simulations from point sources.

The model simulations deal with dispersion of three major pollutants viz., Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and Particulate matter emitted from the stacks.

4.3.3.1 *Air Pollution Impact Prediction through Modelling*

❖ **Aermod View**

AERMOD is an air dispersion-modeling package, which seamlessly incorporates the popular USEPA Models, ISCST3, ISC-PRIME and AERMOD into one interface without any modifications to the models. These models are used extensively to assess pollution concentration and deposition from a wide variety of sources.

❖ **Aermod Model**

The AMS/EPA REGULATORY MODEL (AERMOD) was specially designed to support the Environmental Regulatory Modeling Programs. AERMOD is a regulatory steady-state-modeling system with three separate components;

- AERMOD (AERMIC Dispersion Model);
- AERMAP (AERMOD Terrain Preprocessor); and
- AERMET (AERMOD) Meteorological Pre-processor.

The AERMOD model includes a wide range of options for modeling air quality impacts of pollution sources, making it popular choice among the modeling community for a variety of applications. AERMOD requires two types of meteorological data files, a file containing surface scalar parameters and a file containing vertical profiles.

These two files are provided by AERMET meteorological pre-processor program.

- PRIME building downwash algorithms based on the ISC – PRIME model have been added to the AERMOD model;
- Use of arrays for data storage;
- Incorporation of EVENT processing for analyzing short-term source culpability;
- Explicit treatment of multiple – year meteorological data files and the annual average; and
- Options to specify emissions that vary by season, hour-of-day and day-of-week.

Deposition algorithms have been implemented in the AERMOD model – results can be output for concentration, total deposition flux, dry deposition flux, and / or wet deposition flux. The model contains algorithms for modeling the effects of settling and removal of large particulates and for modeling the effects of precipitation scavenging for gases or particulates.

❖ **Aermet**

In order to conduct a refined air dispersion modeling project using the AERMOD short-term air quality dispersion model, it is necessary to process the meteorological data representative of the study area being modelled. The collected meteorological data is not always in the format supported by the model; therefore, the meteorological data needs to be pre-processed using AERMET program.

The AERMET program is a meteorological pre-processor, which prepares hourly surface data and upper air data for use in the AERMOD air quality dispersion model. AERMET is designed to allow future enhancements to process other types of data and to compute boundary layer parameters with different algorithms. AERMET processes meteorological data in three stages and from this process two files are generated for use with the AERMOD model.

A surface file of hourly boundary layer parameters estimates a profile file of multiple-level observations of wind speed, wind direction, temperature and standard deviation of the fluctuating wind components

❖ **Application of AERMOD**

AERMOD model with the following options has been employed to predict the cumulative ground level concentrations due to emissions from the proposed expansion and modernization activity.

- All terrain dispersion parameters are considered;
- Predictions have been carried out to estimate concentration values over radial distance of 10 km around the project area;
- Uniform polar receptor network has been considered;
- Emission rates from the sources were considered as constant during the entire period;
- The ground level concentrations computed without any consideration of decay coefficient;
- Calm winds recorded during the study period were also taken into

consideration;

- 24 hourly mean ground level concentrations were estimated using the entire meteorological data collected during the study period; and
- The study area is used to represent the graphical output of the GLC's using the terrain processor.

❖ **Meteorological Data**

The hourly meteorological data recorded at site is converted to the mean hourly meteorological data as specified by CPCB and the same has been used in the model. Hourly mixing heights are taken from the "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India" published by India meteorological department, 2008, New Delhi.

The meteorological data recorded during study period continuously on wind speed, wind direction, temperature etc., have been processed to extract the data required for simulation by AERMOD using AERMET. The meteorological input data used for the model is presented in **Table - 4.1**.

❖ **Model Input Data**

The main pollutants from the proposed expansion and modernization will be Particulate Matter (PM₁₀, PM_{2.5}), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x). The pollutants are dispersed adequately by providing suitable stack heights. The stack emission details of surrounding industries of Ashok Lay Land have been considered for cumulative stack analysis. The lists of industries in the surrounding area from the plant boundary are shown below.

- 1) Coromandel International Limited;
- 2) Kothari Industries Fertilizer Division; and
- 3) Toshiba JSW Power Systems Pvt. Ltd.

The details of expected stack emissions from the proposed expansion and modernization units are given in the **Table - 2.6** in chapter 2.

TABLE - 4.1
HOURLY MEAN METEOROLOGICAL DATA

Time in hours	Wind speed in m/s	Wind direction in degrees	Air Temperature in K	Stability class	Mixing height in m
12:10 AM	2.27	22.5	304	1	1000
01:10 AM	2.12	0	304	1	1000
02:10 AM	1.99	22.5	304	1	1000
03:10 AM	1.75	0	304	1	1000
04:10 AM	1.80	0	304	2	1000
05:10 AM	1.99	22.5	304	2	900
06:10 AM	1.75	45.0	304	1	800
07:10 AM	1.80	0	304	4	800
08:10 AM	2.05	22.5	305	4	200
09:10 AM	2.85	0	305	6	200
10:10 AM	3.59	22.5	306	6	200

Time in hours	Wind speed in m/s	Wind direction in degrees	Air Temperature in K	Stability class	Mixing height in m
11:10 AM	3.79	22.5	307	6	200
12:10 PM	4.30	45.0	307	6	200
01:10 PM	4.41	45.0	307	6	200
02:10 PM	4.50	45.0	306	6	200
03:10 PM	4.66	90.0	306	6	200
04:10 PM	4.71	90.0	305	6	200
05:10 PM	4.35	45.0	305	6	200
06:10 PM	3.80	67.5	304	6	500
07:10 PM	3.36	67.5	304	6	800
08:10 PM	2.92	22.5	304	6	800
09:10 PM	2.66	45.0	304	4	800
10:10 PM	2.44	22.5	304	1	800
11:10 PM	2.44	45.0	304	1	1000

❖ **Presentation of Results**

In the present case, model simulations have been carried out for the period 1st July 2020 – 30th September 2020. For the short-term simulations, the concentrations were estimated around 1200 receptor points chosen to obtain an optimum description of variations in concentrations over the site in 10-km radius covering 16 directions.

The predicted incremental ground levels concentration for PM, SO₂ and NO_x are given in **Table - 4.2**. The predicted ground level concentration isopleths are given in **Figure - 4.1** to **4.3**.

TABLE - 4.2
SHORT TERM MAXIMUM INCREMENTAL CONCENTRATIONS

Parameters	Concentration (µg/m ³)	Distance (km)	Direction
PM	1.3	0.38	SW
SO ₂	1.3	0.38	SW
NO _x	3.13	0.38	SW

❖ **Comments on Predicted Concentrations**

A perusal of Table - 4.2 reveals that the maximum incremental short-term 24-hourly ground level concentrations for PM, SO₂ and NO_x likely to be encountered are 1.3 µg/m³, 1.3 µg/m³ and 3.13µg/m³ respectively occurring at a distance of about 0.38 km in the South west direction.

❖ **Resultant Concentrations after Implementation of the expansion and modernization Project**

Cumulative impact on baseline ambient air quality, after the implementation of the proposed expansion and modernization has been arrived by superimposing the present baseline maximum air quality levels of each pollutant. The resultant ambient air quality after implementation of the expansion and modernization activity is given

in **Table - 4.3.**

TABLE - 4.3
RESULTANT CONCENTRATIONS AFTER PROPOSED EXPANSION AND MODERNIZATION

Parameters	Concentration ($\mu\text{g}/\text{m}^3$)			Distance and Direction	NAAQS Limits (2009) ($\mu\text{g}/\text{m}^3$)
	Baseline	Incremental	Resultant		
PM	86.5	1.3	87.8	0.38, SW	100
SO ₂	31.7	1.3	33.0	0.38, SW	80
NO _x	32.9	3.13	36.03	0.38, SW	80

A perusal of the table above covered under each activity reveals that there will be a marginal increase in terms of pollution load. However, it can be observed that the resultant ambient air quality after considering the point source emissions, fugitive / area source emissions and line source emissions are well below the limits as per national ambient air quality standards, 2009 and the area has sufficient carrying capacity to accommodate the industrial development.

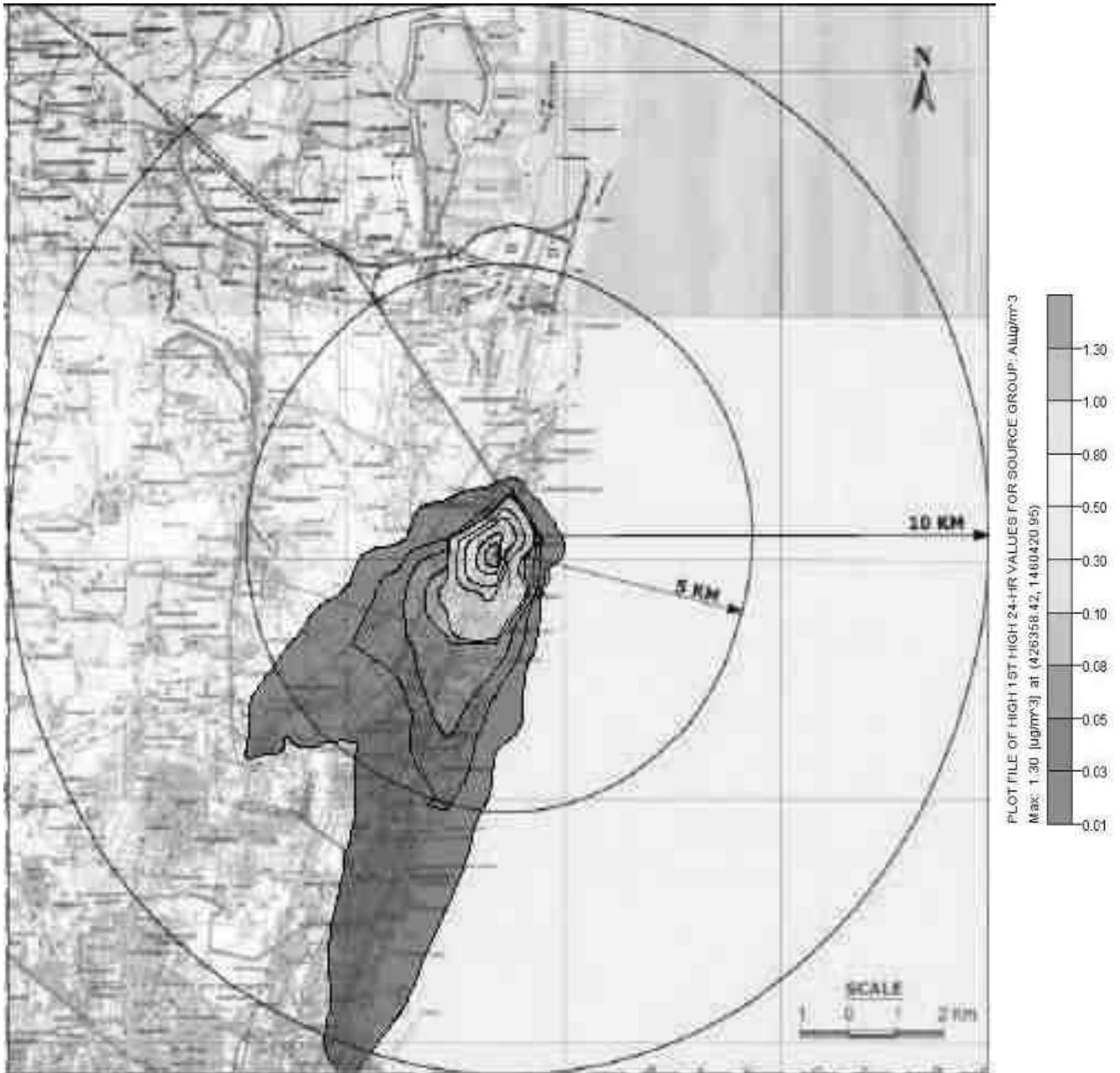


FIGURE - 4.1
SHORT TERM 24 HOURLY INCREMENTAL GLCS FOR PM

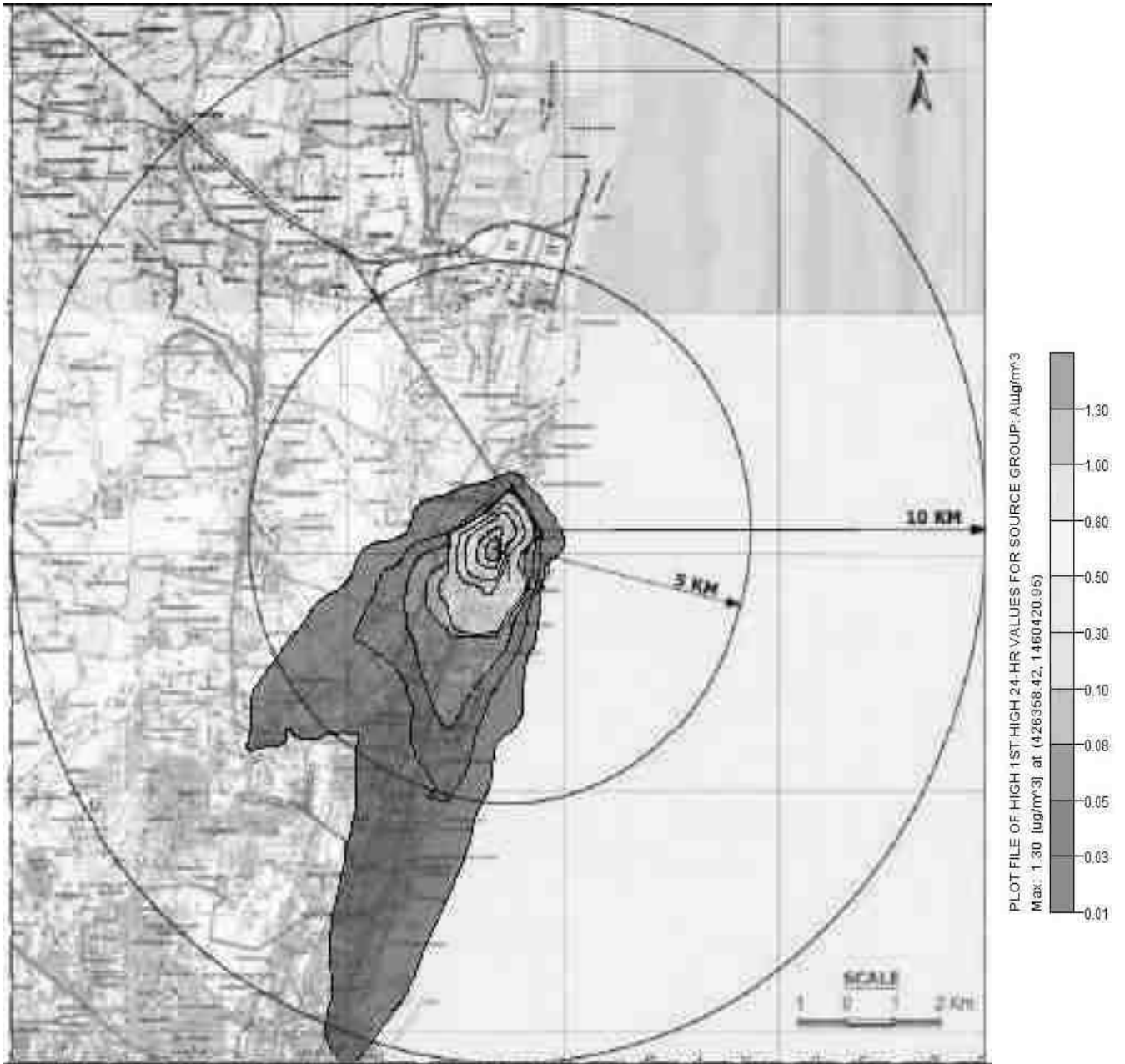


FIGURE - 4.2
SHORT TERM 24 HOURLY INCREMENTAL GLCS FOR SO₂

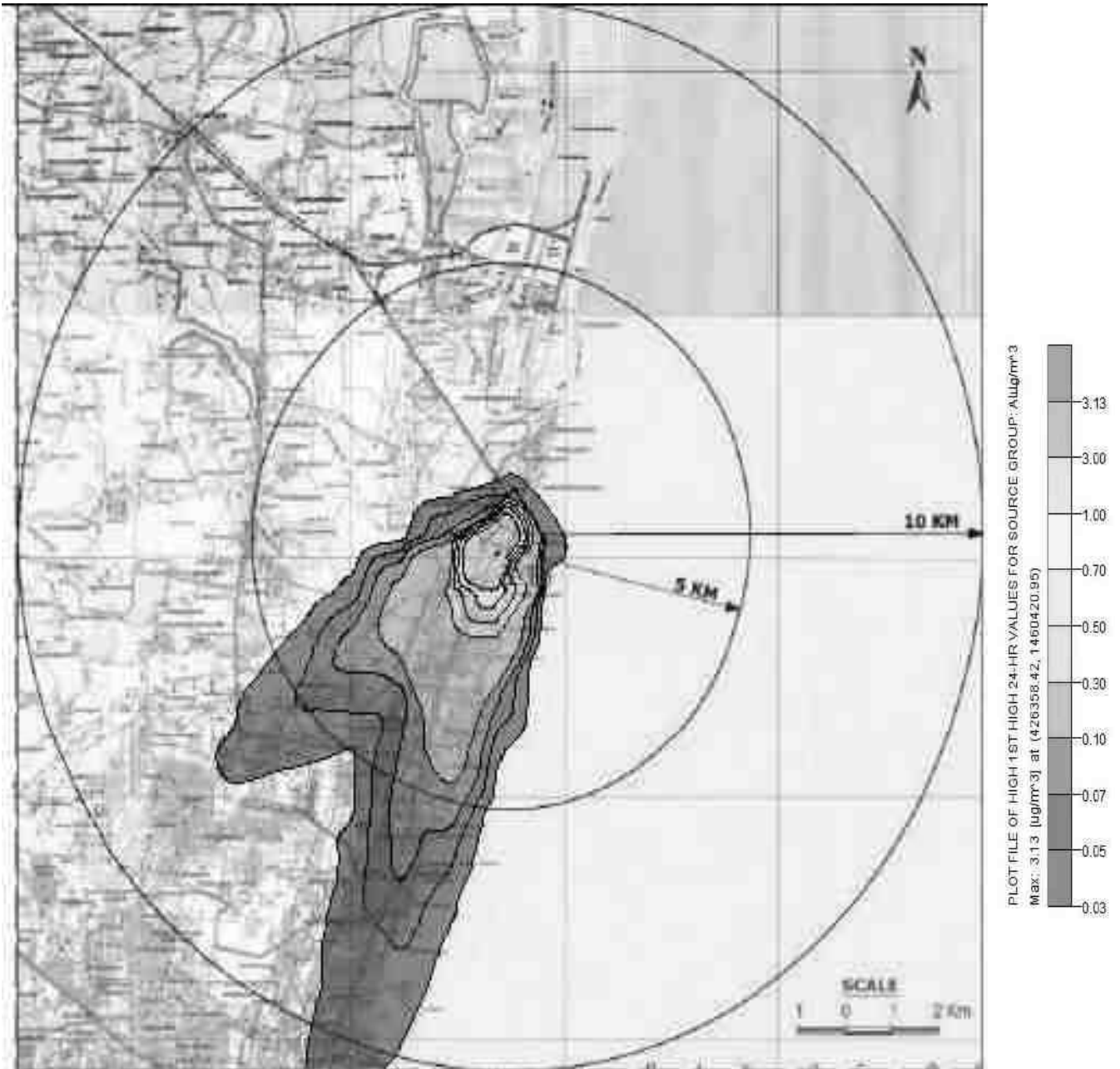


FIGURE - 4.3
SHORT TERM 24 HOURLY INCREMENTAL GLCS FOR NO_x

4.3.3.2 Air Pollution Management

Fugitive Emission Control Measures:

The fugitive emissions from the plant operations will be controlled through the following control measures:

- Raw material handling areas are major source for fugitive emissions. Most of the time, sources of fugitive emissions will be the transfer and junction points, product hopper area and loading points. Bag filter will be provided with appropriate suction devices to control the fugitive emissions;
- Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission;
- The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions; and
- Usage of respiratory protective equipment by all employees to be ensured.

The impact of fugitive emissions from the proposed expansion and modernization on air quality of the region is insignificant.

4.3.4 Gaseous Emission Control Measures:

Melting of metals and alloys in the induction furnaces generates dust and metal oxide fumes. These dust and fumes are extracted from the furnace and they are passed through an air pollution control system consisting of spark arrestor, dilution damper followed by wet scrubber etc. and then it would be released into the atmosphere through stacks. These dust and fumes are extracted from the furnace and they are passed through wet scrubber for treating. After treatment, it will be released onto the atmosphere through the individual stacks of required height. The pollutants generated from the Induction furnace is controlled by the wet scrubber followed with stack of suitable height. Bag filter will be provided to shot blasting machines, sand recycling plant. Also, SNAG grinders are provided with cyclone separator with stack. Necessary vents will be provided in the sand mill and other required areas. The Regular monitoring and maintenance of the pollution control equipment's enhances the complete process of the plant site.

4.3.5 Impact on Water Resources and Water Quality

4.3.5.1 *Impact on Water Resources*

The entire water demand for the existing and proposed expansion and modernization will be met from existing open well in the plant premises. Ashok Leyland has estimated the one-time water requirement for the proposed expansion and modernization to be 447 KLD. Out of this, 425 KLD will be the daily fresh water requirement. To minimize the impacts on groundwater table, Ashok Leyland has proposed to develop rainwater harvesting structures to recharge ground water table in plant site and to enhance the ground water recharge potential in the region. The rain water harvesting, storm water management along with the existing rain water harvesting structures are presented in *Chapter – 2* of this report.

4.3.5.2 Impact on Water Quality & Management

The water balance and wastewater generation details have been described in *Chapter-2*. As the manufacturing process will be operated only on the dry process, water is mainly used at certain stages in the process like cooling tower make-up, sand moulding, scrubber make-up, paint booth, DG set cooling tower and domestic usages.

The domestic sewage (270 KLD) generated from the proposed expansion and modernization will be treated in the proposed Sewage Treatment Plant of 1600 KLD capacity. The treated water of 250 KLD from the STP will be reused for green belt development. The effluent from the paint booth will be treated in the ETP

Blowdown from cooling system will be cooled and recycled back to the process. No wastewater will be discharged outside the plant premise. Hence, there will be no impact on the water regime due to the wastewater generation from the plant operation.

4.3.6 Impact due to Solid Waste Generation

The details of hazardous and non-hazardous waste generation with waste quantities and method of disposal are given in *chapter-2*. In order to avoid problems associated with solid waste disposal problems, an effective solid waste management system will be followed by the Ashok Leyland. The sludge from sewage treatment plant will be used as manure for green belt. The solar pan residue generated will be collected, stored, transported and disposed in TSD, Gummidipoondi. Hence, the impact due to solid waste generation from the plant operation is not envisaged. The hazardous waste generated such as used oil, wastes containing oil will be handed over to the authorized recyclers.

4.3.6.1 Solid Waste Management

TABLE - 4.4
DETAILS OF SOLID WASTE GENERATION

Sr. No	Solid waste	HWM Categ.	Quantity (TPM)	Treatment or Disposal
I	Existing			
A	Used Sand	-	3250	Send to authorized Contractors
B	Furnace Slag	-	166.6	Send to authorized Contractors
C	Grinding Dust	-	8.33	Send to authorized Contractors
D	Municipal solid waste	-	7.35	Will be collected and given to civic bodies
II	After Expansion and Modernization			
A	Used Sand	-	3675.0	Send to authorized Contractors
B	Furnace Slag	-	330.0	Send to authorized Contractors
C	Grinding Dust	-	12.0	Send to authorized Contractors
D	Municipal solid waste	-	3.10	Will be collected and given to civic bodies

4.3.7 Impact on Noise Levels

The major noise generating sources are from the furnace, knock out, sand plant, moulding sections and external transport movements.

The noise generating machineries are blowers, centrifugal pumps and stand by DG set which will be maintained within the standard limits of 70 -75 dB (A). The details of the major noise generating sources during the plant operational phase are listed in **Table - 4.5**

TABLE - 4.5
ANTICIPATED NOISE LEVELS AT PLANT BOUNDARY

Sr. No	Unit	Type	Noise Level dB (A)
1	Scrap Storage Area	Continuous	66.85
2	Near Fettling Shot Blasting	Intermittent	67.5
3	Sand Plant Multi Cooler Dust Collector	Intermittent	62.5
4	Near Furnace Area	Intermittent	74.05
5	Near ETP Outlet	Intermittent	70.15
6	Moulding M/C Area	Intermittent	80.65
7	Core shop Near SMB	Intermittent	78.2
8	Near Fettling Air Blow Booth Stack	Intermittent	71.8
9	Near Paint Booth	Intermittent	61.85
10	Core Shop Core Making	Intermittent	80.95

Presentation of Results

The noise dispersion from the plant site is computed based on mathematical modelling. The incremental noise levels are computed at plant site in 100 m x 100 m grid intervals over an area of 10 km x 10 km study area. The predicted results of incremental noise level at each grid points are used to draw noise contours. The predicted noise contour around expected sources is shown in **Figure - 4.7**.

The predicted noise level at the boundary due to various plant activities will be ranging in between 48-50 dB (A). It is seen from the simulation results that the incremental noise level will be well within the CPCB standards.

4.3.7.1 Noise Attenuation Measures

The following control measures will be implemented for the proposed expansion and modernization project:

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures, acoustic louvers, slots etc;

- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources;
- The air compressor, DG sets, shack out vibrators etc. will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units;
- Furnace operators will be protected by enclosing the source of noise with sound-deadening material or by providing sound-proofed shelters;
- Construction of noise protection wall at the scrap yard; and
- Adequate greenbelt development is also being developed in the plant boundary of the foundry unit.

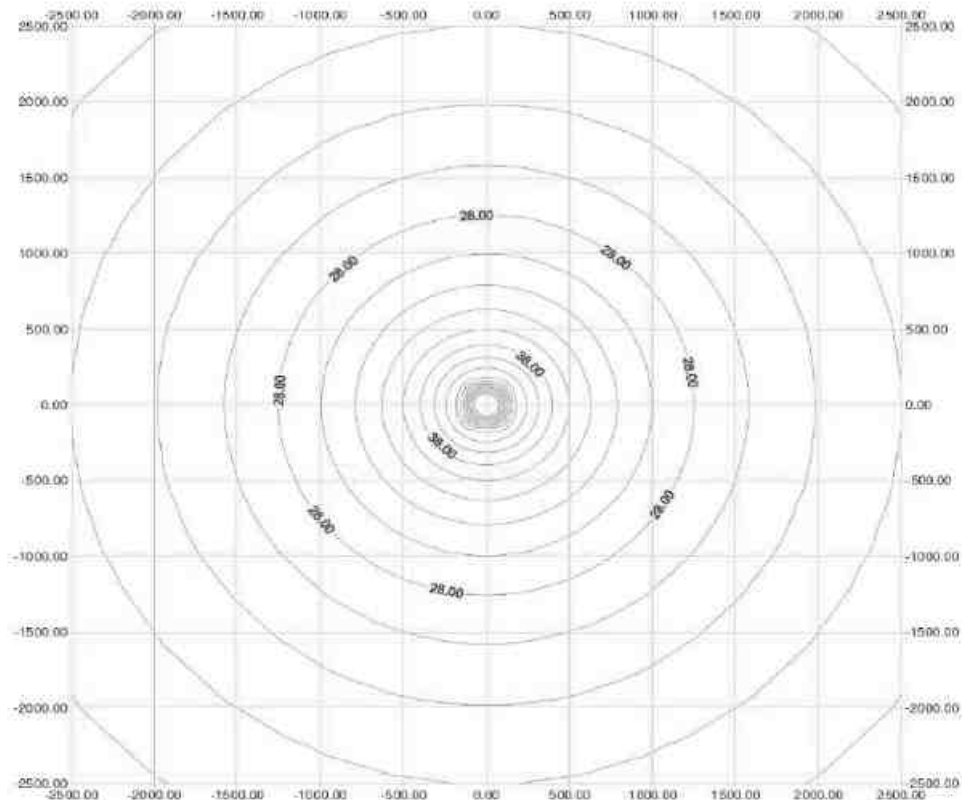


FIGURE- 4.4
PREDICTED NOISE CONTOUR - AFTER EXPANSION AND MODERNIZATION

4.3.8 Impact on Ecology

Prediction of Impacts on Biodiversity

Prediction of impacts is based both on the direct and indirect; short-term as well as long-term; irreversible and irreversible impacts that are most likely to occur owing to the proposed industrial activity during establishment and operation. The ecological factors that are considered most significant as far as the impact on flora and fauna are concerned:

1. Whether there shall be any reduction in species diversity
2. Whether there shall be any habitat loss or fragmentation
3. Whether there shall be any additional risk or threat to the rare or endangered or endemic or threatened (REET) species
4. Whether there shall be any impairment of ecological functions such as (i) disruption of food chains, (ii) decline in species population and or (iii) alterations in predator-prey relationships.

The project proponent is responsible for any kind of remediation and restoration in case of any Ecological damage, according to the principle of "Polluter Pays". It is an old foundry going for expansion and modernization. The industry is required to fully comply with the Air Act and Water Act and obtain CFE or CTE and CFO or CTO from the State Pollution control Boards besides the statutory Environmental Clearance in accordance with the EIA Notification of 2006. The probable impacts of the project on Ecology and biodiversity is given in **Table 4.6**. The magnitude of the impact is shown as mi and the sensitivity of the impact is shown as si. Depending on the magnitude, the impacts are quantified and assigned the values from 0 to 5. The si value can be negative or positive depending on the outcome. The product of misi is indicated as the total impact. The overall impacts are manageable with EMP (Environment Management Plan). The mild but lasting negative impact due to air pollution is taken care by using the APC (air pollution control) systems.

TABLE - 4.6
PREDICTED IMPACTS OF THE PROPOSED ACTIVITY ON ECOLOGY AND BIODIVERSITY

S.No	Whether the Project is Capable of Causing	Without EMP			With EMP	
		Yes / No	mi	si		misi
1	Shrinkage of habitat	0	0	1	0	0
2.	Fragmentation of habitat	0	0	1	0	0
3	Degradation or denudation of habitat	0	0	1	0	0
4.	Pollution of water bodies	0	0	1	0	0
5	Air pollution from foundry	0	1	-1	-1	0
6	Long lasting severe adverse impacts	0	0	1	0	0
7	Adversely impacting the	0	0	-3	0	0

	RET Flora or Fauna					
8.	Sustaining the Ecology and biodiversity of the area	0	0	1	0	0
9	Posing an additional threat to surrounding vegetation	0	0	1	0	0
10	Impacts due to solid waste	0	1	-1	-1	0
Total negative impacts without EMP					-2	0
Total impacts with EMP					0	0

Thus, the project is not going to adversely impact the biodiversity. The air pollution modelling studies show that the ambient air quality in and around the foundry shall remain safe and within the NAQ standards. Thus, it may be safely concluded that the proposed expansion and modernization doesn't pose any unmanageable threat to the Ecology, Biodiversity and the RET fauna of the study area either directly or indirectly.

4.3.9 Impact on Demography and Socio-Economics

As per 2011 census, the study area consists of 4,55,972 persons inhabited in the 10 km radial distance from the periphery of the plant. It is obvious to assume that the activities of the existing and the proposed increase in manufacturing will produce some improvements in the socio-economic levels in the study area. The anticipated impact of this project on various aspects is described in the following sections.

Impact on Literacy and Educational Facilities


The data of the study area reveals literacy rates of 77%. The better literacy rates are possible due to assumed better economic conditions of the people. Better literacy means better social status and thereby improved life style. This will be a positive impact due to the existing and proposed expansion and modernization activity.

Impact on Civic Amenities

The positive impacts of plant activities on the civic amenities are substantial. The development of CSR activities like drinking, sanitation and infrastructure facilities in the nearby habitation could enhance the positive impact of the industry on people.

Impact on Economic Aspects

The impact of industrialization on the economic aspects can be clearly observed. The existing plant activities have already provided employment to 200 persons of different skills and trades. On expansion and modernization, the number of employees will remain the same. The employment has ameliorated the economic conditions of these families directly and has provided employment to many other families indirectly who are involved in business and service-oriented activities.

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	<p style="text-align: right;">Chapter-4</p> <p style="text-align: center;"><i>Anticipated Environmental Impacts and Mitigation Measures</i></p>


4.3.10 Impacts on Public Health and Safety

The discharge of waste materials (stack emission, wastewater and solid wastes) from process operations can have potential impact on public safety and health. The impact from the discharge of waste products is not expected to be significant since, the adverse impacts on ambient air, water and soil quality are predicted to be low.

It is predicted that the impacts on public safety will be very low, due to the effective safety system and safety management available in the plant. Overall, the impact on public safety and health from the expansion and modernization of foundry unit activities are likely to be insignificant.

CHAPTER - 5

ANALYSIS OF ALTERNATIVES

 ASHOK LEYLAND	<p align="center">Environmental Impact Assessment for the Proposed Expansion and Modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</p> <p align="right">Chapter - 5 Analysis of Alternatives</p>
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5.0 ANALYSIS OF ALTERNATIVES

5.1 Analysis of alternative sites for proposed expansion and modernization

The proposed expansion will take place within the existing plant premises itself. Therefore, no additional land will be acquired for the proposed expansion and modernization.

1. The existing plant area is located in Industrial Land use zone;
2. The land area of 13.86 ha (34.25 acres) is already under the ownership of promoters which is sufficient to carry out the proposed expansion and modernization;
3. No forest land is involved;
4. No crop land or agricultural field located nearby;
5. The site has near connectivity to raw material suppliers;
6. Located near to waste co-processing industries and disposal centre;
7. Accessibility to Ennore railway line and Ennore seaport;
8. National highway (SH-114) is adjacent to plant site;
9. Power connectivity from TANGEDCO;
10. Nearest Fire station is below 5 km;
11. Manpower availability from nearby areas;
12. No resettlement and rehabilitation issues; and
13. Absence of areas of archaeological and historical importance within 10 km radius.

Based on the above criterion, alternate site analysis is not required for the proposed expansion and modernization activity.

CHAPTER - 6

ENVIRONMENTAL MONITORING PROGRAM

6.0 ENVIRONMENTAL MONITORING PROGRAM

6.1 General

To ensure compliance with environmental regulation and also to maintain healthy environmental conditions around the proposed expansion and modernization of steel melting plant several measures have been proposed in the Environmental Management Plan (EMP) for mitigation of adverse environmental impacts. These shall be implemented as per proposal and shall be monitored regularly.

A monitoring strategy shall be ensured that all environmental resources, which may be subject to contamination, are kept under review and hence monitoring of the individual elements of the environment will be done. A major part of the sampling and measurement activities will be concerned with long-term monitoring aimed at providing an early warning of any undesirable changes or trends in the natural environment that could be associated with the plant activity.

This is essential to determine whether the changes are in response to a cycle of climatic conditions or due to plant activities. During the operation phase, Environment Monitoring Department (EMD) will undertake all the monitoring work to ensure the effectiveness of environmental mitigation measures. The suggestions given in the environmental monitoring programme will be implemented by the EMD by following an implementation schedule. In addition to the monitoring programme, the following will also be done to further ensure the effectiveness of the mitigation measures:

- Environmental inspections will be carried out for the entire plant operation to check for compliance with standards / applicable norms by in-house experts;
- The environmental aspects to be monitored will ensure proper implementation and effectiveness of various mitigation measures envisaged/adopted during the design and commissioning stage of the proposed expansion and modernization as described here under.

This chapter presents the details of environmental monitoring, schedule, institutional arrangements for pollution control, cost for environmental protection measures and details of greenbelt development for the proposed expansion and modernization project.

6.2 Implementation Schedule of EMP

The mitigation measures suggested in the *Chapter - 4* will be implemented so as to reduce the impact on environment due to the operations of the plant operation. In order to facilitate easy implementation, mitigation measures are phased as per the priority of implementation. The priority of the implementation schedule is given in **Table - 6.1**.

TABLE - 6.1
EMP IMPLEMENTATION SCHEDULE

Sr.No	Recommendations	Requirement
1	Air pollution Control measures	Before commissioning
2	Water pollution control measures	Before commissioning
3	Noise control measures	Along with the commissioning of the project
4	Solid waste management	During commissioning of the project
5	Greenbelt development	Stage wise implementation

6.3 Environmental Monitoring and Reporting procedure

Regular monitoring shall check whether the commitments proposed are being met. This may take form of direct measurements and recording of quantitative information such as amounts and concentrations of discharge, emissions and wastes, for measurements against corporate statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators.

6.3.1 Objective of Monitoring

The objectives of environmental post-project monitoring are to:

- Verify effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Confirm statutory and corporate compliance; and
- Identify unexpected changes.

The attributes which require regular monitoring are specified underneath:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil quality; and
- Green Belt Development.

The post project monitoring to be carried out at the industry level is discussed below:

Monitoring and Reporting Procedure

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of environment during operational phase. With the knowledge of baseline conditions, the monitoring program can serve as an indicator for any deterioration in environmental conditions due to operational phase and suitable mitigation steps could be taken in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. The following routine monitoring program will be implemented under the post project monitoring. The environmental attributes shall be monitored as given below:

Air Pollution and Meteorological Aspects

- Both ambient air quality and stack emissions will be monitored. The ambient air quality to be monitored twice in a week in line with the guidelines of Central Pollution Control Board for PM10, PM2.5, SO₂, NO_x and CO;
- Online stack emissions monitoring to be carried out for the parameter of SO₂. In addition, flow rate, temperature, velocity will also be monitored for better interpretation of the results; and
- Automatic weather monitoring station shall be provided to monitor wind speed, wind direction, temperature, relative humidity, atmospheric pressure, rainfall, evaporation

rate, solar radiation and cloud cover. The parameters will be recorded at one-hour frequency.

Wastewater Quality

The domestic sewage emanating from the sewage treatment plant will be monitored once in a month for physico-chemical characteristics.

Noise Levels

Noise levels near the melting section, machine shop, cooling tower and DG sets will be monitored once in three months.

Monitoring Equipment and Consumables

A well-equipped laboratory with consumable items will be provided for monitoring of environmental parameters. Alternatively, monitoring can be outsourced to a recognized laboratory.

6.4 Monitoring Schedule

Environmental monitoring schedules are prepared covering various phases of project advancement, such as erection phase and regular operational phase.

6.4.1 Environmental Monitoring during Construction Phase

The proposed expansion and modernization envisages setting up melting furnaces. The construction activities require preparing land, mobilization of construction material and equipment to plant site. The generic environmental measures that need to be undertaken during project construction stage are given in **Table - 6.2**.

TABLE - 6.2
ENVIRONMENTAL MONITORING SCHEDULE DURING CONSTRUCTION PHASE
(AS PER EP ACT)

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1	Air Emissions	All equipment to be operated within specified design parameters	Random checks of equipment logs/manuals	Periodic
		Vehicle trips to be minimized to the extent possible	Vehicle logs	Periodic during site clearance & construction activities
		Maintenance of DG set emissions to meet stipulated standards	Gaseous emissions (SO ₂ , HC, CO, NO _x)	Periodic emission monitoring
		Ambient air quality within the premises of the plant area to be monitored	The ambient air quality will conform to the standards for PM ₁₀ , PM _{2.5} , SO ₂ , NO _x and CO	As per CPCB /SPCB requirement or on monthly basis whichever is earlier



Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
2	Noise	List of all noise generating machinery onsite along with age to be prepared.	Equipment logs, noise reading.	Regular during construction activities
		Equipment to be maintained in good working order.		
		Night working is to be minimized.	Working hour records	Daily records
		Generation of vehicular noise	Maintenance of records of vehicles	Daily records
		Noise to be monitored in ambient air within the plant premises.	Spot Noise recording	As per CPCB/SPCB requirement or on quarterly basis whichever is earlier
3	Wastewater Discharge	No untreated discharge to be made to surface water, groundwater or soil	No discharge hoses shall be in vicinity of watercourses	Periodic during construction activities
4	Soil Erosion	Protect topsoil stockpile wherever possible at edge of site	Effective cover in place	Periodic during construction activities
5	Drainage and Effluent Management	Ensure drainage system and specific design measures are working effectively.	Visual inspection of drainage and records thereof	Periodic during construction activities
		The design to incorporate existing drainage pattern and avoid disturbing the same		
6	Waste Management	Implement waste management plan that identifies and characterizes every waste arising associated with proposed expansion and modernization activities and which identifies the procedures for collection, handling & disposal of each waste arising.	Comprehensive Waste Management Plan should be in place and available for inspection on-site Compliance with MSW Rules, 1998 and Hazardous Wastes (Management and Handling Rules), 2003	Periodic check during construction activities
7	Non-routine events and accidental releases	Plan to be drawn up, considering likely emergencies and steps required to prevent /limit consequences	Mock drills and records of the same	Periodic during construction activities
8	Health	Employees and migrant labour health check ups	All relevant parameters including HIV	Regular check ups
9	Environmental	The Environmental	Responsibilities and	During

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
	Management Cell/ Unit	Management Cell/Unit is to be set up to ensure implementation and monitoring of environmental safeguards	roles will be decided before the commencement of work	construction phase

6.4.2 Monitoring Schedule during Operational Phase

The following attributes which merit regular monitoring based on the environmental setting and nature of project activities are listed below:

- Source emissions and ambient air quality;
- Groundwater levels and ground water quality;
- Water and wastewater quality (water quality, effluent & sewage quality etc);
- Solid and hazardous waste characterization;
- Soil quality;
- Noise levels (equipment and machinery noise levels, occupational exposures and ambient noise levels); and
- Ecological preservation and afforestation.

The following routine monitoring programme as detailed in **Table - 6.3** shall be implemented at site. Besides this monitoring, the compliances to all environmental clearance conditions and regular permits from SPCB/MoEFCC shall be monitored and reported periodically (once every six months).

TABLE - 6.3
ENVIRONMENTAL MONITORING DURING OPERATIONAL PHASE AS PER EP ACT

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1	Air Emissions	<u>Stack Monitoring</u> Stack emissions from power boilers, melting furnaces to be optimized and monitored	Gaseous emissions (PM ₁₀ , PM _{2.5} , PM size distribution, SO ₂ , CO, NO _x)	Periodical monitoring during entire operation phase
		Stack emissions from DG set to be optimized and monitored	Gaseous emissions (SO ₂ , HC, CO, NO _x)	Periodic during entire operation phase
		<u>AAQ Monitoring</u> Ambient air quality within the premises of the plant and nearby habitations to be monitored Exhaust from vehicles to be	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , O ₃ , CO, Lb, As, Ni, C ₆ H ₆ , B(a)P, NH ₃ and Hg	As per CPCB/ SPCB requirement or on weakly basis whichever is earlier



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**Chapter - 6
Environmental Monitoring Program**

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
		minimized by use of fuel-efficient vehicles and well-maintained vehicles having PUC certificate	Vehicle logs to be maintained	
		<u>Meteorology</u> Measuring onsite data of Meteorology	Wind speed, direction, temp., relative humidity and rainfall, solar radiation	Periodical monitoring using on-line weather station during operation phase
2	Noise	<u>Industrial Noise Level</u> Noise generated from operation of power boilers, steel melting section and cooling tower to be optimized and monitored. <u>Ambient Noise Level</u> Noise generated from operation of DG set to be optimized and monitored and should be provided with acoustic enclosures	Spot Noise Level recording; L_{eq} (night), L_{eq} (day), L_{eq} (dn) Noise levels to be recorded at 1m distance from the respective unit	Once every six months
		Generation of vehicular noise	Maintain records of vehicles	Periodic during operation phase
3	Wastewater Discharge	Wastewater (treated and untreated) analysis	As per CPCB	Once in a month
4	Drainage and effluent Management	Ensure drainage system & specific design measures are effective & working Design to incorporate existing drainage pattern and avoid disturbing the same	Visual inspection of and cleaning of drainage before monsoon season	Periodic during operation phase
5	Water Quality and Water Levels	Monitoring of groundwater quality around ash	Comprehensive monitoring as per IS: 10500	Once in a month Water level maintaining once



Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
		pond and ground water levels	Groundwater level in meters bgl	every season
		River water quality downstream to discharge	As per IS: 10500	Once in a month
6	Emergency preparedness, such as fire fighting	Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention	Mock drill records, on site emergency plan, evacuation plan	Periodic during operation phase
7	Maintenance of flora and fauna	Vegetation, greenbelt / green cover development	No. of plants, species	Once in summer and winter
8	Waste Management	Implement waste management plan that identifies and characterizes every waste arising associated with the plant activities and which identifies the procedures for collection, handling & disposal of each waste arising	Records of solid waste generation, treatment and disposal	Periodic during operation phase
9	Soil quality	Maintenance of good soil quality	Physico-chemical parameters and metals.	Periodical monitoring at ash dyke
10	Health	Employees and migrant labour health check ups	All relevant parameters	Regular check-ups

6.5 Monitoring Methods and Data Analysis of Environmental Monitoring

All environmental monitoring and relevant operational data will be stored in a relational database. This will enable efficient retrieval and storage and interpretation of the data. Regular data extracts and interpretive reports will be sent to the regulator

6.5.1 Air Quality Monitoring and Data Analysis

6.5.1.1 *Stack Monitoring*

The emissions from all the stacks shall be monitored regularly. The exit gas temperature, velocity and pollutant concentrations shall be measured. Any unacceptable deviation from the design values shall be thoroughly examined and appropriate action shall be taken. Air blowers shall be checked for any drop-in exit gas velocity.

6.5.1.2 *Workspace Monitoring*

The concentration of airborne pollutants in the workspace/work zone environment shall be monitored periodically. If concentrations higher than threshold limit values are observed, the source of fugitive emissions shall be identified and necessary measures shall be taken. If the levels are high, suitable measures as detailed in EMP shall be initiated.

6.5.1.3 *Ambient Air Quality Monitoring*

The ground level concentrations of PM₁₀, PM_{2.5}, SO₂ and NO_x in the ambient air shall be monitored at regular intervals. Any abnormal rise shall be investigated to identify the causes and appropriate action shall be initiated. Greenbelt shall be developed for minimizing dust propagation. The ambient air quality data should be transferred and processed in a centralized computer facility equipped with required software. Trend and statistical analysis should be done.

6.5.2 Water and Wastewater Quality Monitoring and Data Analysis

To ensure a strict control over the water consumption, flow meters shall be installed for all major inlets. All leakages and excess shall be identified and rectified. In addition, periodic water audits shall be conducted to explore further possibilities for water conservation. Methods prescribed in "Standard Methods for Examination of Water and Wastewater" prepared and published jointly by American Public Health Association (APHA), American Water Works Association (AWWA) is recommended.

6.5.2.1 *Monitoring of Wastewater Streams*

All the wastewater streams in the project area shall be regularly analyzed for flow rate, physical and chemical characteristics. Such analysis is carried out for wastewater at the source of generation, at the point of entry into the wastewater treatment plant and at the point of final discharge. These data shall be properly documented and compared against the design values for any necessary corrective action.

6.5.3 Noise Levels

Noise levels in the work zone environment shall be monitored. The frequency shall be once in three months in the work zone. Similarly, ambient noise levels near habitations shall also be monitored once in three months. Audiometric tests should be conducted periodically for the employees working close to the high noise sources.

6.6 Reporting Schedules of the Monitoring Data

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site and data thus generated shall be regularly furnished to the state/central regulatory authorities. The frequency of reporting shall be once in every six months to the local state PCB officials and to Regional office of MoEF & CC. The Environmental Audit reports shall be prepared for the entire year of operations and shall be regularly submitted to regulatory authorities.

6.7 Cost Provision for Environmental Measures

The capital cost of the project is around 1200 crores and the total project cost for the proposed expansion and modernization project is about Rs. 15.0 Crores. Out of this, Rs. 2620 lakhs have been spent on environment protection, management, pollution control, treatment and monitoring systems, appropriate budgetary provision would be made and provision for recurring expenditure for environment management of the project would be made. The details of budget allocation during functional phase are given in **Table - 6.4**

TABLE - 6.4
COST PROVISION FOR ENVIRONMENTAL MEASURES

Sr. No.	Description of Item	Environment Capital Cost (Rs. in Lakhs)	Environment Recurring Cost (Rs. in Lakhs/annum)
1	Air pollution control systems	2500.0	500.0
2	Water pollution control system	25.0	10.0
3	Solid Waste Management	10.0	2.5
4	Noise pollution control	10.0	2.5
5	Environment Monitoring	25.0	6.5
6	Occupational Health & Safety (OHS)	20.0	25.0
7	Green belt Development	30.0	20.0
Total		2620.0	566.5

6.8 Greenbelt development

6.8.1 Objective

The main objective of the green belt is to provide a barrier between the plant and the surrounding areas. The green belt helps to capture the fugitive emissions and to attenuate the noise generated in the plant apart from improving the aesthetics of the plant site. In order to control the industrial pollutants, dense tree plantations are necessary.

As the sedimentation pattern of the pollutants, ambient and ground level concentration of pollutants are usually determined by the direction and speed of prevailing wind and vertical and horizontal thermal gradients prevailing in the area, the belt of plantations will be designed accordingly. The width of the tree belt depends on the gaseous emissions, availability of land and site characteristics etc.

Geometry of planting of tree is more important in order to have effective wind break by the plantation. For an effective green belt, a mixture of tree species is necessary and some shrubs and grasses will be inter-cropped. As far as possible, there will be no gaps in the green belt. Where opening is imperative, alignments to roads will be such that open gaps are prevented to overcome funnelling action of wind.

The inter-spaces will be planted with grasses, bushes and hedges. Greenbelt is thus a set of rows of trees planted in such a way that they form an effective barrier between the plant and the surroundings. The tree species selected for greenbelt includes the native species.

6.8.2 Proposed Greenbelt Development

The Future greenbelt maintain should be integrated with the existing plantation. The existing greenbelt area of 4.90 ha (35.32%) is well maintained. The detailed program for greenbelt is suggested below:

❖ Design of Green Belt

The following guidelines shall be considered in green belt development.

- Shrubs and trees will be planted in encircling rows around the project site;
- The short trees (<10 m height) will be planted in the first rows (towards plant side) of the green belt. The tall trees (>10 m height) will be planted in the outer rows (away from plant side);
- Planting of trees in each row will be in staggered orientation (Triangular form); and
- The spacing between the trees shall be maintained slightly less than the normal spaces, so that the trees may grow vertically and slightly increase the effective height of the green belt.

❖ Greenbelt Split-up Particulars

- Greenbelt is maintained at 35.32% which covers a land area of 4.90 ha for the existing industry;
- Presently, 10,000 no's of trees are being maintained in the plant. After the proposed expansion and modernization additionally 1000 no's of trees will be developed. The green belt has been designed by considering the tree density of 1500 trees/ha; and
- The greenbelt development split-up details are shown in **Table - 6.5**.

TABLE - 6.5
DETAILS OF GREENBELT AREA SPLIT-UP

Sr. No.	Details	Region	ha	% of land area allocated for greenbelt development
1	Greenbelt Area -1	North West	1.38	25.0
2	Greenbelt Area -2	North East	1.18	11.8
3	Greenbelt Area -3	South East	0.91	59.9
4	Greenbelt Area -4	South West	1.15	3.3
Total			4.90	100%

❖ **Plant Species for Green Belt**

While selecting the plant species for the proposed expansion and modernization of greenbelt, the following points have been taken into consideration:

- Should be a fast-growing type;
- Should have a thick canopy cover;
- Should be perennially green;
- Should be preferably of native origin; and
- Trees which are suited in the Cauvery delta are ideally planted in the green belt.

❖ **Criteria for Selection of Species**

Species to be selected should fulfill the following specific requirements of the areas:

- Availability of seed material;
- Tolerance to specific conditions or alternatively wide adaptability to eco-physiological conditions;
- Rapid growth;
- Capacity to endure water stress and climatic extremes after initial establishment;
- Differences in height, growth habits and bold shapes;
- Pleasing appearance;
- Capacity to selectively concentrate some materials from the surroundings;
- Providing shades;
- Large bio-mass and leaf number to provide fodder and fuel;
- Ability of fixing atmospheric Nitrogen; and
- Improving waste lands.

❖ **Some Additional Information about Plantation**

To undertake plantation on site for different purposes, following steps will be involved:

- Raising seedlings in nursery;
- Preparation of pits and preparing them for transfer of seedlings; and
- After-care.

❖ **Raising Seedlings in Nursery**

Seedlings should be raised in nurseries. Adequate number of surplus seedlings should be available considering 10% mortality in seedlings. Healthy seedlings should be ready for transfer to permanent location before rainy season.

❖ **Preparation of pits and preparing them for transfer of seedlings**

- Standard pit size would be 1 m x 1 m x 1 m;
- The distance between pits would vary depending on their location;
- The pits should be filled using good soil from nearby agricultural fields (3 parts) and Farm yard manure (1 part);
- Rhizobium commercial preparation (1 kg/1000 kg);
- BHC powder, if the soil inhabits white ants (Amount variable); and
- The pits should be watered prior to plantation of seedlings.

❖ **Recommended Species in the Greenbelt Area by the Horticulturist**

The recommended species for the greenbelt development is given in **Table - 6.6**.

TABLE - 6.6
LIST OF SPECIES SHOWING HIGH AIR POLLUTION TOLERANCE INDEX (APTI)

Sr. No	Scientific Name	Common Name	Family	Air Pollution Tolerance Index levels
1	<i>Azadirachta indica</i>	Neem/Vembu	Meliaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
2	<i>Alstonia scholaris</i>	<i>Elilaippalai</i> / Devils Tree	Apocynaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
3	<i>Bauhinia variegata</i>	<i>Segappumandrai</i> / Pink Orchid Tree	Caesalpinaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
4	<i>Dalbergia sissoo</i>	Sisoo, Shisham	Fabaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
5	<i>Thespesia populnea</i>	Purvasu/Portia Tree	Malvaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
6	<i>Pterospermum acerifolium</i>	Vennangu/ Kanak Champa	Sterculiaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
7	<i>Haldina -Adina - cordifolia</i>	<i>Kadambai</i> / <i>Kadamba</i> / <i>Haldu</i>	Rubiaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
8	<i>Pongamia pinnata</i>	Karanj/Pungai/Indian Beech Tree	Fabaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
9	<i>Dalbergia latifolia</i>	Kala-shisham/Rose Wood	Fabaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise
10	<i>Tectona grandis</i>	Teak	Verbenaceae	For controlling Suspended Particulate Matter (SPM), SO ₂ , NO _x and Noise

All the above-mentioned species are ideally suited for the ecological habitat of Ennore, comprising of loamy alluvial soils. They are all fast-growing species, ideal for undertaking greenbelt plantations. The choosing of the species should be ratified by the Horticulturist of the project site and local forest department. Their planting should be interspersed with each other to create mixed canopy of the plants and the ideal stance for planting all trees is 3 x 3 m

CHAPTER - 7

ADDITIONAL STUDIES

7.0 ADDITIONAL STUDIES

7.1 Risk Assessment and Disaster Management Plan

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the plant. On the other hand, risk analysis deals with the identification and quantification of risks, the plant equipment and personnel are exposed to, due to accidents resulting from the hazards present in the plant.

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighbouring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc.

In the sections below, the identification of various hazards, probable risks in the proposed Expansion and modernization of foundry division, maximum credible accident analysis, consequence analysis are addressed which gives a broad identification of risks involved in the plant. Based on the risk estimation for fuel and chemical storage, Disaster Management Plan (DMP) has been prepared.

7.1.1 Approach to the Study

Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of potential hazard areas;
- Identification of representative failure cases;
- Visualization of the resulting scenarios in terms of fire (thermal radiation) and explosion;
- Assessment of the overall damage potential of the identified hazardous events and the impact zones from the accidental scenarios;
- Assessment of the overall suitability of the site from hazard minimization and disaster mitigation points of view;
- Furnishing specific recommendations on the minimization of the worst accident possibilities; and
- Preparation of broad Disaster Management Plan (DMP), On-site and Off-site Emergency Plan, which includes Occupational and Health Safety Plan.

7.1.2 Hazard Identification

Identification and quantification of hazards in the foundry industry is of primary significance in the analysis, quantification and cost-effective control of accidents. A classical definition of hazard states that hazard is in fact the characteristic of system/plant/process that presents potential for an accident.

Hence, all the components of a system/plant/process need to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident. The following two methods for hazard identification have been employed in the study:

- Identification of major hazardous units based on Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 of Government of India (GOI Rules, 1989); and

- Identification of hazardous units and storage units based on relative ranking technique, viz. Fire-Explosion and Toxicity Index (FE&TI).

7.1.3 Identification of Major Hazardous Units

Hazardous substances may be classified into three main classes such as flammable substances and unstable substances and toxic substances. The ratings for a large number of chemicals/substances based on flammability, reactivity and toxicity have been given in NFPA Codes 49 and 345 M. In the proposed project of expansion and modernization, HSD will be stored in-built tank of DG set for generation of power in case of grid failure. The details of HSD storage and its classification as per GOI rules are given in **Table-7.1**. Hazardous characteristics of HSD are listed in **Table-7.2**.

**TABLE-7.1
APPLICABILITY OF GOI RULES TO FUEL**

Sr. No.	Chemical/ Fuel	Listed in Schedule	Storage	Threshold Quantity (T) for Application of Rules	
				5,7-9,13-15	10-12
1	HSD	3 (1)	1000 Lit – Inbuilt storage within DG set (2X 1250 KVA)	25 MT	200 MT

**TABLE-7.2
PROPERTIES OF STORAGE FUELS**

Chemical/ Fuel	Codes/Label	TLV	FBP	MP	FP	UEL	LEL
			°C			%	
HSD	Flammable	5 mg/m ³	369	338	32.9	7.5	0.6

TLV	:	Threshold Limit Value	FBP	:	Final Boiling Point
MP	:	Melting Point	FP	:	Flash Point
UEL	:	Upper Explosive Limit	LEL	:	Lower Explosive Limit

7.1.4 Common Causes of Accidents

Based on the analysis of past accident information, common causes of accidents are identified as:

- Poor housekeeping;
- Improper use of tools, equipment, facilities;
- Unsafe or defective equipment facilities;
- Lack of proper procedures;
- Failure to follow prescribed procedures;
- Jobs not understood;
- Lack of awareness of involved hazards;
- Lack of guides and safety devices; and
- Lack of protective equipment and clothing.

7.1.5 Failures of Human Systems

Major causes of human failures reported are due to:

- Stress induced by poor equipment design, unfavourable environmental conditions, fatigue, etc;
- Lack of training in safety and loss prevention;
- Indecision in critical situations; and
- Inexperienced staff being employed in hazardous situations.

Often, human errors are not analyzed while accident reporting and accident reports only provide information about equipment and/or component failures. Hence, a great deal of uncertainty surrounds analysis of failure of human systems and consequent damages.

7.2 Hazard Assessment and Evaluation

7.2.1 Methodology

An assessment of the conceptual design is conducted for the purpose of identifying and examining hazards related to utility and support systems, environmental factors, facilities, and safeguards.

7.2.2 Preliminary Hazard Analysis (PHA)

A preliminary hazard analysis is carried out initially to identify the major hazards associated with storage and the processes of the plant. This is followed by consequence analysis to quantify these hazards. The various process activities involved in the plant purely mechanical operations those are not complex or hazardous. Hence, no major hazards with potential for any emergency situation exist in the process plants. The other hazards related to the Plant and storage areas are given below in **Table - 7.3**.

TABLE - 7.3
PRELIMINARY HAZARD ANALYSIS FOR PROCESS AREAS

Equipment	Process	Potential Hazard	Provision
Induction furnaces	The MS scrap is charged into the furnace where it gets melted and is converted to liquid metal	<ul style="list-style-type: none"> ▪ Charging a furnace with impure or moist scrap metal and alloys. ▪ Pouring or tipping the molten metal into a holding furnace or ladle. ▪ Pouring the molten metal from ladles into moulds. 	<ul style="list-style-type: none"> ✓ Barriers and other protecting covering, including the mobile shields should be used. ✓ Set up to protect workers against the splashes of molten metal and electromagnetic radiation. ✓ Using of PPE (Personal Protective Equipment) must reduce or eliminate the risks associated with the handling of molten metal in melting unit.
Power Transformers	Transmit the power from high tension to low tension	Fire and explosion	All electrical fittings and cables are provided as per the specified standards
Switch Yard Control Room	-	Fire in cable galleries and switch	As above

TABLE-7.4
PRELIMINARY HAZARD ANALYSIS IN GENERAL

PHA Category	Description of Plausible Hazard	Recommendation	Provision
Environmental factors	If there is any leakage and eventuality of source of ignition.	-	All electrical fittings and cables will be provided as per the specified standards. All motor starters are flame proof.
	Highly inflammable nature of fuels may cause fire hazard in the storage facility.	A well-designed fire protection including protein foam, dry powder, CO ₂ extinguisher should be provided.	Fire extinguisher of small size and big size are provided at all potential fire hazard places. In addition to the above, fire hydrant network is also provided.

7.2.3 Maximum Credible Accident Analysis (MCAA)

Hazardous substances may be released as a result of failures or catastrophes, causing possible damage to the surrounding area. A disastrous situation may arise due to outcome of fire, explosion or toxic hazards in addition to other natural causes, which eventually lead to loss of life, property and ecological imbalance. Major hazards posed by flammable storage can be identified taking recourse to MCA analysis. Depending upon the effective hazardous attributes and their impact on the event, the maximum effect on the surrounding environment and the respective damage caused can be assessed.

The results of consequence analysis are useful for getting information about all known and unknown effects that are of importance when some failure scenario occurs in the proposed expansion and modernization activity and also to get information as how to deal with the possible catastrophic events. It also gives the residents in the project and people living in the vicinity of the area, an understanding of their personal situation.

Damage Criteria

The Inbuilt storage of HSD in the DG Set and unloading facility may lead to fire and explosion hazards. The damage criteria due to accidental release of any hydrocarbon arise from fire and explosion. The vapors of these fuels are not toxic and hence no effects of toxicity are expected.

Tank fire will occur if the radiation intensity is high on the peripheral surface of the tank leading to increase in internal tank pressure. Pool fire will occur when fuel collected in the dyke due to leakage gets ignited.

- **Fire Damage**

A flammable liquid in a pool will burn with a large turbulent diffusion flame. This releases heat based on the heat of combustion and the burning rate of the liquid. A part of the heat is radiated while the rest is convected away by rising hot air and combustion products. The radiations can heat the contents of a nearby storage or process unit to above its ignition temperature and thus result in a spread of fire. The radiations can also cause severe burns or fatalities of workers or fire fighters located within a certain distance.

Hence, it will be important to know beforehand the damage potential of a flammable liquid pool likely to be created due to leakage or catastrophic failure of a storage or process vessel. This will help to decide the location of other storage vessels and decide the type of protective clothing the workers/fire fighter's need, the duration of time for which they can be in the zone, the fire extinguishing measures needed and the protection methods needed for the nearby storage/process vessels. The damage effects on people and equipment due to thermal radiation intensity are presented in **Tables-7.5** and **Table-7.6** respectively.

**TABLE-7.5
DAMAGE DUE TO INCIDENT RADIATION INTENSITIES**

Sr. No.	Incident Radiation (kW/m ²)	Type of Damage Intensity	
		Damage to Equipment	Damage to People
1.	37.5	Damage to process equipment	100% lethality in 1 min. 1% lethality in 10 sec.
2.	25.0	Minimum energy required to ignite wood at indefinitely long exposure without a flame	50% Lethality in 1 min. Significant injury in 10 sec.
3.	19.0	Maximum thermal radiation intensity allowed on thermally unprotected adjoining equipment	-
4.	12.5	Minimum energy to ignite with a flame; melts plastic tubing	1% lethality in 1 min.
5.	4.5	-	Causes pain if duration is longer than 20 sec, however blistering is un-likely (First degree burns)
6.	1.6	-	Causes no discomfort on long exposures

Source: *Techniques for Assessing Industrial Hazards by World Bank*

The effect of incident radiation intensity and exposure time on lethality is given in **Table- 7.6**.

**TABLE-7.6
RADIATION EXPOSURE AND LETHALITY**

Radiation Intensity (kW/m ²)	Exposure Time (seconds)	Lethality (%)	Degree of Burns
1.6	--	0	No Discomfort even after long exposure
4.5	20	0	1st
4.5	50	0	1st
8.0	20	0	1st
8.0	50	<1	3rd
8.0	60	<1	3rd
12.0	20	<1	2nd
12.0	50	8	3rd
12.5	--	1	--
25.0	--	50	--
37.5	--	100	--

7.2.4 Identification of Hazards, Assessment and their Management

The various hazards associated, apart from fuel storage with the plant process has been identified and has outlined in **Table-7.7**.

**TABLE-7.7
HAZARD ANALYSIS FOR PROCESS IN FOUNDRY UNIT**

Sr. No.	Blocks/Areas	Hazards Identified
1	Induction furnace	Liquid metal
2	Switch-yard Control Room	Fire in cable galleries and Switch-gear/Control Room

7.2.5 Hazardous Events with Greatest Contribution to Fatality Risk

The hazardous event scenarios likely to make the greatest contribution to the risk of potential fatalities are summarized in **Table-7.8**. 'Onsite facility' refers to the operating site at AAP, whereas 'offsite facility' refers to transport and handling systems, which are away from the AAP operating site.

**TABLE-7.8
HAZARDOUS EVENTS CONTRIBUTING TO ON-SITE FACILITY RISK**

Hazardous Event	Risk Rank	Consequences of Interest
Onsite vehicle impact on personnel	3	Potential for single fatalities, onsite impact only
Entrapment/struck by Machinery	3	Potential for single fatalities, onsite impact only
Fall from heights	3	Potential for single fatalities, onsite impact only
Electrocution	3	Potential for single fatalities, onsite impact only
Storage stack collapse	3	Potential for single fatalities, onsite impact only

7.2.6 Risk Assessment Summary

The preliminary risk assessment has been completed for the proposed expansion and modernization of foundry unit and associated facilities:

- The industry is operating with uninterrupted power supply & there is a petrol bunk within 1.0 km. There would not be necessity for bulk storage of Diesel hence the major impacts to community and environmental is less. Proper handling of fuel systems and machineries would reduce the probability; and
- The hazardous event scenarios and risks in general at this facility can be adequately managed to acceptable levels by performing the recommended safety studies as part of detailed design, applying recommended control strategies and implementing a Safety Management System

7.2.7 Recommended Approach to Combat with the Possible Accidents

Considering all possible accident scenarios as analysed in the risk analysis, it is established that there will not be any major potential hazards in the project causing major damages inside and outside the boundary. In spite of this, the project authorities should be well prepared to handle any such eventuality as described below;

In case of Explosion:

The following measures and actions are to be taken:

- Evacuate the area in vicinity;
- Take all necessary actions to avoid escalation of the accident;
- If problem appears to be out of control, call fire brigade and police. Report to the District collector; and
- Provide first aid to the victims as suggested in the Material Safety Data Sheets.

Spillage due to Diesel Storage Tank Rupture:

This accident scenario has considerable damage potential. In such scenario the following steps should be taken:

- Contain fuel supply to the tankers;
- Determine the extent of damage; and
- Undertake all the emergency actions mentioned above.

7.3 Disaster Management Plan

The disaster management plan has been prepared inline with Tiruvallur District Disaster Management Plan, 2016. A disaster is a catastrophic situation in which suddenly, people are plunged into helplessness and suffering, as a result, need protection, clothing, shelter, medical and social care and other necessities of life.

Disasters can be divided into two main groups. In the first, disasters resulting from natural phenomena like earthquakes, volcanic eruptions, storm surges, cyclones, tropical storms, floods, avalanches, landslides, forest fires etc. The second group includes disastrous events occasioned by man, or man's impact upon the environment. Examples are armed conflict, radiation accidents, campus fires, river pollution, air, sea, rail and road transport accidents and can reach catastrophic dimensions in terms of human loss.

There can be no set criteria for assessing the gravity of a disaster in the abstract since this depends to a large extent on the physical, economic and social environment in which it occurs. What would be considered a major disaster in a developing country, ill-equipped to cope with the problems involved may not mean more than a temporary emergency elsewhere.

However, all disaster brings in their wake similar consequences that call for immediate action, whether at the local, national or international level, for the rescue and relief of the victims. This includes the search for the dead and injured and removal of debris and social care, the provision of temporary shelter to the homeless food, clothing and medical supplies, and the rapid re-establishment of essential services.

7.3.1 Objectives of Disaster Management Plan (DMP)

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Disaster Management Plan, it will be widely circulated and personnel training given through rehearsals/drills.

The Disaster Management Plan would reflect the probable, consequential severity of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further the management should be able to demonstrate that their assessment of the consequences uses good supporting evidence and is based on currently available and reliable information, incident data from internal and external sources and if necessary the reports of outside agencies. To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a planned emergency document is prepared, called the "Disaster Management Plan"

The objective of the Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

7.3.2 Specific Emergencies Anticipated

Fire consequences can be disastrous, since they involve huge quantities of fuel either stored or in dynamic inventory in pipelines or in nearby areas. Toxic releases can affect persons working around. Preliminary hazard Analysis has provided a basis for consequence estimation.

7.3.3 Emergency Organization

It is recommended to set up an Emergency Organization. A senior executive who has control over the affairs of the plant would be heading the Emergency Organization. He would be designated as Site Controller. Works Manager would be designated as the Incident Controller. In the case of stores, utilities, open areas, which are not under the control of the Production Heads, Senior Executive responsible for maintenance of utilities would be designated as Incident Controller. All the Incident Controllers would be reporting to the Site Controller.

Each Incident Controller, for himself, organizes a team responsible for controlling the incidence with the personnel under his control. Shift In-charge would be the reporting officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller.

Emergency co-ordinators would be appointed who would undertake the responsibilities like fire fighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, Security In-charge, Personnel Department, Essential services personnel would be engaged. All these personnel would be designated as Key personnel.

In each shift, electrical supervisor, electricians and other maintenance staff would be drafted for emergency operations. In the event of power or communication system failure, some of staff members in the office/plant offices would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

7.3.3.1 Emergency Communication

Whoever notices an emergency situation such as fire, escalation of fire, leakage etc will inform his immediate superior and Emergency Control Center. A place nearer to the security office shall be identified as Emergency Control Center. The person on duty in the Emergency Control Center would appraise the Site Controller. Site Controller verifies the situation from the Incident Controller of that area or the Shift In-charge and takes a decision about an impending On Site Emergency. This would be communicated to all the Incident Controllers, Emergency Co-ordinators. Simultaneously, the emergency warning system would be activated on the instructions of the Site Controller.

7.3.4 Onsite Emergency Preparedness and Response for Accidents

7.3.4.1 Emergency Responsibilities

The responsibilities of the key personnel are appended below:

Site Controller:

On receiving information about emergency he would rush to Emergency Control Center (ECC) and take charge of ECC and the situation and;

- Assesses the magnitude of the situation on the advice of incident Controller and decides, Whether the affected area needs to be evacuated;
- Whether personnel who are at assembly points need to be evacuated;
- Declare Emergency and order for operation of emergency siren;
- Organizes announcement by public address system about location of emergency;
- Assesses which areas are likely to be affected, or need to be evacuated or need to be alerted;
- Maintains a continuous review of possible development and assesses the situation in consultation with Incident Controller and other Key Personnel as to whether shutting down the plant or any section of the plant is required and if evacuation of persons is required;
- Directs personnel for rescue, rehabilitation, transport, fire, brigade, medical and other designated mutual support systems locally available, for meeting emergencies;
- Controls evacuation of affected areas, if the situation is likely to go out of control or effects are likely to go beyond the premises of the factory, informs the District Emergency Authority, Police, Hospital and seeks their intervention and help;
- Informs the Inspector of Factories, Deputy Chief Inspector of Factories, TNPCB and other statutory authorities;
- Gives a public statement if necessary;

- Keeps record of chronological events and prepares an investigation report and preserve evidence; and
- On completion of On Site Emergency and restoration of normalcy, declares all clear and orders for all clear warning.

Incident Controller:

- Assembles the incident control team;
- Directs operations within the affected areas with the priorities for safety to personnel minimize damage to the plant, property and environment and minimize the loss of materials;
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency;
- Ensure that key personnel help is sought;
- Provides advice and information to the Fire and Security Officer and the Local Fire Services as and when they arrive;
- Ensures that all non-essential workers/staff of the affected areas evacuated to the appropriate assembly points, and the areas are searched for casualties;
- Has regard to the need for preservation of evidence so as to facilitate any inquiry into the causes and circumstances, which caused or escalated the emergency;
- Co-ordinates with emergency services at the site;
- Provides tools and safety equipment to the team members;
- Keeps in touch with the team and advice them regarding the method of control to be used; and
- Keeps the Site Controller of Emergency informed of the progress being made.

Emergency Coordinator - Rescue, Fire Fighting:

- Helps the incident Controller in containment of the emergency;
- Ensures fire pumps are in operating conditions and instructs pump house operator to be ready for any emergency with standby arrangement;
- Guides the fire fighting crew i.e. firemen, trained plant personnel and security staff;
- Organizes shifting of the fire fighting facilities to the emergency site, if required;
- Takes guidance of the Incident Controller for fire fighting as well as assesses the requirements of outside help;
- Arranges to control the traffic at the gate and the incident area;
- Directs the security staff to the incident site to take part in the emergency operations under his guidance and supervision;
- Evacuates the people in the plant or in the nearby areas as advised by Site Controller;
- Searches for casualties and arranges proper aid for them;
- Assembles search and evacuation team;
- Arranges for safety equipment for the members of this team;
- Decides which paths the evacuated workers should follow; and
- Maintains law and order in the area, and if necessary seeks the help of police.

Emergency Coordinator-Medical, Mutual Aid, Rehabilitation, Transport and Communication:

- In the event of failure of electric supply and thereby internal telephone, sets up communication point and establishes contact with the ECC;
- Organizes medical treatment to the injured and if necessary will shift the injured to nearby hospitals;

- Mobilizes extra medical help from outside, if necessary;
- Keeps a list of qualified first aid providers of the factory and seek their assistance;
- Maintains first aid and medical emergency requirements;
- Makes sure that all safety equipment is made available to the emergency team;
- Assists Site Controller with necessary data and to coordinate the emergency activities;
- Assists Site Controller in updating emergency plan, organizing mock drills verification of inventory of emergency facilities and furnishing report to Site Controller;
- Maintains liaison with Civil Administration;
- Ensures availability of canteen facilities and maintenance of rehabilitation center;
- He will be in liaison with Site Controller/Incident Controller;
- Ensures transportation facility;
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure;
- Controls rehabilitation of affected areas on discontinuation of emergency; and
- Ensures availability of diesel/petrol for transport vehicles engaged in emergency operation.

Emergency Coordinator - Essential Services:

- He would assist Site Controller and Incident Controller;
- Maintains essential services like Diesel Generator, Water, Fire Water, Compressed Air/Instrument Air, power supply for lighting;
- He would plan alternate facilities in the event of power failure, to maintain essential services such as lighting, refrigeration plant etc;
- He would organize separate electrical connections for all utilities and emergency services so that in the event of emergency or fires, essential services and utilities are not affected;
- Gives necessary instructions regarding emergency electrical supply, isolation of certain sections etc. to shift in-charge and electricians; and
- Ensures availability of adequate quantities of protective equipment and other emergency materials, spares etc.

General Responsibilities of Employees during an Emergency:

During an emergency, it becomes more enhanced and pronounced when an emergency warning is raised, the workers if they are in-charge of process equipment should adopt safe and emergency shut down and attend any prescribed duty as essential employee. If no such responsibility is assigned, he should adopt a safe course to assembly point and await instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

7.3.4.2 Emergency Facilities

Emergency Control Center (ECC):

For the time being, Office Block or a place nearer to the security office is identified as Emergency Control Center. It would have external Telephone, Fax, and Telex facility. All the Site Controller/ Incident Controller Officers, Senior Personnel would be located here. Also, it would be an elevated place. The following information and equipment are to be provided at the Emergency Control Center (ECC).

- Intercom, telephone
- P and T telephone
- Safe contained breathing apparatus
- Fire suit/gas tight goggles/gloves/helmets

- Hand tools, wind direction/velocities indications
- Public address megaphone, hand bell, telephone directories
- (Internal P and T) factory layout, site plan
- Emergency lamp/torch light/batteries
- Plan indicating locations of hazard inventories, plant control room, sources of safety equipment, work road plan, assembly points, rescue location vulnerable zones, escape routes.
- Hazard chart
- Emergency shut-down procedures
- Nominal roll of employees
- List of key personnel, list of essential employees, list of Emergency Co-ordinators
- Duties of key personnel
- Address with telephone numbers and key personnel, emergency coordinator, essential employees.
- Important address and telephone numbers including Government agencies, neighbouring industries and sources of help, out side experts, chemical fact sheets population details around the factory.

Assembly Point:

Number of assembly points depending upon the plant location would be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water etc. would be organized. In view of the size of plant, different locations are ear marked as assembly points. Depending upon the location of hazard, the assembly points are to be used.

Fire Fighting Facilities:

First Aid Fire fighting equipment suitable for emergency should be maintained in each section in the plant. This would be as per statutory requirements. However, fire hydrant line covering major areas would be laid. It would be maintained at 6- kg/cm² pressure. Fire alarms would be located in the bulk storage areas. Fire officer will be the commanding officer of fire fighting services.

Location of Wind Sock:

On the top of the Administration block and the top of each production blocks, windsocks shall be installed to indicate direction of wind for emergency escape.

Emergency Medical Facilities:

Stretchers, gas masks and general first aid materials for dealing with fire burns would be maintained in the medical center as well as in the emergency control room. Medical superintendent of the township will be the head of the causality services ward. Private medical practitioners help would be also are sought. Government hospital would be approached for emergency help.

Apart from plant first aid facilities, external facilities would be augmented. Names of Medical Personnel, Medical facilities in the area would be prepared and updated. Necessary specific medicines for emergency treatment of Burns for Patients and for those affected by toxicity would be maintained. Breathing apparatus and other emergency medical equipment would be

provided and maintained. The help of near by industrial management in this regard would be taken on mutual support basis.

Ambulance:

An ambulance with driver availability in all the shifts and an emergency shift vehicle would be ensured and maintained to transport injured or affected persons. Number of persons would be trained in first aid so that, in every shift, first aid personnel would be available.

7.3.4.3 Emergency Actions

Emergency Warning

Communication of emergency would be made familiar to the personnel inside the plant and people outside. An emergency warning system shall be established.

Emergency Shutdown

There are number of facilities which can be provided to help deal with hazardous conditions, when a tank is on fire. The suggested arrangements are:

1. Stop the production;
2. Dilute contents;
3. Remove heat;
4. Deluge with water; and
5. Transfer contents.

Whether a given method is appropriate depends on the particular case. Cessation of agitation may be the best action in some instances but not in others. Stopping of the feed may require the provision of by pass arrangements.

Methods of removing additional heat include removal through the normal cooling arrangements or use of an emergency cooling system. Cooling facilities, which use vaporizing liquid, may be particularly effective, since a large increase in vaporization can be obtained by dropping pressure.

Evacuation of Personnel:

There could be more number of persons in the storage area and other areas in the vicinity. The area would have adequate number of exits and staircases. In the event of an emergency, unconnected personnel have to escape to assembly point. Operators have to take emergency shutdown procedure and escape. Time Office maintains a copy of deployment of employees in each shift, at ECC. If necessary, persons can be evacuated by rescue teams.

All Clear Signal:

Also, at the end of an emergency, after discussing with Incident Controllers and Emergency Co-ordinators, the Site Controller orders an all clear signal. When it becomes essential, the Site Controller communicates to the District Emergency Authority, Police, and Fire service personnel regarding help required or development of the situation into an Off-Site Emergency.

7.3.4.4 General

Employee Information:

During an emergency, employees would be warned by raising siren in specific pattern. Employees would be given training of escape routes, taking shelter, protecting from toxic effects. Employees would be provided with information related to fire hazards, antidotes and first aid measures. Those who would be designated as key personnel and essential employees should be given training to emergency response.

Public Information and Warning:

The industrial disaster effects related to this plant may mostly be confined to the plant area. The detailed risk analysis has indicated that the pool fire effects would not be felt outside. However, as an abundant precaution, the information related to chemicals in use would be furnished to District Emergency Authority for necessary dissemination to general public and for any use during an off site emergency. Factories of this size and nature are in existence in our state since long time.

Co-ordination with Local Authorities:

Keeping in view of the nature of emergency, two levels of coordination are proposed. In the case of an On Site Emergency, resources within the organization would be mobilized and in the event of extreme emergency, local authorities help should be sought.

In the event of an emergency developing into an off site emergency, local authority and District emergency Authority (normally the Collector) would be appraised and under his supervision, the Off Site Disaster Management Plan would be exercised. For this purpose, the facilities that are available locally, i.e. medical, transport, personnel, rescue accommodation, voluntary organizations etc. would be mustered. Necessary rehearsals and training in the form of mock drills should be organized.

Mutual Aid:

Mutual aid in the form of technical personnel, runners, helpers, special protective equipment, transport vehicles, communication facility etc should be sought from the neighbouring industrial management.

Mock Drills:

Emergency preparedness is an important step in planning of Industrial Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel should be trained in the operations. Co-ordination meeting with the line Department officials for preparedness and implementation, viability and conduct of Mock Drill/training should be conducted along with Divisional or Taluk level of Tiruvallur District.

Important Information:

Once the Plant goes into stream, important information such as names and addresses of key personnel, essential employees, medical personnel, outside the plant, transporters address,

address of those connected with Off Site Emergency such as Police, Local Authorities, Fire Services, District Emergency Authority should be prepared and maintained.

7.3.5 Off-Site Emergency Preparedness Plan

7.3.5.1 *Introduction*

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency situation go beyond the plant boundaries, it becomes an off-site emergency. Off-site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighbouring population. The off-site plan in detail will be based on those events, which are most likely to occur, but other less likely events, which have severe consequence, will also be considered. Incidents which have very severe consequences yet have a small probability of occurrence should also be considered during the preparation of the plan. However, the key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.

The roles of the various parties who will be involved in the implementation of an off-site plan are described below. Depending on local arrangements, the responsibility for the off-site plan should be either rest with the works management or, with the local authority. Either way, the plan should identify an emergency co-ordinating officer, who would take the overall command of the off-site activities. As with the on-site plan, an emergency control center should be setup within which the emergency co-ordinating officer can operate.

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors:

- a. In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire likely need to be evacuated, although a severe smoke hazard may require this to be reviewed periodically;
- b. If a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people should be advised to stay indoors and shield them from the fire. This latter case particularly applies if the installation at risk could produce a fireball with very severe thermal radiation effects;
- c. For release or potential release of toxic materials, limited evacuation may be appropriate down wind, if there is time. The decision would depend partly on the type of housing "at risk". Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty house, which exist close to factories, offer little or no protection.

The major difference between releases of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say 300 m per minute covers a large area of land very quickly.

Any consideration of evacuation should take this into account. Although the plan will have sufficient flexibility built in to cover the consequences of the range of accidents identified for the on-site plan, it will cover in some detail the handling of the emergency to a particular distance from each major hazard works.

7.3.5.2 Aspects Proposed to be considered in the Off-Site Emergency Plan

The main aspects, which should be included in the emergency plan, are:

- **Organization**

Details of command structure, warning systems, implementation procedures, emergency control centers. Names and appointments of incident controller, site main controller, their deputies and other key personnel.

- **Communications**

Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

- **Specialized knowledge**

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized chemical knowledge and laboratories.

- **Voluntary organizations**

Details of organizers, telephone numbers, resources etc.

- **Chemical information**

Details of the hazardous substances stored or procedure on each site and a summary of the risks associated with them.

- **Meteorological information**

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts.

- **Humanitarian arrangements**

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances and temporary mortuaries.

- **Public information**

Arrangements for dealing with the media press office and informing relatives, etc.

- **Assessment of emergency plan**

Arrangements for: (a) Collecting information on the causes of the emergency; (b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.3.5.3 Role of the Emergency Co-ordinating Officer

The various emergency services should be co-ordinated by an Emergency Co-ordinating Officer (ECO), who will be designated by the district collector. The ECO should liaison closely with the site main controller.

The Emergency Operation Center (EOC) functioning at each Taluk office Collectorate, round the clock. Again, depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

7.3.5.4 Role of the Local Authority

The duty to prepare the off-site plan lies with the local authorities. The Emergency Planning Officer (EPO) appointed should carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO should liaison with the works, to obtain the information to provide the basis for the plan. This liaison should ensure that the plan is continually kept upto date.

It will be the responsibility of the EPO to ensure that all those organizations, which will be involved in off site handling of the emergency situation, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off-site plans should be organized by the EPO.

7.3.5.5 Role of Police

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. Their functions should include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

7.3.5.6 Role of Fire Authorities

The control of a fire should be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions and toxic release.

Fire authorities in the region should be appraised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They should be involved in on-site emergency rehearsals both as participants, and on occasion, as observers of exercises involving only site personnel.

7.3.5.7 Role of Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, should have a vital part to play following a major accident, and they should form an integral part of the emergency plan. For major fires, injuries should be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. For major toxic releases, the effects vary according to the chemical in question, and the health authorities should be

apprised about the likely toxic releases from the plant, which will enable them in dealing with the aftermath of a toxic release with treatment appropriate to such casualties. Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical "mutual aid" scheme should exist to enable the assistance of neighbouring authorities to be obtained in the event of an emergency.

7.3.5.8 Role of Government Safety Authority

This will be the factory inspectorate available in the region. Inspectors are likely to satisfy themselves that the organization responsible for producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well-documented procedures and evidence of exercise undertaken to test the plan.

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. These may vary from keeping a watching brief to a close involvement in advising on operations in case involvement in advising on operations. In cases where toxic gases may have been released, the factory inspectorate may be the only external agency with equipment and resources to carry out tests.

7.4 Occupational Health and Safety

Large industries, in general where numerous activities are involved during construction, erection, testing, commissioning, operation and maintenance, materials and machines are the basic inputs. Along with the boons, the industrialization generally brings several problems like occupational health and safety.

The industrial planner therefore has to properly plan and take the steps to minimize the impacts of industrialization and to ensure appropriate occupational health, safety including fire plans. All these activities again may be classified under construction and erection & operation and maintenance. The proposed safety plan is given below:

7.4.1 Occupational Health

Occupational health needs attention both during construction and erection & operation and maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

- **Construction and Erection**

The occupational health problems envisaged at this stage can mainly be due to the constructional accident and noise. To overcome these hazards, in addition to arrangements to reduce it within TLV's (Threshold Limit Values), personal protective equipment shall be supplied to workers.

- **Operation and Maintenances**

The problem of occupational health in the operation and maintenance phase is due to noise hearing losses. Suitable personnel protective equipment shall be given to the employees. The working personnel shall be given the following appropriate personnel protective equipment.

1. Industrial Safety Helmet
2. Crash Helmet
3. Face shield with replacement of acrylic vision
4. Welder's equipment for eyes and face protection
5. Ear muffs
6. Safety belt
7. Leather Hand Gloves
8. Industrial Safety Shoes with steel toe
9. Special UV and infra-red glasses
10. Eye protection with side shields

Full Fledged hospital facilities shall be made available round the clock for attending emergencies arising out of accidents, if any. All working personnel shall be medically examined once in a month and at the end of his term of employment.

7.4.2 Safety Plan

Safety of both men and material during the erection and operation phases is of concern. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan.

The disaster in the proposed plant is possible due to the furnace, material handling, leakage of fuel/oil, collapse of structures and fire/explosion etc. Keeping in view the safety requirement during, operation and maintenances phases, the proposed Expansion and modernization plant shall formulate safety policy with the following regulations;

- To allocate sufficient resources to maintain safe and healthy condition of working environment;
- To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of plants, machinery and equipment;
- To ensure that adequate safety instructions are given to all employees;
- To provide wherever necessary protective equipment, safety appliances and clothing and to ensure their proper use;
- To inform employees about material, equipment or processes used in their work, which are known to be potentially hazardous to health or safety;
- To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experiences and up to date knowledge;
- To provide appropriate facilities for first aid and prompt treatment of injuries and illnesses at work;
- To provide appropriate instruction, training, retraining and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters;
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service; and
- To publish/notify regulation, instructions and notices in the common language of employees.

7.4.3 Safety Organisation

Construction and Erection Phase

A Qualified and experienced safety officer shall be appointed. The responsibilities of the safety officers include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health.

Operation and Maintenance Phase

When the construction is completed the positing of safety officers shall be in accordance with the requirement of Factories Act and their duties and responsibilities shall be as defined thereof.

7.4.4 Safety Circle

In order to fully develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety circles would be constituted in each area of the work. The circle would consist of 5-6 employees from that area. The circle normally shall meet for about an hour every week.

7.4.5 Safety Training

A full-fledged training center shall be set up. Safety training shall be provided by the safety officers with the assistance of faculty members called from Corporate Center, Professional Safety Institutions and Universities. To create safety awareness, safety films shall be shown to workers and leaflets etc., can be distributed.

Some precautions and remedial measures proposed to be adopted to prevent fires are:

- Spread of fire in horizontal direction would be checked by providing fire stops for cable shafts;
- Reliable and dependable type of fire detection system with proper zoning and interlocks for alarm are effective protection methods for conveyor galleries;
- Housekeeping of high standard helps in eliminating the cause of fire and regular fire watching system strengthens fire prevention and fire fighting; and
- Proper fire watching by all concerned would be ensured.

7.4.6 Health and Safety Monitoring Plan

All the potential occupational hazardous work places such as furnace melting area, material handling, loading and unloading area shall be monitored regularly. The health of employees working in these areas shall be monitored once in a month for early detection of any ailment.

Though effective measures are taken to combat pollution in ambient conditions, occupational health hazards are not overlooked. Project will provide well organized occupational health services to all its employees by taking responsibility for establishment

and maintenance of safe and healthy working environment and assessment of the physical and mental capabilities to turn out specific workloads.

7.4.7 Medical Surveillance

The industry will have the medical center for all the employees. All the employees will be examined periodically by the standard qualified doctors once in a month to determine the health status of the workers in respect of occupational health hazard to which they are exposed.

- Hazardous area wise list will be prepared by the medical officers to perform the specific test for the working employees.
- No person will be signed up to operate the crane, locomotive or work-lift or give signals unless his eye sight and color vision is properly examined by the concern ophthalmologist.

7.4.8 Industrial Medical Center Responsibilities

- Surveillance of workers health in relation to work;
- Surveillance of working environments;
- Identification and evaluation of environmental factors which may affect the worker's health;
- Assessment of conditions of occupational health of employees; and
- Observance of safety norms and reduce/eliminate exposure to hazardous environments.

7.4.9 Employees training Programme

The industry will provide training program to the working employees. The training programme will include the hazardous operation, usage of the nose mask and earplugs, Engineering Act and working process in connection with their jobs roles.

7.4.10 List of Test for Working Employees

List of tests that are being conducted for every month to the workers are as:

- X-ray Chest view;
- Electro Cardiogram (ECG);
- Eye fitness;
- Spirometry Test; and
- Audiogram Test.

7.4.11 Medical Examination

Ashok Leyland Limited will take up monitoring activities periodically to assess hazards due to gases, dusts, vibrations, radiations etc. The following medical check-up/examination will be done:

- Pre-employment medical check-up for the employees;
- X-ray Chest test including bone scan, CT ratio;
- ECG to find the activity of the heart related problems;
- Eye Fitness (near and far as well as colour vision);
- Spirometry to measure the lung function; and
- Audiogram Test to find the deafness.

7.5 Social Impact Assessment

The impact of the proposed Expansion and modernization activity will begin with the starting up of the plant roof Expansion and modernization activities at the site. The proposed Expansion and modernization activity will provide employment to considerable number of skilled, semi-skilled and unskilled construction labourers. In normal circumstances, the local people will be given preference for the unskilled activities, as there are many construction labourers in the vicinity of the project and are expected to be available with normal wages. Presently, a large number of skilled and semi-skilled technicians and labourers who emigrated from various parts of India have been engaged in many companies on wages/contract basis. Similar technicians and skilled workers will either be brought or sourced from the local area for erection of the proposed Expansion and modernization activity.

The peak labour force required during the construction period will be sourced from the local area. Provision of wage employment to the local populace during construction period of the project will benefit the local area to some extent. This will enhance the income levels of the construction labourers and lead to their socio-economic wellbeing during the construction phase of the proposed Expansion and modernization activity, which will be positive impact due to the project.

In addition, the real estate in the region will get a boon and the land prices are likely to shoot-up as part of speculation. Normally, the construction activity will benefit the local populace in a number of ways, which include the requirement of skilled, semi-skilled and unskilled construction labourers, tertiary sector employment and provision of goods and services for daily needs including transport. `

In line with the above, some more recommendations are given below:

- Local people will be given preference;
- All the guidelines under the Labour Act and Safety Rules as specified under Factories Act, 1948 will be implemented during the construction work to avoid any accidents; and
- The contractor will be instructed to provide basic needs of the workers. This will be part of the contractual agreement between the project proponent and the contractor engaged for construction.

7.6 Rehabilitation & Resettlement Action Plans

The proposed expansion and modernization activity is going to implemented in the existing plant itself hence there is no Rehabilitation & Resettlement issues.

7.7 Traffic Management systems

This data illustrates the study of existing & proposed traffic levels at selected junctions from the plant site. The location of the existing plant is given below

7.7.1 Location details

TABLE-7.9
DETAILS OF THE PLANT LOCATION

Sr. No.	Particulars	Details		
		Points	Latitude	Longitude
1.	Site co-ordinates	A	13°12'52.52"N	80°19'12.98"E
		B	13°12'46.78"N	80°19'23.73"E
		C	13°12'36.20"N	80°19'20.17"E
		D	13°12'42.57"N	80°19'03.55"E
2.	Elevation above MSL			
3.	Nearest Highway	SH-114 Kathivakkam Highway-Adjacent, W		
4.	Nearest Railway Station	Ennore Railway Station – 0.38 km, NNE		
5.	Nearest Airport	Chennai Intl. Airport (27.7 km, SSW)		
6.	Seismicity Zone	Zone-III as per IS: 1893 (Part-1) 2002		

7.7.2 Data generation

The vehicles passing through the road (in both ways) were counted separately for 24 hours at one selected location from 0600 hrs to 0600 hrs next day continuously. Category-wise vehicle counting has been done continuously and recorded in the traffic volume count on hourly basis under respective categories.

7.7.2.1 Road Connectivity to the project

The project site is located adjacent from SH-114 which is connecting Chennai & Ennore. The traffic generated by the proposed project expansion and modernization will added to the existing traffic. Though pressure develops, the connecting road is sufficient to handle the pressure.

7.7.2.2 Categorization of Traffic

The engine driven vehicles were categorized into various heads viz. Trucks/Bus, Light Carriage Vehicles (LCV), Car/Jeep, Multi Axle Vehicles, Two/Three Wheelers and Cycles/others.

7.7.2.3 Sampling Locations

The one location is represented in **Table-7.10**

TABLE-7.10
DETAILS OF THE TRAFFIC MONITORING LOCATION

Location Code	Location Details
T-1	SH-114 Kathivakkam Highway



**FIGURE-7.1
TRAFFIC MONITORING LOCATIONS**

**TABLE-7.11
ROAD GEOMETRIC SCENARIO**

Road	Road width (m)	Lanes	Surface Condition	Street lights	Road Markings	Road signs	Remarks
Kathivakkam Highway	7.5	2	Good	A	A	A	-

**TABLE-7.12
IRC GUIDELINES**

No of traffic lanes and widths	Traffic flow	Capacity in PCU's per hour for various traffic conditions		
		Roads with no frontage access, no standing vehicles, very little cross traffic	Roads with frontage access but no standing vehicles and high capacity intersections	Roads with free frontage access, parked vehicles and heavy cross traffic
2 - lane (7 - 7.5 m)	One way	2400	1500	1200
	Two way	1500	1200	750
3 - lane (10.5 m)	One way	3600	2500	2000
4 - lane	One way	4800	3000	2400

(14 m)	Two way	4000	2500	2000
6 – lane	One way*	3600	2500	2200
(21 m)	Two way	6000	4200	3600

*denotes for three lanes in predominant direction of flow

TABLE-7.13
IRC – LOS GUIDELINES

V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
1.0 & above	F	Worst

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr
* Note: Capacity as per IRC Guidelines

The hourly vehicular traffic densities for continuous normal day at each location observed during the study period and the same are presented in **Table-7.14, 7.15 & 7.16**.

Location Number : T-1
Details of Location : Kathivakkam Highway (SH-114)

TABLE-7.14
TRAFFIC DENSITIES

Time	Two-Wheeler	Auto Rickshaw	Car/Utility	Buses & Other heavy Vehicles	Total Vehicles	Total PCUS
09.00 AM to 10.00 AM	482	27	94	45	648	497
10.00 AM to 11.00 AM	456	32	53	63	604	502
11.00 AM to 12.00 PM	412	39	55	85	591	555
12.00 PM to 01.00 PM	442	25	58	84	609	556
01.00 PM to 02.00 PM	441	32	63	69	605	522.5
02.00 PM to 03.00 PM	322	19	52	89	482	499
03.00 PM to 04.00 PM	334	23	74	97	528	555
04.00 PM to 05.00 PM	433	22	78	92	625	592.5
05.00 PM to 06.00 PM	445	36	82	86	649	598.5
06.00 PM to 07.00 PM	541	58	69	98	766	691.5
07.00 PM to 08.00 PM	538	56	74	121	789	762
08.00 PM to 09.00 PM	457	31	56	132	676	711.5
09.00 PM to 10.00 PM	215	13	42	88	358	426.5
10.00 PM to 11.00 PM	125	11	36	45	217	244.5
11.00 PM to 12.00 AM	131	6	10	22	169	147.5
12.00 AM to 01.00 AM	89	0	29	19	137	130.5
01.00 AM to 02.00 AM	86	5	41	6	138	107
02.00 AM to 03.00 AM	42	4	18	3	67	52
03.00 AM to 04.00 AM	69	3	11	9	92	75.5

04.00 AM to 05.00 AM	138	18	16	9	181	130
05.00 AM to 06.00 AM	145	21	21	23	210	183.5
06.00 AM to 07.00 AM	121	15	89	42	267	290.5
07.00 AM to 08.00 AM	216	33	96	68	413	441
08.00 AM to 09.00 AM	496	37	105	117	755	741
Total	7176	566	1322	1512	10576	10012

**TABLE-7.15
EXISTING TRAFFIC SCENARIO**

Road	V	C*	Existing V/C Ratio	LOS
Chennai – Kathivakkam Highway (SH-114)	417.2	1500	0.28	B

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr
* Note: Capacity as per IRC Guidelines

7.7.3 Traffic flow Assessment

The total traffic generated from the proposed Expansion and modernization is 429.2 PCUs (417+12=429.2). The flow of vehicles in the proposed Expansion and modernization doesn't not create any significant impacts to the environment. There will be a frequent movement of trucks in the plant premise for the transportation of raw material and products but after the proposed activities only a small increase in truck numbers which would not cause a significant impact.

**TABLE-7.16
TRAFFIC SCENARIO – AFTER EXPANSION**

Road	V	C*	Modified V/C Ratio	LOS
Kathivakkam Highway (SH-114)	417.2+12=429.2	1500	0.29	B

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr
* Note: Capacity as per IRC Guidelines

After the proposed expansion and modernization, the traffic generated due to the industrial activity would be 429.2 PCU. On combining with the existing traffic condition, the V/C ratio was found to be 0.29 and Level of Service is very Good.

7.7.4 Conclusion

The existing level of service (LOS) of the Chennai – Ennore Hwy (SH-114) is '**B**' which is very good. After considering the transportation of trucks and other vehicles due to the proposed project expansion and modernization, meagre impact was envisaged. The level of service predicted to be '**B**' (**very Good**) even after the proposed expansion and modernization.

CHAPTER - 8

PROJECT BENEFITS

8.0 PROJECT BENEFITS

8.1 Improvement in the Physical Infrastructure

The impact of foundry unit on the civic amenities will be substantial after the proposed expansion. The basic requirement of the community needs will be strengthened by extending health care, educational facilities to the community, providing drinking water to the villages, building/strengthening of existing roads in the area.

Ashok Leyland Limited will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities.

The construction of new roads in the project area will enhance the transportation facilities. With improved transportation facilities there is always a scope for development. The communication facilities will improve after the expansion and modernization of foundry operations.

Medical facilities will be augmented in dispensaries of the plant area. These medical facilities would also be available to local people in the surrounding in case of emergencies.

8.2 Improvement in the Social Infrastructure

The foundry unit expansion and modernization will result in improvement of the social infrastructure in the following manner:

- Generation of employment and improved standard of living;
- Establishment of small and medium scale engineering ancillaries;
- Increased revenue to the state by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.

In addition to above, due to increase in purchasing power of local habitants:

- There shall be significant change in the socio-economic scenario of the area;
- The proposed expansion and modernization project shall enhance the prospects of direct and in direct employment during construction. Recruitment for the unskilled and semiskilled workers for the proposed expansion and modernization activity will be sourced from the nearby villages;
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible; and
- Overall the expansion and modernization project will change living standards of the people and improve the socio-economic conditions of the area.

8.3 Employment Potential

The impact of foundry unit on the economic aspects can be clearly observed. The activity of project expansion and modernization will provide employment to persons of different skills and trades. The local population will be given preference to get an employment.

The employment potential will ameliorate economic conditions of these families directly and provide employment to many other families indirectly who are involved in business and service-oriented activities.

The employment of local people in primary and secondary sectors of project shall upgrade the prosperity of the region. These will in-turn improve the socio-economic conditions of the area.

The total manpower required for the proposed expansion and modernization during the operation phase is about 2200 persons. In addition to the above, direct employment shall be provided to the contractual labour and indirect employment opportunities will also arise after expansion and modernization of foundry unit.

8.4 Corporate Environmental Responsibility Policy

The existing CSR policy lays down the guidelines and mechanism to carry out CSR projects/programs by Ashok Leyland Limited and to report their CSR work in the format provided by the rules under the Companies Act, 2013.

Ashok Leyland have developed the policy in consonance with section 135, Companies Act, 2013 on CSR and in accordance with the CSR rules notified thereof by the ministry of Corporate Affairs, Government of India in 2014.

M/s. Ashok Leyland Limited. CSR policy is formed by the guiding principles that form part of the CSR rules. CSR policy is applied to all CSR projects/program undertaken by Ashok Leyland Limited as per Schedule VII of the Companies Act 2013, within the geographical limits of India only, for the benefits of marginalized, disadvantaged, poor or deprived sections of the community and the environment.

M/s. Ashok Leyland Limited proposes to take part in various CER activities like water supply, tree plantation, bus shelters, medical camp, road facilities and development of the villages. 2.0% of the project cost will be allocated for CER activity. The CER activity action plan for the existing and proposed expansion and modernization is shown in **Table - 8.1(a)** and **Table-8.1(b)**.

TABLE - 8.1(a)
CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES- EXISTING

Sr. No.	CSR Activity
1	Child development activities from underprivileged rural communities
2	Road to school program has been initiated in 3 districts (Chennai, Namakkal, Hosur)
3	Water ATMs has been installed in various schools
4	Health care for students has also been carried out

TABLE - 8.1(b)
CORPORATE ENVIRONMENT RESPONSIBILITY ACTION PLAN

Sr. No	Activity	Capital cost (Lakhs)	Recurring cost (Lakhs/ annum)
1.	Water supply facility to nearby villages	5.0	2.0
2.	Funding for the education, distribution of free books, uniforms for students	2.5	5.0
3.	Improvement of nearby water bodies	20.0	15.0
4.	Free periodical health camps for the nearby habitation people	2.5	5.0
Total		30.0	27.0



ASHOK LEYLAND



FIGURE-8.1
PHOTOGRAPHS OF EXISTING CSR ACTIVITIES

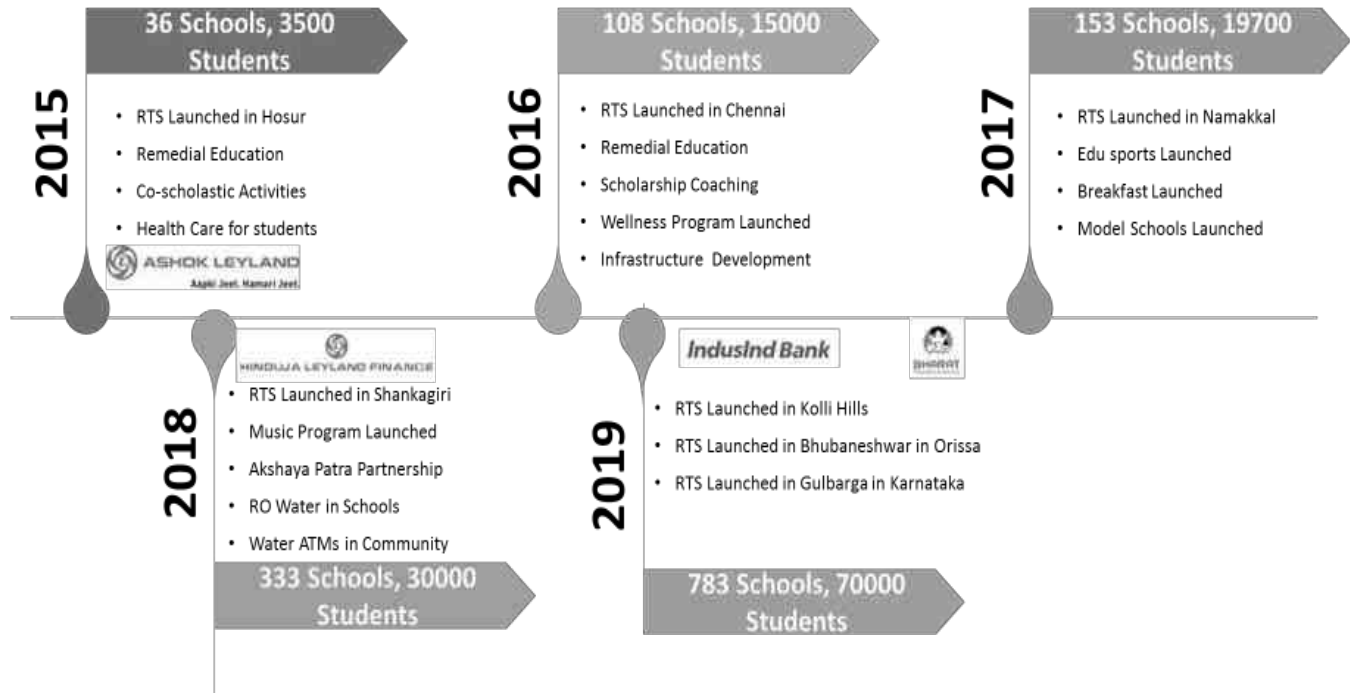



FIGURE-8.2
DETAILS OF ROAD TO SCHOOL ACTIVITIES

CHAPTER - 9

ENVIRONMENTAL COST BENEFITS ANALYSIS

 ASHOK LEYLAND	<p><i>Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</i></p> <p style="text-align: right;">Chapter - 9 Environmental Cost Benefit Analysis</p>
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9.0 ENVIRONMENTAL COST BENEFIT ANALYSIS

The scope of the EIA/ EMP has been prepared vide Terms of Reference (ToR) issued by MoEF&CC, New Delhi vide letter No. SEIAA-TN/F.No.7465/2020/3(a)/ALL/TOR-726/2020 dated 23.06.2020 and is enclosed as **Annexure-I.**

As per SO 1533 dated 14th September 2006, the chapter on environmental cost benefit analysis is to be prepared is prescribed at scoping stage.

The chapter has to be carried out specifically if required as per scoping, as this is not specifically mentioned in ToR, Further detail study is not carried out.

CHAPTER - 10

ENVIRONMENT MANAGEMENT PLAN

10.0 ADMINISTRATIVE ASPECTS OF ENVIRONMENT MANAGEMENT PLAN

10.1 Introduction

The Management action plan aims at controlling pollution at the source level to the possible extent with the best available technology followed by treatment measures before they are discharged to the environment. However, it may have some positive or negative impacts on the surrounding environment. The negative impacts are within the limits and can be easily ameliorated to a significant extent through adoption of appropriate mitigative measures.

10.2 Environment Management System

The earlier chapters identified measures for environmental protection especially for providing the necessary pollution control to comply with the standards stipulating the limits for emitting pollutants in air, water or on land so that the assimilative capacity is not exceeded. Standards are stipulated by various regulatory agencies to limit the emission of pollutants in air and water. Similarly, a mandatory practice is recommended for preparing an Environment Statement each year in order to reduce the quantities of wastes. This in itself is not sufficient since this does not provide an assurance that its environmental performance not only meets, but also will continue to meet legislative and policy requirements.

In the present report, the Environmental Management Systems (EMS) is discussed for the proposed amendment, including facilities to ensure that the activities and services of the region conform to the supportive and assimilative capacity. This is based on International Organization for Standardization ISO 14001:2015 Environmental Management Systems.

Environmental Policy

The top management has developed the environmental policy, which is relevant to its proposed amendment activities and services at the project and their environmental effects. Broadly, this will cover the following:

- Be consistent with the occupational health and safety policy and other operational policies (such as quality policy);
- Indicate which of the activities are covered by the environmental management system;
- Be communicated and implemented at all levels of the project operation; and
- Be available publicly.

The policy for Environment Management is to create sound and eco-friendly environment for sustainable development in and around the plant premises.

Organization and Personnel

To facilitate the implementation of the EMS, one of the most important aspects relate to the organization and personnel. The related issues are:

- Define and document the responsibility, authority and inter-relations of key personnel involved in the implementation of the environmental policy, objectives and environmental management system;

- Identify the in-house verification requirements and procedures including resources and personnel;
- Communicate to employees at all levels the importance of compliance with the environmental policy, their role and responsibilities in achieving compliance, the potential consequences of departures from the specified procedures and identify and provide appropriate training; and
- Establish and maintain procedures to ensure that contractors are made aware of the environmental management system requirements and provisions.

10.3 Environment Management Cell

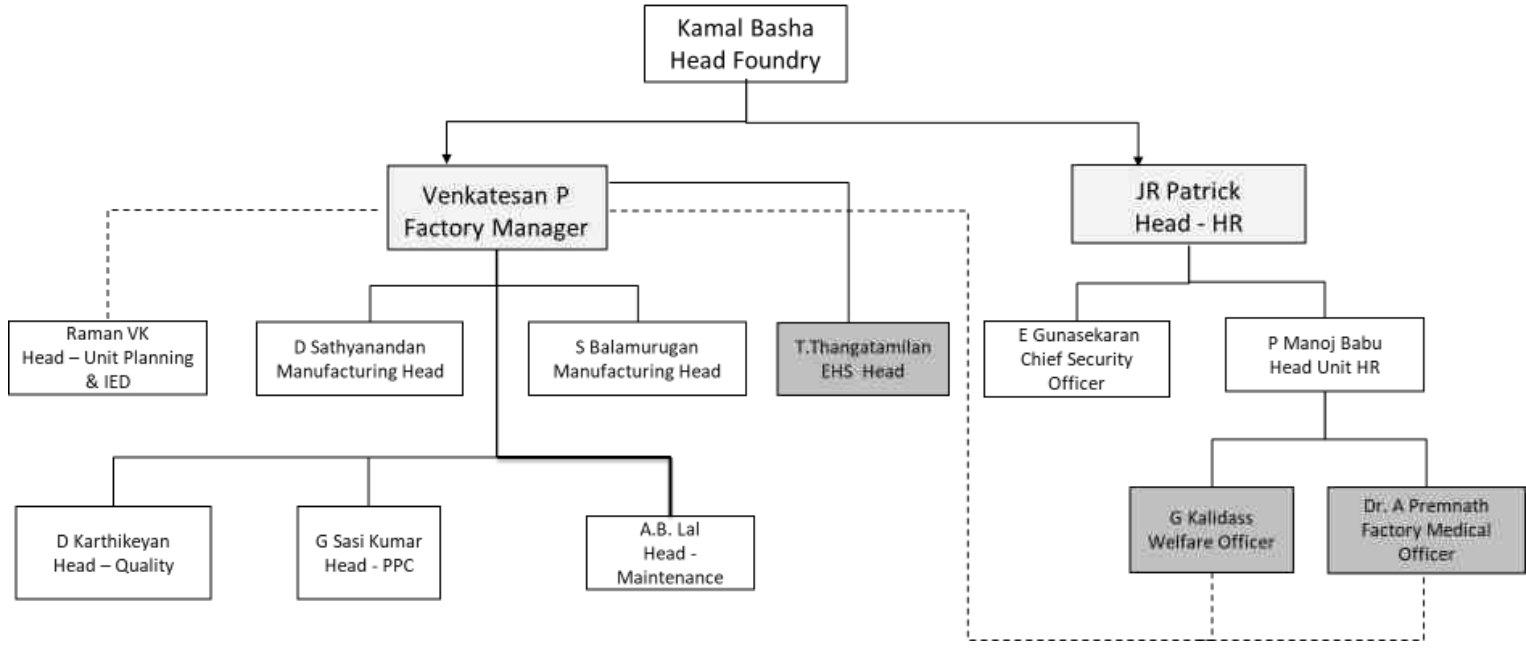
The Foundry unit will be supervised and controlled by the plant head supported by department managers and the adequate team of technically and statutorily qualified personnel apart from the operating staff of skilled, semi-skilled, unskilled and other categories. As conscious of this, ALL has an Environment Management Cell consisting of officers from various disciplines to co-ordinate the activities concerned with the management and implementation of the environmental control measures.

Environment Management Cell will be headed by a EHS head and will constitute factory manager, environmental engineer, safety officer, chemists, administrative staff and officer. The organizational structure of the unit is presented in **Figure - 9.1**.

The EHS head will be coordinating the environmental activities and reporting to the Factory manager. The Manager will be headed by the Plant head. The responsibility of EHS head is to conduct the post project monitoring, regular performance evaluation of pollution control equipment and developing and maintaining the greenbelt within the plant premises and in general ensure regulatory compliances as well as planning for further improvement. The EHS head will be supported by safety officer, Environmental Engineer and Finance & Administration officer.

Chemists are headed by Environmental Engineer. Chemists are assigned the analysis work in the laboratory. The work of statistical analysis of the results is assigned to Associate Managers. Chemists are responsible for the collection of samples, conduct field studies for ambient air quality monitoring and conduct stack monitoring.

The Environment Management Cell will also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and green belt development.



**FIGURE-10.1
ORGANIZATIONAL CHART**

CHAPTER - 11

SUMMARY & CONCLUSION

11.0 INTRODUCTION

M/s. Ashok Leyland Limited (Formerly known as Hinduja Foundries Ltd) proposes to increase their manufacturing capacity of ferrous castings in their existing premise. The industry is situated at 39A & 39B at Kathivakkam village, Tiruvottiyur taluk, Tiruvallur District, Tamil Nadu.

M/s. Ashok Leyland Limited, Foundry Division (herein after referred to as ALL) established at Ennore in 1961 is a part of Ashok Leyland, India's largest foundry group. The erstwhile Hinduja Foundries Limited was amalgamated with Ashok Leyland Limited pursuant to the Order of the National Company Law Tribunal (NCLT) vide Order dated April 24, 2017. The NCLT order was filed with the Registrar of Companies, Chennai on April 28, 2017 and the scheme became effective on April 28, 2017. The amalgamation is effective from the appointed date of October 1, 2016.

The existing plant has been operating in a company owned land area of 13.86 ha (34.25 acres) which features furnace, sand preparation and mould making divisions. The furnace division comprises 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace to produce castings of 2790 TPM. The company has obtained Consent to Operate granted under Air & Water Act from TNPCB for the existing unit which is valid up to March 2023.

Presently, the industry has proposed to increase the manufacturing capacity of ferrous castings from 2790 TPM to 6125 TPM. The projected production will be achieved by the existing 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace and other supporting equipment's. The enhancement in the production doesn't require an additional area hence, the existing land would be sufficient to carry out the expansion and modernization activity. The estimated total cost for the proposed expansion and modernization is Rs. 15.0 Crores.

Project Scoping Category

In order to obtain Environmental Clearance from State Level Environment Impact Assessment Authority (SEIAA) and Consent for Establishment (CFE) from the Tamil Nadu Pollution Control Board (TNPCB), Environmental Impact Assessment (EIA) report with detailed Environmental Management Plan (EMP) is essential as per the EIA Notification 2006 and its subsequent amendments.

As per the Environmental Impact Assessment Notification dated 14th September 2006, the proposed expansion and modernization project falls under the **Schedule No. 3(a) [Metallurgical Industries-Ferrous and Non-ferrous]**.

Considering the project activity, nature the project proposal falls under the **Category 'B1'**. The project was considered in the 153rd SEAC meeting held on 04.06.2020 and subsequently in the 382nd SEIAA meeting held on 23.06.2020 received TOR vide letter No. **SEIAA-TN/F.No.7465/2020/3(a)/ALL/TOR-726/2020** dated **23.06.2020**

11.1 Location of the Project

The Plant site is situated at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu. The plant site is about 15.5 km (SSW) from Chennai and 46.5 km from Tiruvallur district (West). Nearest habitation Ennore and Kathivakkam is about 0.02 km (NNE) and 0.35 km (NNW) from the plant site. The site is about adjacent to the SH-114 Connecting Chennai and Ennore. The nearest Railway station is Ennore R.S at a distance of 0.38 km in NNE. The Nearest Airport is Chennai International Airport at a distance of 29.0 Km in SW

The proposed expansion and modernization activities will be carried out within the existing industrial premises itself. Therefore, no additional land will be acquired for the proposed expansion and modernization. The Index map and the study area map of 10 km radius is shown in **Figure - 11.1** and **Figure - 11.2** respectively. Google map of 10 km radius of the existing plant site is shown in **Figure - 11.3**. The details of environmental setting are given in **Table - 11.1**.

TABLE - 11.1
ENVIRONMENTAL SETTING OF THE PLANT SITE (10 KM RADIUS)

Sr.No	Particulars	Details		
		Point	Latitude	Longitude
1.	Latitude & Longitude	A	13°12'52.52"N	80°19'12.98"E
		B	13°12'46.78"N	80°19'23.73"E
		C	13°12'36.20"N	80°19'20.17"E
		D	13°12'42.57"N	80°19'03.55"E
2.	Elevation above MSL	4 – 9 m		
3.	Land use at the project site	Industrial Land use as per DTCP		
4.	Nearest Habitation	Ennore- 0.02 km, NNE Kathivakkam – 0.35 km, NNW		
5.	Nearest Highway	SH-114 Connecting Chennai to Ennore-Adjacent, W		
6.	Nearest Railway station	Ennore Railway Station – 0.38 km, NNE		
7.	Nearest Air Port	Chennai International Airport – 27.17 km, SSW		
8.	Nearest Harbor	Ennore Port - 5.31 Km, NNE		
9.	Nearest Town	Ennore – 0.02 km, W		
10.	Reserve Forest within 10-km radius	Nil in 10 km radius		
11.	Nearest water bodies	Bay of Bengal - 0.12 km, E Kosasthalayar River – 0.37 Km, WNW Kadapakkam Panchayat Lake – 7.1 Km, W Vichoor Lake – 8.27 Km, W		
12.	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10-km radius		
13.	Defense Installation / Archaeological / Ports	Nil in 10 km radius		
14.	CRZ identification	CRZ-II as per CZMP/study by IRS, Anna University		
15.	Historical places	Nil		
16.	Socio-economic factors	No resettlement and rehabilitation involved		
17.	Nearest Hospitals	Ernavur Government Hospital (2.86 Km, SW) Urban Primary Healthcare center (4.02 Km, SW)		
18.	Religious places	CSI St. Peter church (0.01 Km, WNW) Masjid-e-Mammor (0.15 Km, SW) Sri Batherakali Amman Temple (0.43 Km, N)		
19.	Nearby Industries	Ashok Leyland Defence Unit – Adjacent, S Coromandel International Limited – 0.15 Km, N Ennore Thermal Power Station-1.0 Km, SW NTPC thermal Power plant- 2.5 Km, N		

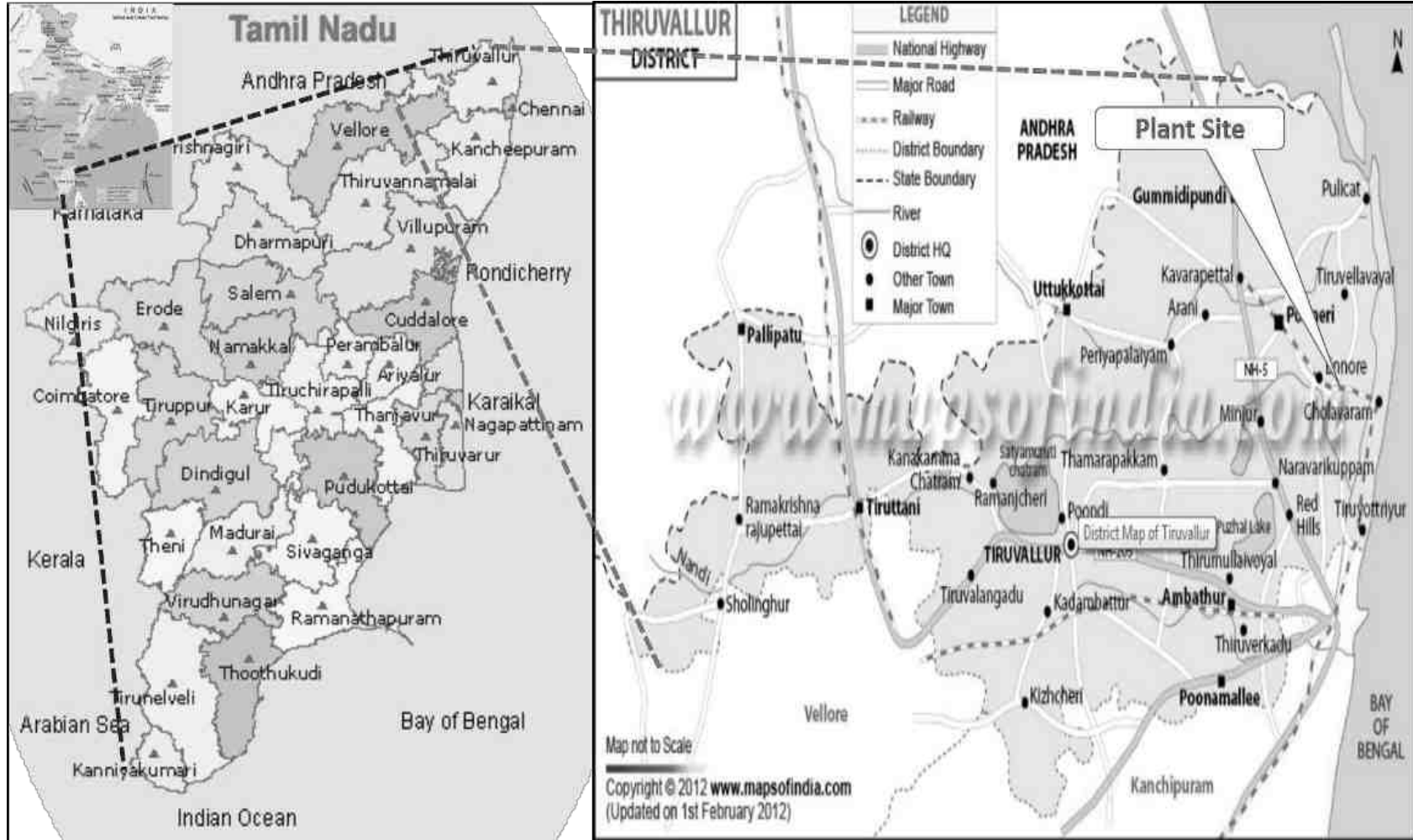
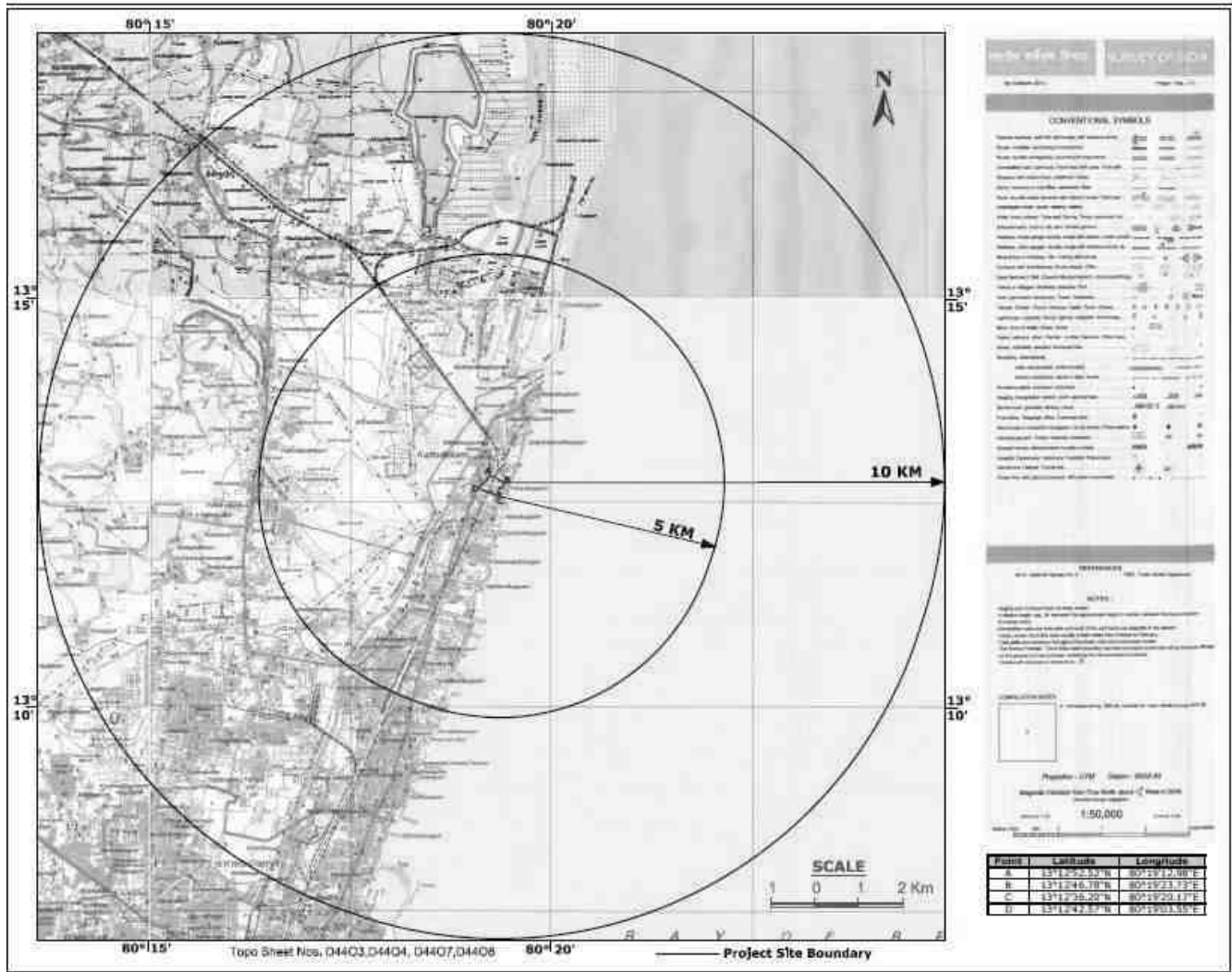


FIGURE - 11.1
INDEX MAP



**FIGURE - 11.2
STUDY AREA MAP**



FIGURE - 11.3
GOOGLE MAP OF 10 KM RADIUS

11.2 Project Details

11.2.1 Manufacturing Details

The facility is proposed to enhance the production quantity of ferrous castings from 2790 TPM to 6125 TPM.

11.2.2 Land Requirement

The total land available under the ownership of the Ashok Leyland Limited is 13.86 ha (34.25 acres). The existing plant site is classified as Industrial Land use Zone. The proposed expansion and modernization will be carried out within the existing premises itself. The details of land-use breakup of the existing plant and after the proposed expansion and modernization are given in **Table - 11.2**

TABLE - 11.2
DETAILS OF LANDUSE BREAK-UP

S. No.	Break up	Area		Percentage
		Ha	Acres	
1	Process building area	4.79	11.83	34.55
2	Non-process building area	0.68	1.66	4.84
3	Storage area	0.34	0.84	2.45
4	Parking Area	0.06	0.17	0.50
5	Driveway & pathway area	2.16	5.36	15.65
7	Green belt area	4.90	12.1	35.32
8	Open area	0.93	2.29	6.69
	Total	13.86	34.25	100

Source: Ashok Leyland Limited

11.2.3 Raw Material Requirement

The major raw materials required for the proposed expansion and modernization project are Scraps, Mild steel, CI borings, Pig iron and Silica sand. The details of various raw materials, sources and their mode of transport are given in **Table-11.3**

TABLE - 11.3
DETAILS OF RAW MATERIAL REQUIREMENT FOR FOUNDRY UNIT

S. No.	Raw Material	Existing (TPM)	After Expansion (TPM)	Source
1	Pig Iron	203.0	565.0	Goa, Karnataka
2	Mild Steel	1522.0	3300.0	Tamil Nadu
3	CI Borings, CI Scrap & Foundry Returns	1268.0	2825.0	Tamil Nadu
4	Product scrap	320.0	0	-
5	Washed Silica Sand	2635.6	3675.0	Andhra Pradesh
6	Sodium Silicate	8.36	1.5	Tamil Nadu
7	Resin & Binders	41.0	59.0	Maharashtra

S. No.	Raw Material	Existing (TPM)	After Expansion (TPM)	Source
8	Core Paints	50.0	66.0	Maharashtra
9	Casting Paints	8.36	13.8	Maharashtra
10	Thinner (3:1 ratio)	3.825	4.600	Maharashtra
11	Di methyl Formaldehyde	0.396	0.594	Tamil Nadu
12	S M Release Oil (Silicone oil)	0.253	0.380	Tamil Nadu

11.2.4 Power and Fuel Requirement

The peak power demand for the entire unit is 19100 KVA while the average power demand will be about 17000 KW. In order to meet the desired quantity additional power supply of 700 KVA will be required. Therefore, the peak power demand for the entire unit after expansion and modernization will be 19900 KVA while the average power demand will be about 17910KW. The entire power requirement will be sourced through TANGEDCO. The Induction furnaces are installed in the existing activity as per Central Electricity Authority's directions to minimize the power surge and harmonic distortion in the incoming feeders. To meet the emergency power requirement during power cuts and grid failures 2 Nos of 1250 KVA DG Sets will be installed and the existing DG set of 5000 KVA will be decommissioned. The Power & fuel requirement details are given in **Table – 11.4 and Table 11.5**

TABLE-11.4
POWER REQUIREMENT

Particulars	Existing	After Expansion
Power Requirement		
Source:		
1. TANGEDCO	19100 KVA	19900 KVA
Backup facility		
DG-Set	1x5000 KVA	2x1250 KVA

Note: After the Proposed expansion DG set of capacity 5000 KVA will be decommissioned.
Source: Ashok Leyland Limited

TABLE-11.5
FUEL REQUIREMENT

S. No	Description	Existing TPD	After Expansion TPD
1	HSD	3.0	4.0
2	HFO	0.1	0

Existing DG set of 5000 KVA will be decommissioned, hence HFO will not be used

10.2.5 Water Requirement

The total water requirement for plant activity will be 447.0 KLD after the proposed expansion and modernization activity. The daily freshwater demand will be 425.0 KLD which will be sourced from open wells located within the plant premises. The NOC for the water withdrawal has been obtained from Chennai Metropolitan Development Authority. The water requirement of the existing and after expansion and modernization is shown in **Table-11.6**

TABLE - 11.6
DETAILS OF WATER REQUIREMENT

S No	Category	Requirement in KLD	
		Existing	After Expansion
1.	Cooling tower makeup	28.0	50.0
2.	Process	72.0	97.0
3.	Domestic requirement	350.0	300.0
Total		450.0	447.0

Source: Ashok Leyland Limited

11.2.6 Manpower Requirement

The total manpower available in the existing plant is about 1950 nos. After expansion and modernization activity additional man power of 250 Nos will be equipped from the nearby communities for various plant operations. The unit is operated round the clock in three shifts. The total manpower after the proposed expansion and modernization will be 2200 nos.

11.2.7 Process Description

The conversion of MS scrap in to castings does not require any sophisticated technology. Various grades of scraps, borings and ferro alloys are melted in furnaces and pour into the moulds. The moulds of required size and shape prepared by using sand and bentonite (clay) which act as a binding material. Then the castings separated from sand moulds and cleaned. The manufacturing process of Iron castings involves the following steps in sequence.

- Sand preparation and Mould Making/Core making;
- Making cores and sand moulds;
- Melting in induction furnace and Pouring;
- Shot blasting and fettling; and
- Quality testing and Dispatch.

11.3 **Baseline Environmental Status**

The 10 km radial distance from the existing plant boundary has been considered as study area for Environmental Impact Assessment (EIA) baseline studies. Environmental monitoring for various attributes like meteorology, ambient air quality, surface and ground water quality, soil characteristics, noise levels and flora & fauna have been conducted at specified locations and the secondary data collected from various Government and Semi-Government organizations. Baseline Environmental monitoring studies for the various environmental attributes were carried out during 1st July 2020 to 30th September 2020. The details of the baseline study are presented as follows:

11.3.1 Meteorology

Meteorological data at the site was monitored during 1st July 2020 to 30th September 2020. It was observed that during study period temperature ranged from 23°C to 38°C. During the same period of observations, the relative humidity recorded was ranged from 36% to 96%. Predominant wind directions are mostly from the WSW followed by SW.

11.3.2 Ambient Air Quality

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at eight (8) locations. The summary of the ambient air quality monitoring results is given in **Table - 11.7**.

TABLE - 11.7
SUMMARY OF AMBIENT AIR QUALITY IN THE STUDY AREA

Sr. No	Parameters	Concentration ($\mu\text{g}/\text{m}^3$)		NAAQS Limits, 2009 ($\mu\text{g}/\text{m}^3$)
		Maximum	Minimum	
1	Particulate matter $\text{PM}_{2.5}$	32.8	15.1	60
2	Particulate matter PM_{10}	88.6	59.7	100
3	Sulphur dioxide (SO_2)	33.4	7.1	80
4	Oxides of Nitrogen (NO_x)	33.5	8.5	80
5	Carbon monoxide, CO	330	193.0	2000

11.3.3 Water Quality

Eight (8) ground water samples and four (4) surface water samples within the study area were considered for assessment. The water samples are compared with the standards of drinking water IS 10500:2012

Ground water quality

The results of the ground water samples are compared with the standards for drinking water as per IS: 10500:2012. The analysis results indicate that the pH ranges in between 7.02-8.05, which is well within the specified standard of 6.5 to 8.5. The maximum pH of 8.05 was observed at Kattukuppam (GW3) and the minimum pH of 7.02 was observed at Thulsikuppam (GW6). Total hardness was observed to be ranging from 188.1-559.9 mg/l. The maximum hardness was recorded at Edayanchavadi (GW4) and the minimum hardness was recorded at Kattukuppam (GW3). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 616-2698 mg/l. The maximum TDS was recorded at Edayanchavadi (GW4) and the minimum TDS was recorded at Kattukuppam (GW3).

Chlorides at all the locations were within the permissible limit, ranging in between 158.4-724.6 mg/l. Fluorides are ranging in between 0.6-0.9 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 2.9-9.5 mg/l. The heavy metal content is below detectable limits.

Surface water quality

During the baseline period season, most of the surface water bodies in the study area were dry hence 6 samples were taken for analysis. The analysis results indicate that the pH ranges in between 7.86-8.03, which is well within the specified standard of 6.5-8.5. The maximum pH of 8.03 was observed at sea (SW4) and the minimum pH of 7.86 was observed at Kosathalayar River (SW1).

Total hardness was observed to be ranging from 1122.3-2010.8 mg/l. The maximum hardness was recorded at Sea (SW4) and the minimum hardness was recorded at Kosathalayar River (SW1). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 1072-31225 mg/l. The maximum TDS was recorded at Ennore Creek (SW3) and the minimum

TDS was recorded at Kosathalayar River (SW1).

Chlorides at all the locations were within the permissible limit, ranging in between 284-15365 mg/l. Fluorides are ranging in between 0.7-1.3 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 4.5-19.7 mg/l. The heavy metal content is below detectable limits

11.3.4 Soil Characteristics

Six (6) soil samples were collected in and around the plant site to assess the present soil quality of the region. It has been observed that the texture of the soil is mostly "clay soil" in the study area. The common color of the soil is pale brown. The pH of the soil ranged from 7.47 to 7.95, indicating that the soil is alkaline in nature. The bulk density of soil ranges from 1.2 to 1.3 gm/cc

11.3.5 Noise Levels

The noise monitoring has been conducted for determination of ambient noise levels at Eight (8) locations in the study area. The daytime (L_{day}) noise levels were found to be in the range of 47.8 dB (A) to 63.2 dB (A). The night time (L_{night}) noise levels were observed to be in the range of 43.2 dB(A) to 59.4 dB(A). Hence, the noise levels were found to be well within the range specified by CPCB norms.

11.3.6 Ecological Environment

From the field observations there are no reserve forests in the 10km radius of the study area. As per MoEF and Forest Department of Tamil Nadu state, there are no National Parks, Wildlife Sanctuaries, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridors or IBAs within 10 km of the project site. As per the records of the Botanical Survey of India, there are no plants of conservation importance in the study area.

No rare or endangered or threatened (RET) or Schedule I species in the study area as per the Wildlife Protection Act, 1972.

10.3.7 Socio Environment

The study area (10-km radius) has a total population of 4,55,972 persons according to 2011 Census. The male and female constitute 50.3 % and 49.6 % of the total population respectively. As per census, the study area comprises 20.6% population belonging to Scheduled Castes (SC) and 0.44% belonging to Scheduled Tribes (ST).

The literacy rate is found to be 77%. As per census 2011 records, the main workers were found to be 31% of the total population. The marginal workers and non-workers constituted to 5% and 62% of the total population.

11.4 Anticipated Environmental Impacts and Mitigation Measures

Impacts during Operational Phase

11.4.1 Impact on Soil

The soil quality remains the same as the proposed expansion and modernization does not

involve a change in land use pattern. The probable sources of degradation of soil quality will be due to generation and disposal of ash and fugitive dust emission. The airborne fugitive dust from the plant is likely to be deposited on the topsoil in the immediate vicinity of the plant boundary. However, the fugitive emissions are likely to be controlled to a great extent through pollution control measures like water sprinkling and the greenbelt development. Hence, no impact is envisaged on soil quality of the project site

11.4.2 Impact on Air Quality

Particulate Matter (PM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x) will be the major pollutants from the proposed expansion and modernization. In order to control the emissions of particulates, the pollution control equipments are proposed. Adequate stack height has been provided to disperse gaseous emissions over a wider area.

Gaseous Emission Control Measures:

Melting of metals and alloys in the induction furnaces generates dust and metal oxide fumes. These dust and fumes are extracted from the furnace and they are passed through an air pollution control system consisting of spark arrestor, dilution damper followed by wet scrubber etc. and then it would be released into the atmosphere through stacks. These dust and fumes are extracted from the furnace and they are passed through wet scrubber for treating. After treatment, it will be released onto the atmosphere through the individual stacks of above 30 m. The pollutants generated from the Induction furnace is controlled by the wet scrubber followed with stack of suitable height. In the billet division, the pollution generated from the induction furnace is controlled by cyclone separator, mist eliminator, wet scrubber followed by common stack with rolling mill. The Regular monitoring and maintenance of the pollution control equipment's enhances the complete process of the plant site.

11.4.3 Impact on Water Quality & Management

As the manufacturing process will be operated only on the dry process, water is mainly used at certain stages in the process like machinery cooling, scrubber make up and domestic needs. The entire water demand for the existing operation and proposed expansion and modernization will be met from existing bore well located within the industrial premises.

The total water requirement for plant activity will be 447.0 KLD after the proposed expansion and modernization activity. The daily freshwater demand will be 425.0 KLD which will be sourced from open wells located within the plant premises. After expansion and modernization, the generated sewage (270.0 KLD) will be treated in common STP of capacity 1600 KLD. No wastewater will be discharged outside the plant premises. Hence, there is no impact on the water regime due to the wastewater generation from the plant operation.

11.4.4 Impact due to Solid Waste Generation

In order to avoid problems associated with solid waste disposal, an effective solid waste management system will be followed. Hence, the impact due to solid waste generation during the plant operation is not envisaged. The sources, quantity of the solid waste generated and waste management measures for existing and after the proposed expansion and modernization are presented in **Table - 11.8**

**TABLE - 11.8
DETAILS OF SOLID WASTE GENERATION AND MANAGEMENT**

S. No.	Waste Generation	Quantity (TPM)		Mode of Disposal
		Existing	Expansion	
Non-Hazardous Waste				
1	Used Sand	3250	3675.0	Send out through authorized Contractors
2	Furnace Slag	166.6	330.0	Send out through authorized Contractors
3	Grinding Dust	8.33	12.0	Send out through authorized Contractors
4	Municipal solid waste	7.35	3.10	Will be collected and given to civic bodies
Hazardous Waste				
1	Used/Spent Oil	100	150	Sold to CPCB authorized recyclers
2	Waste/Residues containing oil	2	2.5	Sold to CPCB authorized recyclers
3	Paint Waste/Residues	1.2	2.0	Sold to CPCB authorized recyclers
4	Discarded containers	60	190	Disposed to SPCB authorized disposer
5	ETP Sludge	2.0	3.0	Disposed to CTSDf

11.4.5 Impact on Noise levels

The major noise generating sources are from cooling tower, air compressors, shack out vibrators, transformer, sand plant, moulding section, DG sets, loading & unloading operation. The predicted noise level through mathematic modeling at the boundary due to various plant activities will be ranging in between 48-50 dB (A). It is seen from the modelling results that the incremental noise levels are within the CPCB standards.

Noise Attenuation Measures

The following control measures will be implemented for the proposed expansion and modernization project:

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures;
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, DG sets, shack out vibrator will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units; and
- Adequate greenbelt development is also being developed in the plant boundary of the plant.

11.4.6 Impact on Ecology

The incremental concentrations of the air quality modelling show that the resultant levels of PM, SO₂ and NO_x are well within the permissible limits as per National Ambient Air Quality Standards, 2009. The impacts on aquatic ecology due to the proposed expansion and modernization activity would be negligible as the treated water will be properly reused and no waste water is discharged outside the plant premises. The proposed expansion and modernization do not create any significant impact on aquatic bodies.

11.4.7 Impact on Public Health

The discharge of waste materials (stack emission, wastewater and solid wastes) from process operations can have some adverse impact on public safety and health in the surrounding area, if appropriate treatment procedures are not followed. As the plant pollution control equipments will be designed as per the modern available technology for controlling the impacts, no adverse impacts on public health in the area are anticipated.

11.5 Environmental Management Plan

Environmental Management Plan during the Erection Phase

11.5.1 Soil Environment Management

Preparation of site will involve excavations and fillings. The earthen material generated during excavations and site grading periods, shall be properly dumped and slope stabilisation shall be taken. The topsoil generated during erections shall be preserved and reused for plantations.

The additional greenbelt area shall be delineated before start-up of earthwork and tree plantation shall be taken up during erection stage itself.

11.5.2 Air Quality Management

The activities like site development, grading and vehicular traffic contribute to increase in PM and NO_x concentrations. The mitigation measures recommended to minimize the impacts are:

- Water Sprinkling in construction area;
- Asphaltting the main approach road;
- Proper maintenance of vehicles and construction equipment; and
- Tree plantation in the area earmarked for greenbelt development.

11.5.3 Water Quality Management

- The earthwork (cutting and filling) will be avoided during the rainy season and will be completed during the summer season.
- Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken.
- Soil binding and fast-growing vegetation will be grown to arrest the soil erosion.

11.5.4 Noise Level Management

Operation of construction equipment and vehicular traffic contribute to the increased noise level. Recommended mitigation measures are:

- Enclosures for noise making units like pumps, compressors, shack out vibrators etc.,
- Good maintenance of vehicles and construction equipment;
- Plantation of trees around the plant boundary to attenuate the noise; and
- Provision of earplugs and earmuffs to workers.

11.5.5 Ecological Management

Clearing of vegetation will not be required as the land is already under possession of the project proponent. Thus, there will not be any ecological impact due to the project expansion and modernization in its erection stage.

Environment Management Plan during the Operation Phase

During operation phase, the impacts on the various environmental attributes should be mitigated using appropriate pollution control equipment. The Environment Management Plan prepared for the proposed expansion and modernization project aims at minimizing the pollution at the source itself.

11.5.6 Air pollution Management

Fugitive and Stack emission from the foundry unit will contribute to increase in concentrations of PM, SO₂ and NO_x. The mitigation measures recommended are as follows:

- Raw material handling sections are major source for fugitive emissions;
- Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission; and
- The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions.

11.5.7 Water pollution management

The recommended measures to minimise the impacts are as follows;

- Recycling of wastewater for greenbelt areas;
- Adequate treatment of wastewater prior to recycling/reuse to maximum extent;
- Utilization of treated domestic wastewater in greenbelt development and plant operation;
- Lining of effluent dyke suitably to prevent any seepage into ground to avoid any groundwater contamination;
- Provision of storm water system to collect and store run-off water during rainy season and utilization of the same in the process to reduce the fresh water requirement; and
- Suitable rainwater harvesting structures to be constructed.

11.5.8 Noise pollution Management

The major noise generating sources are the cooling tower, air compressors, shack out vibrators, furnace section, DG sets, loading & unloading operation. Some recommendations are;

- Adequate protective measures in the form of ear muffs/ear plugs have been provided to the workers working in high noise areas;

- In addition, reduction in noise levels in the high noise machinery areas could be achieved by adoption of suitable preventive measures such as suitable building layout in which the equipment is to be located; and
- Adequate greenbelt development is also being developed in the plant boundary.

11.5.9 Solid Waste Management

- The Non-hazardous wastes such as used sand, furnace slag, grinding dust and municipal solid wastes will be Send out through authorized Contractors.
- The Hazardous wastes such as Used/Spent Oil, Waste/Residues containing oil, Paint Waste/Residues, discarded containers will be collected and given to CPCB authorized recyclers and ETP Sludge will be Disposed to CTSDf.

11.6 Traffic Study

The project site is located to from SH-114 which is Chennai-Ennore highway. The engine driven vehicles were classified into various levels like two wheelers, Auto Rickshaw, Car/Utility, Buses and Trucks. The proposed expansion and modernization involves the transport of raw material and finished goods near to and from the plant site. The present level of traffic on the existing road is found to be 417.2 PCUs/hr. The total traffic generated from the proposed expansion and modernization is 429.2 PCUs/hr (417.2+12=429.2). The transportation in the proposed expansion and modernization not create any significant impacts to the environment. The traffic scenario is presented in **Table-11.9**.

**TABLE-11.9
TRAFFIC SCENARIO**

Road	V	C*	V/C Ratio	LOS
Chennai - Ennore Hwy (SH-114)	Existing			
	417.2	1500	0.28	B
	After Expansion and modernization			
	429.2 (417.2+12)	1500	0.29	B

V= Volume in PCUs/hr & C= Capacity in PCUs/ hr
* Note: Capacity as per IRC Guidelines

The existing level of service (LOS) of the Chennai - Ennore Hwy (SH-114) is '**B**' which is very good. After considering the transportation of trucks due to the proposed project expansion and modernization, meagre impact was envisaged. The level of service predicted to be '**B**' (**very Good**) even after the proposed expansion and modernization.

There will be a frequent movement of trucks in the plant premise for the transportation of raw material and products but the proposed expansion and modernization involves only a small increase in truck numbers which may never cause a significant impact. The vehicular movements can discharge SO₂, NO_x and particulate emissions due to combustion engines. The emission from the vehicular movements can be controlled by good management practices of the vehicles.

- Vehicles used for transportation will be equipped with novel engine for reducing emissions.
- Low sulphur-High Speed Diesel will be used for fuelling vehicles.
- Periodical maintenance of vehicles with emission testing will be carried out.

11.7 Environmental Monitoring Program

The environmental monitoring program is important in terms of evaluating the performance of pollution control equipment installed in the plant. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/TNCPB. The frequency of air, noise, surface water and ground water sampling and location of sampling will be as per the directives of Tamil Nadu Pollution Control Board.

11.7.1 Budgetary Allocation for Environmental Protection

The capital cost of the project is around 1200 crores and the total project cost for the proposed expansion and modernization project is about Rs. 15.0 Crores. Out of this, Rs. 26.20 lakhs have been spent on environment protection, management, pollution control, treatment and monitoring systems, appropriate budgetary provision would be made and provision for recurring expenditure for environment management of the project would be made **Table - 11.10**

TABLE - 11.10
COST PROVISION FOR ENVIRONMENTAL MEASURES

Sr. No.	Description of Item	Environment Capital Cost (Rs. in Lakhs)	Environment Recurring Cost (Rs. in Lakhs/annum)
1	Air pollution control systems	2500.0	500.0
2	Water pollution control system	25.0	10.0
3	Solid Waste Management	10.0	2.5
4	Noise pollution control	10.0	2.5
5	Environment Monitoring	25.0	6.5
6	Occupational Health & Safety (OHS)	20.0	25.0
7	Green belt Development	30.0	20.0
Total		2620.0	566.5

11.7.2 Greenbelt Development

Greenbelt will be developed along with the existing greenbelt area. Greenbelt/landscaping are already being maintained at 35.32% which covers a land area of 4.90 ha for the existing plant. Additionally, plantation developed within existing greenbelt area.

11.8 Disaster Management Plan

To tackle the consequences of a major emergency inside the plant premises or its immediate vicinity, a Disaster Management Plan has been formulated. The objective of the Disaster Management Plan is to make use of the combined resources of the foundry unit and the outside services, to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;

- Provide for the needs of relatives;
- Provide authoritative information to the media;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

11.8.1 Occupational Health & Safety Measures

Large projects where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance, the men, materials and machines are the basic inputs. Along with the benefits, the industrialization generally brings several problems like occupational health and safety.

The industrial planner therefore has to take steps to minimize the impacts and to ensure appropriate occupational health and safety in the foundry unit. The following measures are proposed:

- Conducting awareness programs at regular intervals to the employees;
- Providing safety kits and prevention kits; and
- Provision of Clinic at the plant site to handle emergency situations that may arise.

11.9 Corporate Environment Responsibility

The existing CSR policy lays down the guidelines and mechanism to carry out CSR projects/programs by Ashok Leyland Limited and to report their CSR work in the format provided by the rules under the Companies Act, 2013.

Ashok Leyland have developed the policy in consonance with section 135, Companies Act, 2013 on CSR and in accordance with the CSR rules notified thereof by the ministry of Corporate Affairs, Government of India in 2014.

M/s. Ashok Leyland Limited. CSR policy is formed by the guiding principles that form part of the CSR rules. CSR policy is applied to all CSR projects/program undertaken by Ashok Leyland Limited as per Schedule VII of the Companies Act 2013, within the geographical limits of India only, for the benefits of marginalized, disadvantaged, poor or deprived sections of the community and the environment.

M/s. Ashok Leyland Limited proposes to take part in various CER activities like water supply, tree plantation, bus shelters, medical camp, road facilities and development of the villages. 2.0% of the project cost will be allocated for CER activity. The CER activity action plan for the existing and proposed expansion and modernization is shown in **Table - 11.11(a)** and **Table-11.11(b)**.

TABLE - 11.11(a)
EXISTING CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES

Sr. No.	CSR Activity
1	Child development activities from underprivileged rural communities
2	Road to school program has been initiated in 3 districts (Chennai, Namakkal, Hosur)
3	Water ATMs has been installed in various schools
4	Health care for students has also been carried out

TABLE - 11.11(b)
CORPORATE ENVIRONMENT RESPONSIBILITY ACTION PLAN

Sr. No	Activity	Capital cost (Lakhs)	Recurring cost (Lakhs/ annum)
1.	Water supply facility to nearby villages	5.0	2.0
2.	Funding for the education, distribution of free books, uniforms for students	2.5	5.0
3.	Improvement of nearby water bodies	20.0	15.0
4.	Free periodical health camps for the nearby habitation people	2.5	5.0
Total		30.0	27.0

11.10 Project Benefits

The basic requirement of the community needs will be strengthened by extending health care, educational facilities to the community, providing drinking water to the villages, building/strengthening of existing roads in the area.

Implementation of the power project will result in the following benefits


- Temporary employment for people from the neighboring villages during construction phase;
- Community development activities such as training of local unemployed youth in various construction skills, English speaking, personality development, development of self-help groups for women, providing drinking water facility, strengthening of rural roads, deepening of ponds etc.,
- State will get revenue from payment towards taxes and water cess etc.,
- Providing dispensary with a medicine bank to cater to the health care needs of the surrounding villages;
- Providing vocational training to women in areas for their self-employment.
- Utilizing the services of ex-servicemen for providing training to youth in areas of personality development, security etc.,

11.11 Conclusion

The proposed Expansion and modernization of foundry unit has certain level of marginal impacts on the local environment. Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed expansion and modernization project would be beneficial to the society as well as to reduce the demand-supply gap of ferrous castings products which contributes to the economic development of the region in particular and country in general.

CHAPTER - 12

DISCLOSURE OF CONSULTANTS

 ASHOK LEYLAND	<i>Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu</i>
	Chapter – 12 <i>Disclosure of Consultant</i>

12.0 DISCLOSURE OF CONSULTANTS ENGAGED

12.1 Introduction

Studies were carried out by several institutions of different disciplines during the preparation of the EIA/EMP report based on the Expert Appraisal Committee (EAC) prescribed Terms of Reference.

12.2 Vimta Labs Limited-Environment Consultant

Vimta Labs Limited is a leading multi-disciplinary testing and research laboratory in India. Vimta provides contract research and testing services in the areas of environmental assessment, analytical testing, clinical research, pre-clinical (animal) studies, clinical reference lab services, advanced molecular biology services and research & development studies.

The **Environment Division** has been in the forefront of its vision to provide better environment through guiding and assisting the industry for sustainable development. A stalwart in the mission to protect and preserve the natural resources on earth for future generations, it offers extensive research and consultancy services in the field of environment. With its rich experience, multi-disciplinary expertise and with the support of its state-of-the-art analytical equipment, the services offered by the division are wide ranging and encompasses entire gamut of environment management and monitoring services. With its emphasis on quality services over the years, it has evolved itself into a single reference point in India for comprehensive environmental services.

12.2.1 The Quality Policy

- Vimta is committed to good professional practices and quality of operations in its testing, validation and research services;
- Vimta shall ensure customer satisfaction by maintaining independence, impartiality and integrity in its operations;
- Vimta shall provide the services in accordance with national and international norms;
- Vimta shall implement quality systems as per ISO/IEC 17025 and applicable Good Laboratory Practices (GLPs) & Good Clinical Practices (GCPs), to generate technically valid results/data; and
- Vimta shall ensure that all its personnel familiarize with the policies and procedures of the quality system and implement the same in their work.

12.2.2 Major Milestones and Accreditations

- 1984–Registered with an initial investment of Rs.200,000=00
- 1985–Recognized by ISI (now known as Bureau of Indian Standards)
- 1987–Qualified by the criteria of Ministry of Environment and Forests, India and was notified as one of the first 14 Standard Environmental Laboratories published in the Gazette of India
- 1988–Licensed for carrying out tests on Drugs and Pharmaceuticals
- 1991–Accredited by NCTCF, DST, Government of India (the forerunner of NABL)

- 1995–Accredited by NABL, India under its revised scheme, certified by Standards Australia, Quality Assurance Services as per ISO/IEC Guide 25 and ISO 9002
- 1996–GLP Compliance
- 1998–Accreditation by GOSSTANDART and joint venture for certification of Food Exports with ROSTEST, Russia
- 1998–World Bank Recognition
- 2002–ANVISA Brazil Certification
- 2003–USFDA accepts Vimta Bioequivalence study report. Showcased Vimta at AAPS (USA) and ICSE-CPHI (Germany)
- 2003–Recognized by Saudi Arabian Standards Organization
- 2004–Enters Gulf market-Executes a contract for environmental consultancy in Kuwait
- 2006–Expands its overseas activities. Undertakes environmental assignment in Saudi Arabia
- 2006–Undertakes environmental impact assignment in Tanzania, Africa
- 2008–Has been Pre-Qualified by World Health Organization (WHO)
- 2009–Undertaken environmental impact assessment studies in Cameroon, Africa
- 2010 – Quality Council of India Recognition

12.2.3 Services Offered

Spread over 70,000 sq.ft lush green garden premises at Cherlapally, Hyderabad (India), the scientifically designed and meticulously groomed infrastructural facility of the Central Laboratory of **VIMTA** has the most sophisticated instruments backed by an excellent team of professionals.

Over 150,000 sq. ft. of world class research laboratory is also under operation at MN Park-Genome Valley, Hyderabad (India). Having all the facilities under one roof is perhaps the only one of its kind in South Asia in the contract testing and research sector.



VIMTA Central Laboratory, Cherlapally, Hyderabad VIMTA Life Sciences, Genome Valley, Hyderabad

Vimta offers services under the following specializations:

- Environment;
- Analytical;
- Clinical Reference Lab;
- Clinical Research;
- Preclinical;
- Molecular Biology; and
- Research and Development.

The environment division of VIMTA Labs Limited (VLL) has its presence all over India and other countries including a strong association with international consultants like Japan Bank for International Cooperation (JBIC), Kennametal Inc.-USA, Rudal Blanchard-UK, E&E Solutions-Japan, NAPESCO & Kuwait National Petroleum Corporation-Kuwait, Marafiq and Haif Consultants-Saudi Arabia and others. Vimta Labs Limited has the following credentials:

- Recognition by BIS, India;
- Recognition by Ministry of Environment and Forests, Govt. of India and various State Pollution Control Boards (wherever applicable);
- Recognition by Department of Science & Technology, Govt. of India (NABL);
- Recognition by Ministry of Defence, Govt. of India;
- Recognition by APEDA, Ministry of Commerce, Govt. of India;
- Recognition by Saudi Arabia Standard Organization (SASO), Saudi Arabia;
- Recognition from NEMC, Tanzania;
- Accreditation by NCTCF;
- Certification from Standard Australia;
- Recognition from ANVISA Brazil;
- Recognition from USFDA;
- Quality Assurance Services as per ISO/IEC 17025;
- Quality Assurance Services as per ICH Guidelines; and
- Recognition by World Health Organization (WHO).



**National Accreditation Board
for Education and Training**



Certificate of Accreditation

Vimta Labs Ltd, Hyderabad

142, IDA Phase-II, Cherlapally, Hyderabad - 500 051

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3	Thermal power plants	4	1 (d)	A
4	Coal Washeries	6	2 (a)	A
5	Mineral beneficiation	7	2 (b)	A
6	Metallurgical industries	8	3 (a)	A
7	Cement plants	9	3 (b)	A
8	Asbestos milling and asbestos based products	12	4 (c)	A
9	Synthetic organic chemicals industry	21	5 (f)	A
10	Oil & gas transportation pipeline passing through national parks/sanctuaries/coral reefs /ecologically sensitive Areas including LNG terminal	27	6 (a)	A
11	Isolated storage & handling of hazardous chemicals	28	-	B
12	Air ports	29	7 (a)	A
13	Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
14	Ports, harbours, break waters and dredging	33	7 (e)	B
15	Building and construction projects	38	8 (a)	B
16	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated June 15, 2021 and Supplementary MoM dt Oct 26, 2021 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACG/21/2194 dated Dec 30, 2021. The accreditation needs to be renewed before the expiry date by Vimta Labs, Hyderabad following due process of assessment.



Sr. Director, NABET
Dated: Dec 30, 2021

Certificate No.
NABET/EIA/1922/RA 0226

Valid up to
May 27, 2023

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



ASHOK LEYLAND

Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu

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**National Accreditation Board for
Testing and Calibration Laboratories**

(A Constituent Board of Quality Council of India)



CERTIFICATE OF ACCREDITATION

VIMTA LABS LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

**"General Requirements for the Competence of Testing &
Calibration Laboratories"**

for its facilities at

LIFE SCIENCES FACILITY, PLOT NO. 5, M.N.PARK, GENOME VALLEY, SHAMIRPET, HYDERABAD,
MEDCHAL, TELANGANA, INDIA

in the field of

TESTING

Certificate Number: TC-5418

Issue Date: 31/03/2019

Valid Until: 30/03/2021

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL



N. Venkateswaran
Chief Executive Officer



ASHOK LEYLAND

Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu

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National Accreditation Board for Testing and Calibration Laboratories

(A Constituent Board of Quality Council of India)



26.06.2020

Extension in Validity of Accreditation

NABL Policy: It is decided to extend the validity of accreditation for a period of one year to all conformity assessment bodies (CABs) where renewal of accreditation is to take place and accreditation validity date is between 01.01.2020 and 30.06.2022 **subject to the following:**

1. Providing satisfactory documents based on NABL-218 wrt compliance to the requirements of the relevant Standard and NABL requirements.
2. The CABs are required to conduct additional internal audit to ensure compliance with the standard requirements (by increasing the existing frequency of their audit plan) and submit the document.
3. The CABs are required to provide control charts and trends for assuring the validity of results.
4. CABs are required to provide an undertaking to undergo unannounced assessment (onsite and/or remotely, depending on the situation) and actions as per NABL-216 thereof, at any point of time during the validity period.
5. Making payment of **annual accreditation fee** for the extended period.

Examples:

- Accredited CABs with date of issue 15.01.2018 and valid till 14.01.2020, then their Accreditation validity will be extended till 14.01.2021.
- Accredited CABs with date of issue 15.02.2019 and valid till 14.02.2021, then their Accreditation validity will be extended till 14.02.2022.
- Accredited CABs with date of issue 15.06.2020 and valid till 14.06.2022, then their Accreditation validity will be extended till 14.06.2023

NOTE:

1. The above will be applicable to the laboratories for which transition to ISO/IEC 17025:2017 version has been completed. For the laboratories which are accredited as per ISO/IEC 17025:2005 version, they have to undergo transition assessment (onsite and/or remotely, depending on the situation) and follow transition plan defined.
2. The above is not applicable to CABs where there will be a change in name of CAB and/or legal identity change and/or Premises change.
3. Also, **the above is not applicable to the CABs which are not registered in portal** (exemption- International accredited CABs).
4. Routine assessments will take place for any scope extension /addition.
5. Payment due to NABL can be deferred (postpone the payment) upto a period of Six (6) months. There will be no waive-off of any fee for any CABs. If payments are not made, then action as per procedure (NABL-216) will be initiated. There will be no relaxations wrt payment from 01.01.2021.


N.Venkateswaran
CEO, NABL

NABL House, Plot 45, Sector 44, Gurugram 122 002, Haryana, India
Tel. No.: +91-124-4679700 (30 lines) • Fax: +91-124-4679799 • Website: www.nabl-india.org



ASHOK LEYLAND

Environmental Impact Assessment for the Proposed Expansion and modernization of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu

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Accreditation Board of CGWA

Certificate of Accreditation

*M/s. Vimta Labs Limited
Hyderabad, Telangana*

*Has been accredited as a Ground Water Professionals to prepare reports in the
Functional Areas of*

- Impact Assessment of Existing / Proposed GW Extraction*
- Hydrogeological conditions in mining projects.*

Valid from : 15.02.2021

Certificate No. : CGWA/RGI/004

Valid thru : 14.02.2026

Dated : 07.07.2021

क्षेत्रीय निदेशक

Regional Director

आरजीएनजीडब्ल्यूटीआरआई

RGNGWT&RI

सदस्य

Member

आरजीएनजीडब्ल्यूटीआरआई

RGNGWT&RI

12.2.4 Services of Environment Division

Environment essentially being a multi-disciplinary science, the range of services offered by the division are also comprehensive and caters to the needs of industry, pollution control agencies, regulatory authorities and in a larger pursuit of a green globe. The services under environment include:

- Site selection and liability studies;
- Environmental impact assessments;
- Environment management plans;
- Carrying capacity based regional studies;
- Environmental audits;
- Solid and hazardous waste management;
- Risk assessment (MCA, HAZON, HAZOP) & disaster management plans;
- Occupational health and safety, industrial hygiene;
- Environmental monitoring for air, meteorology, water, soil, noise, ecology and socio-economics;
- Industrial emission source monitoring;
- Offshore sampling and analysis of marine water and sediments;
- Marine ecological studies;
- Marine impact assessment;
- Rehabilitation and resettlement studies;
- Forestry and ecological studies;
- Geological and hydro-geological studies;
- Land use/land cover studies based on remote sensing;
- Socio-economic studies;
- Due diligence studies;
- Industrial epidemiological studies;
- Wasteland management studies; and
- Study on bio-indicators.

The services under Environmental Chemistry include:

- Analysis of water, wastewater, soil, solid waste, hazardous waste as per international codes;
- Source emissions and work zone air/noise quality monitoring;
- Analysis of SVOCs, VOCs, PAH, BTEX, AOX, PCB's, TCLP metals, TOC etc.;
- Categorization of hazardous waste; and
- Pesticide residue analysis.

12.2.5 Facilities of Environment Division

Vimta-Environment Division is located in scientifically designed Central Laboratory with the state-of the-art modern facilities to offer wide range of services in indoor and outdoor monitoring and analytical characterization in the field of Environment. Further, it is ably supported by highly skilled and experienced team of professionals in the fields of science, engineering, ecology, meteorology, social planning, geology & hydro-geology and environmental planning.

Besides the regular monitoring equipment such as Respirable Dust Samplers (RDS), automatic weather monitoring stations, stack monitoring kits, personal samplers, noise meters, portable water kits etc, the other major specialized equipment include:

- Monostatic Sodar–Designed by National Physical Laboratory, GOI;
- Integrated Noise Level Meters–Quest, U.S.A;
- Flue Gas Analyzers–Testo, Germany;
- 113-A Gravimetric Dust Sampler-Casella, London;
- ICP AES–Varian, USA;
- Gas Liquid Chromatographs with FID, ECD & pFPD–Varian, USA;
- Gas Chromatograph with Mass Detector–Varian, USA;
- Atomic Absorption Spectrometer [AAS]–Varian, USA;
- PAS-AFC-123 instrument;
- High Performance Liquid Chromatograph (HPLC);
- Laser Particle Size Analyzer;
- Bomb Calorimeter;
- Polarographs;
- X-ray Fluorescent Spectrometer;
- Flame Photometer;
- Carbon Sulphur Analyzer;
- Computerized Fatigue Testing Machine;
- Electronic Universal Testing Machine;
- Fourier Transmission Infrared Spectroscope; and
- Water Flow Current Meter–make Lawrence & Mayo.



HIGH RESOLUTION GAS CHROMATOGRAPHS

12.2.6 Quality Systems

The basic fact that environment division and its supporting site laboratories are accredited by NABL (ISO-17025) and Ministry of Environment and Forests, India and by other international bodies stand testimony to its emphasis on Quality Systems.


12.2.7 Achievements

Being the first laboratory to be recognized under Environment Protection (EP) Act by Government of India (GOI), environment division with its best mind power and

industrial knowledge competency that allows it to compare with the best in the business.

- The environment division till date has executed about 650 environmental impact assessment and environment management studies with risk assessment and disaster management plans for various spectrum of industries and obtained statutory approvals;
- Supported by the strong modern laboratory and experienced hands, environment division is well equipped in conducting due diligence, phase-I and phase-II studies;
- Undertaken specialized studies such as regional environmental impact assessment on carrying capacity principle; upper air meteorological studies using monostatic SODAR for major industrial complexes;
- Associated with prestigious studies such as environmental pollution monitoring around Taj Trapezium (India), pre and post satellite launch studies for Indian Space Research Organisation (ISRO) and monitoring for offshore oil & gas exploration for deep-sea water and sediment sampling;
- The services offered include wide spectrum of industries covering power, chemical, cement, mining, steel & alloys, metallurgical, aluminium refining & smelting, dye & intermediates, bulk drugs, pesticides, agro-chemicals, petro-chemicals, refineries, pulp & paper, oil & gas exploration & production, asbestos, infrastructure such as highways, seaports and airports, river valley, foundries etc;
- Undertaken environmental consultancy for pipeline layout and up gradation of API oil-water separators of various crude oil depots and petrol filling stations of Kuwait National Petroleum Corporation, Kuwait;
- Undertaken performance evaluation and capacity expansion of sewage treatment plant and industrial wastewater treatment Plant for Marafiq, Saudi Arabia;
- Undertaken environmental impact assessment studies for pulp and paper mill expansion of Mufindi Paper Mills, Tanzania, Africa; and
- Undertaken environmental impact assessment studies for bauxite mines in Cameroon, Africa for Cameroon Aluminium Limited (CAL).

The details of the persons involved in the preparation of present EIA/EMP report are presented below:

	Environmental Impact Assessment for the Proposed Expansion of Foundry Unit from 2790 TPM to 6125 TPM of Ferrous Castings at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu
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DETAILS OF PERSONNEL INVOLVED IN CURRENT EIA/EMP STUDY – VIMTA LABS LTD

Sr. No.	Name	Qualification	Position	Contribution in Current EIA	Expertise / Functional Area	Experience
1.	Mr. M. Janardhan	M.Tech (Env. Engg)	Vice President & Head (Env)	FAE for AP, NV & SHW	EC for Sectors- 1, 4,8,9 & 29 FAE for AP, AQ, NV & SHW	About 28 years of experience in the field of Environmental Management and Environmental Engineering
2.	Dr. S. Muneeswaran	M.E (Env.Engg), M.Sc,Ph.D	Sr. Manager/ Sr. Scientist	EIA Co-Ordinator & FAE for AP & NV	EC for Sectors 8,12,31,38,39 FAE for AQ and NV	About 33 years of experience in the field of Environmental Management and Environmental Engineering
3.	Ms. Bh. Durga Bhavani	M.Tech. M. Sc (Env Science)	Assistant Manager	FAE for WP & AQ	EC for Sectors 1, 4, 6 and 21 FAE for AQ & WP	About 17 years of experience in the field of Environmental Management and Environmental Chemistry
4.	Mr. Venkatesham	M.S.W	Group Leader	Expert	FAE-SE	About 15 years of experience in the field of social Impact Assessment Studies
5.	Mr. K. Rajeshwar	M.Sc. (Geo)	Sr. Scientist	FAE (Cat-B) for HG & Geo	FAE-HG/GEO	About 9 years of experience in the field of geology and Hydrogeology
6.	Mr. M. Shaik Qadir	M.E (Env.Engg)	Env. Engineer	Team Member	Team Member (AP, SHW)	About 5 years of experience in the field of Environmental Management and Environmental Engineering
7.	Mr. P. Niranjana Babu	B.Com	Dy. Manager	Secretarial Support	-	About 31 years of experience in the field of environmental monitoring and secretarial support
8.	Mr. J. Ramakrishna	I.T.I (Civil)	Engineer	Cartography	-	About 20 years of experience in the field of environmental management and civil drawings
9.	Dr. Subba Reddy M	M.Sc., Ph.D. (Chemistry)	Group Leader	Expert	FAE-WP	About 5 year of experience in the field of Environmental Management and Environmental Chemistry
Empaneled Experts						
1	Mr. J. Rajendra Prasad	M.Sc.	Empaneled Expert	FAE-HG/GEO	FAE-HG/GEO	About 20 years of experience in the field of landuse and landcover, satellite data interpretation and detailed hydrology & hydrogeology (representing multi-tech services)
2	Mr. Rajgopal Krishnan	M. Tech (Chemical Engg)	Empaneled Expert	FAE for RH	FAE for RH	About 42 years of experience in the field of risk assessment and hazardous management



Empaneled Experts						
Sr. No.	Name	Qualification	Position	Contribution in Current EIA	Expertise / Functional Area	Experience
3	Mr. Dr. Y. Ramamohan	M.Sc, Ph.D	Empaneled Expert	FAE for LU	FAE for LU	About 18 years of experience in land use & remote sensing
4	Prof. K Bayyapu Reddy	M.Sc., Ph.D	Empaneled Expert	FAE-EB and SC	EB & SC	About 45 years of experience in the field of Soil Conservation and Ecology & Biodiversity
<p>FAE – Functional Area Expert GEO – Geology AP – Air Pollution AQ – Air Quality (Modeling) WP – Water Pollution EB – Ecology and Biodiversity</p> <p>MSW – Municipal Solid Waste ISW – Industrial Solid Waste LU/LC- Land use and land cover SHW – Solid and Hazardous Waste SE – Socio-Economic HG – Hydrogeology</p> <p>RH – Risk and Hazardous NV – Noise and Vibrations SC-Soil Conservation</p>						

ANNEXURE - I

TOR ISSUED BY SEIAA



Dr. JAYANTHI. M, I.F.S
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT
ASSESSMENT AUTHORITY – TAMIL NADU

3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet,
Chennai-15.

Phone No.044-24359973

Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Letter No.SEIAA-TN/F.No.7465/ 3(a)/ToR- 726 /2020 Dated: 23.06.2020

To

M/s .Ashok Leyland Limited
Foundry Division
Kathivakkam Village
Tiruvottiyur Taluk
Tiruvallur District

Sir,

Sub: SEIAA, TN – Proposed expansion of foundry unit production capacity 2790 TPM to 6125 TPM of ferrous casting by M/s. Ashok Leyland Limited at S.F.No. 39A & 39B at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu – Category 'B' & Schedule Item No. 3(a) – Metallurgical Industries (Ferrous & Non - Ferrous) of EIA Notification, 2006– Issue of Terms of References (ToR) – Reg.

- Ref:** 1. Your application for Terms of Reference dated: 13.12.2019
2. Minutes of the 153rd SEAC meeting held on 04.06.2020.
3. Minutes of the 382nd SEIAA meeting held on 23.06.2020.

XXXXXX

The proponent of M/s. Ashok Leyland Limited-foundry division have submitted application for Terms of References (ToR) on 26.02.2020, in Form-I, Pre- Feasibility report and draft ToR for the proposed expansion of foundry unit production capacity from 2790 TPM to 6125 TPM of ferrous casting at S.F.No. 39A & 39B in Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu.



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The project proposal was placed in the 153rd meeting of the SEAC held on 04.06.2020. Based on the presentation made by the proponent and the documents furnished the SEAC decided to recommend the proposal for the grant of Terms of References (ToR) to SEIAA with Public Hearing. The proponent should furnish the details/particulars in respect of the following additional ToR in the EIA report, in addition to the standard ToR:

1. The proponent shall furnish the production detail submitted in the Commercial Tax department for the last 5 years.
2. The proponent shall submit the copy of the consent to operate and latest renewal consent order issued by the TNPCB.
3. The proponent shall submit the compliance report from TNPCB for the conditions imposed in the consent order issued by the TNPCB and Environmental Clearance.
4. The proponent shall submit the CRZ clearance for the expansion activity under CRZ notification with compliance status since it attract the CRZ Notification. The layout of the plant should be super imposed in CRZ map.
5. The proponent shall implement the cleaner technologies for the expansion activity and the detail should be included in the EIA report.
6. The proponent shall furnish the flood management plan in consideration with flood level in 2015 at the project site.
7. The Environmental pollution control measures proposed to deal with increased Air pollution, effluent generation and slag generation should be detailed.
8. Even though the industry has been there for long years, no adequate green belt has been developed. The proponent is directed to submit a detailed report on the present green belt developed including number of trees with age, area covered and species. In addition, a detailed proposal for green belt development should be submitted along with EIA. Green belt should be established along the boundaries to neutralize pollutants. Hence ever green trees with good foliage and broad leaves should be planted. Trees like Teak, Coconut, Delonix regia, Rain tree may be avoided. Trees like Neem, Poovarasu, Magilam, Ficus retusa, Ficus religiosa, Mahogany, Pungan may be planted as per norms. The dimensions & DGPS (Differential Global



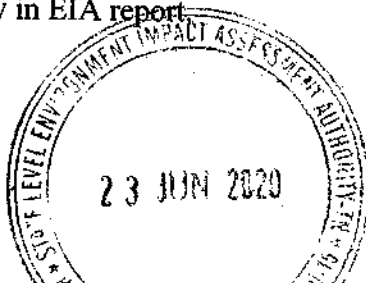
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Positioning System) co-ordinates of areas allocated for green belt (33%) shall be provided.

9. Regarding CER activities, the proponent is instructed to submit the details of activities so far carried out with copies of the receipts. They should concentrate more on infrastructure facilities useful to the local community. Detailed proposal shall be submitted.
10. The project proponent has to strengthen the air pollution control measures of the existing system and furnish an adequacy report on the revamped system from a reputed institution like Anna University or IIT, Madras along with the EIA report. The revamping of the existing air pollution control measures should include the interlinking of position of the hood system and furnace to ensure that the emission from the furnace shall be treated and routed through wet scrubber and stack.

The proposal was considered in 382nd SEIAA meeting held on 23.06.2020. The SEIAA decided to grant Terms of References (ToR) with Public Hearing. The proponent should furnish the details/particulars in respect of the following additional ToR in the EIA report, in addition to the standard ToR:

1. The proponent shall obtain the compliance of the conditions specified in the consent orders obtained for the existing activity.
2. The project proponent shall store the raw material and finished goods in closed shed inside the unit's premises.
3. The separate energy meter shall be provided for APC measures.
4. The project proponent shall furnish the details of safety measures proposed for its expansion activity.
5. The project proponent shall furnish the furnace slag utilization details.
6. The project proponent shall adhere the SoP for the metallurgical industries issued by MoEF&CC .
7. The PP shall incorporate the details of sewage, effluent generation & its disposal details of existing & expansion activities in the EIA report.
8. The PP shall furnish the details of existing machineries & proposed machineries for expansion activity in EIA report.



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9. PP shall furnish details of existing area for storage of raw material, storage of finished products, storage of Hazardous waste, solid waste, ETP & STP, proposed & existing APC measures online monitoring systems provided & proposed in EIA report.
10. Proposal of interlock system for the APC measure provided for the furnace.
11. Permissible land use classification certificate for the establishment of this industry from the competent authority.
12. Proper plans for disposal of slag including the reuse of the slag for purpose which may not create any environmental problem in future.
13. Environmental Cell details shall be provided with Designation and Qualification.
14. The details of Environmental pollution control measures proposed to deal with increased Air pollution, effluent generation and slag generation.
15. Details of adequate solid waste storage area like space requirement. Under what conditions it will be stored and how it will be managed. Detailed methodology for handling and storing of solid waste shall be furnished.
16. The proponent shall furnish the record for the disposal of Hazardous waste to M/s. TNWML for the last five years.
17. The project proponent shall furnish the occupational & Health management plan for the existing and the proposed activity.
18. The proponent shall furnish the green belt area developed and the details of the trees along with photograph and name of the species, age, number of trees to be furnished. The proponent shall earmark the green belt area with GPS co-ordinates in the layout plan and the same shall be submitted along with the EIA report.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

3(a): STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR METALLURGICAL INDUSTRIES (FERROUS & NON FERROUS) PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

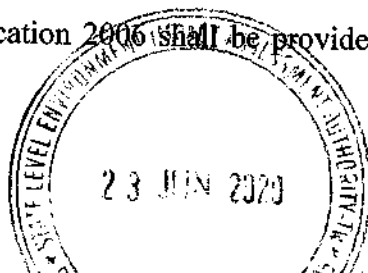
A. STANDARD TERMS OF REFERENCE (TOR)

- 1) Executive Summary



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- 2) Introduction
 - i. Details of the EIA Consultant including NABET accreditation
 - ii. Information about the project proponent
 - iii. Importance and benefits of the project
- 3) Project Description
 - i. Cost of project and time of completion.
 - ii. Products with capacities for the proposed project.
 - iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
 - iv. List of raw materials required and their source along with mode of transportation.
 - v. Other chemicals and materials required with quantities and storage capacities
 - vi. Details of Emission, effluents, hazardous waste generation and their management.
 - vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
 - viii. Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided
 - ix. Hazard identification and details of proposed safety systems.
 - x. Expansion/modernization proposals
 - a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing Iexisting operation of the project from SPCB shall be attached with the EIA-EMP report.
 - b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No

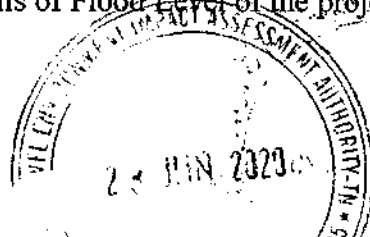


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Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

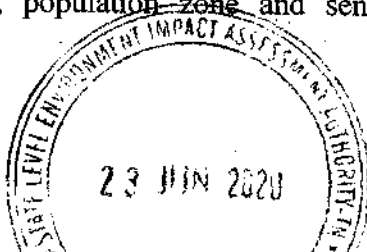
4) Site Details

- i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
- ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)
- iii. Details w.r.t. option analysis for selection of site
- iv. Co-ordinates (lat-long) of all four corners of the site.
- v. Google map-Earth downloaded of the project site.
- vi. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.
- vii. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.
- viii. Landuse break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)
- ix. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area.
- x. Geological features and Geo-hydrological status of the study area shall be included.
- xi. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the



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- river shall also be provided. (mega green field projects)
- xii. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.
- xiii. R&R details in respect of land in line with state Government policy
- 5) Forest and wildlife related issues (if applicable):
- i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)
 - ii. Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha)
 - iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.
 - iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon
 - v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area
 - vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife
- 6) Environmental Status
- i. Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.
 - ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved

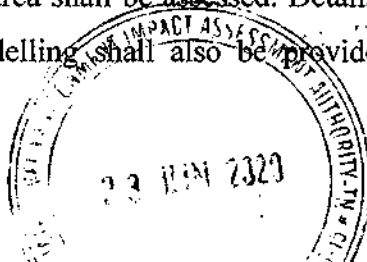


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- forests.
- iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.
 - iv. Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.
 - v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details.
 - vi. Ground water monitoring at minimum at 8 locations shall be included.
 - vii. Noise levels monitoring at 8 locations within the study area.
 - viii. Soil Characteristic as per CPCB guidelines.
 - ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.
 - x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.
 - xi. Socio-economic status of the study area.

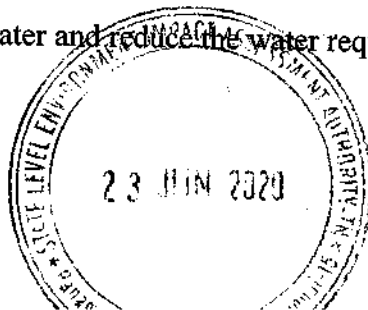
7) Impact and Environment Management Plan

- i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be



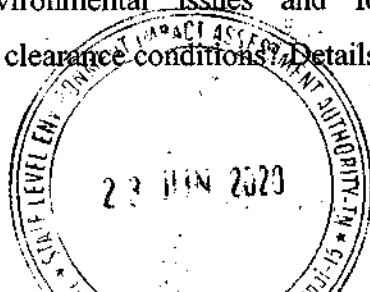

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- plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.
- ii. Water Quality modelling - in case of discharge in water body
 - iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.
 - iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.
 - v. Details of stack emission and action plan for control of emissions to meet standards.
 - vi. Measures for fugitive emission control.
 - vii. Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.
 - viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.
 - ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.
 - x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.




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- xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.
 - xii. Action plan for post-project environmental monitoring shall be submitted.
 - xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.
- 8) Occupational health
- i. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers
 - ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.
 - iii. Details of existing Occupational & Safety Hazards. What are the exposure levels of hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,
 - iv. Annual report of health status of workers with special reference to Occupational Health and Safety.
- 9) Corporate Environment Policy
- i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
 - ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
 - iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.



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- iv. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report
- 10) Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.
- 11) Enterprise Social Commitment (ESC)
- i. Adequate funds (at least 2.5% of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.
- 12) Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.
- 13) A tabular chart with index for point wise compliance of above TOR.
- 14) Copy of Valid factory license issued by Inspectorate of factories to be furnished in EIA/EMP report.

B. SPECIFIC TERMS OF REFERENCE FOR EIA STUDIES FOR METALLURGICAL INDUSTRIES (FERROUS & NON FERROUS)

- 1) Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance).
- 2) Details on blast furnace/ open hearth furnace/ basic oxygen furnace/ladle refining, casting and rolling plants etc.
- 3) Details on installation/activation of opacity meters with recording with proper calibration system

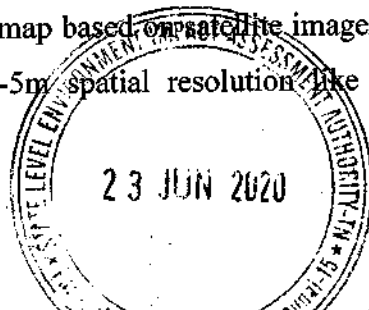


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- 4) Details on toxic metals including mercury, arsenic and fluoride emissions
- 5) Details on stack height requirement for integrated steel
- 6) Details on ash disposal and management -Non-ferrous metal
- 7) Complete process flow diagram describing production of lead/zinc/copper/ aluminium, etc.
- 8) Raw materials substitution or elimination
- 9) Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation
- 10) Details on Holding and de-gassing of molten metal from primary and secondary aluminum, materials pre-treatment, and from melting and smelting of secondary aluminium
- 11) Details on solvent recycling
- 12) Details on precious metals recovery
- 13) Details on composition, generation and utilization of waste/fuel gases from coke oven plant and their utilization.
- 14) Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
- 15) Trace metals Mercury, arsenic and fluoride emissions in the raw material.
- 16) Trace metals in waste material especially slag.
- 17) Plan for trace metal recovery
- 18) Trace metals in water

C. ADDITIONAL TOR FOR INTEGRATED STEEL PLANT

- 1) Iron ore/coal linkage documents along with the status of environmental clearance of iron ore and coal mines.
- 2) Quantum of production of coal and iron ore from coal & iron ore mines and the project they cater to. Mode of transportation to the plant and its impact
- 3) For Large ISPs, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.
- 4) Recent land-use map based on satellite imagery. High-resolution satellite image data having 1m-5m spatial resolution like quickbird, Ikonos, IRS P-6 pan



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sharpened etc. for the 10 Km radius area from proposed site. The same shall be used for land used/land-cover mapping of the area.

- 5) Respirable Suspended particulate matter (RSPM) present in the ambient air must be analysed for source analysis - natural dust/RSPM generated from plant operations (trace elements). The RSPM shall also be analysed for presence of poly-aromatic hydrocarbons (PAH), i.e. Benzene soluble fraction, where applicable. Chemical characterization of RSPM and incorporating of RSPM data.
- 6) All stock piles will have to be on top of a stable liner to avoid leaching of materials to ground water.
- 7) Plan for the implementation of the recommendations made for the steel plants in the CREP guidelines.
- 8) Plan for slag utilization
- 9) Plan for utilization of energy in off-gases (coke oven, blast furnace)
- 10) System of coke quenching adopted with justification.

The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:

1. Project name and location (Village, District, State, and industrial Estate (If applicable).
2. Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC..
3. Requirement of land, raw material, water, power, fuel, with source of supply(Quantitative)
4. Process description in brief specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
5. Measures for mitigating the impact on the environment and mode of discharge or disposal.
6. Capital cost of the project, estimated time of completion.
7. Site selected for the project- Nature of land-Agricultural(Single/double crop), barren, Govt/Private land, status of is acquisition, nearby (in 2-3 km), water body,,

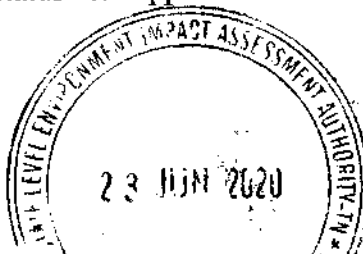


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- population, with in 10km other industries, forest, eco-sensitive zones, accessibility,(note-I case of industrial estate this information may not ne necessary)
8. Baseline environmental data-air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
 9. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
 10. Likely impact of the project, on air, water, land, flora-fanua and nearby population
 11. Emergency preparedness plan in case of natural or in plant emergencies.
 12. Issues raised during public hearing (If applicable) and response given
 13. CSR plan with proposed expenditure.
 14. Occupational Health Measures.
 15. Post project monitoring plan.

Besides the above, the below mentioned general points should also be followed:

- a. A note confirming compliance of the ToR, with cross referencing of the relevant section/ pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Copy of permission related to Port facility, Desalination plant, wind mill/solar power plant from competent Authority.
- d. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- e. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of the Minstry should also be followed.
- f. The consultants involved in the preparation of EIA/EMP report after accreditations with quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including heir status of approvals etc. In this regard circular no. F.No. J-




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/11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred

After preparing the EIA (As per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.

The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.

The ToRs prescribed shall valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per O.M. No. J-11013/41/2006-IA-II(I)(part) dated 29th August 2017.

The receipt of this letter may be acknowledged

Jay G.
**MEMBER SECRETARY
SEIAA-TN**

Copy to:-

1. The Principal Secretary to Government, Environment & Forests Dept,
Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Principal Secretary to Government, Industrial Department,
Govt. of Tamilnadu, Fort St. George, Chennai -9.
3. The Chairman, Central Pollution Control Board, Parivesh Bhavan,
CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
4. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy,
Chennai-600 032



5. The CCF, Regional Office, Ministry of Environment & Forest (SZ),
1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai -34,
6. Monitoring Cell, I A Division, Ministry of Environment & Forests,
Paryavaran Bhavan, CGO Complex, New Delhi 110003.
7. The District Collector, Tiruvallur District.
8. Stock File.



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ANNEXURE – I(A)

COMPLIANCE TO TOR

COMPLIANCE TO TERMS OF REFERENCE

TOR Vide letter No. SEIAA-TN/F.No. 7465/3(a)/ToR-726/2020 dated 23.06.2020

Sr. No	Conditions	Reply
1	Executive Summary	Executive Summary is attached as Annexure-XXVI.
2	Introduction	
i	Details of the EIA Consultant including NABET accreditation	Disclosure of consultants has been provided in Chapter-12
ii	Information about the project proponent	The details of project proponent is presented in Chapter-1, Page No. C1-2
Iii	Importance and benefits of the project	Presented in Chapter-8, Pg. No. C8-1
3	Project Description	
i	Cost of project and time of completion	The total cost for the proposed expansion is INR. 15.0 crores. The project will start commissioning after obtaining Environmental Clearance and CTO from SEIAA & State Pollution Control Board respectively.
ii	Products with capacities for the proposed project	The manufacturing capacity of the plant in existing and after expansion are presented in section 2.2 of Chapter 2 Pg.No C2-1.
iii	If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any	The manufacturing capacity of the existing plant is presented in section 2.2 of Chapter 2 Pg.No C2-1. The existing plant area would be adequate for the proposed expansion.
iv	List of raw materials required and their source along with mode of transportation	The details of raw materials required for the foundry division presented in Table 2.2 of Chapter 2, Pg.No C2-2.
v	Other chemicals and materials required with quantities and storage capacities	NA
vi	Details of Emission, effluents, hazardous waste generation and their management	Emission details of the existing and proposed machineries are provided in Table-C2.8 Chapter-2 Pg.No C2-12 Effluent generated from the industrial premise are provided in Table 2.9 of Chapter-2, Pg.No C2-14. Solid waste generation and management are provided in Table- 2.12 of Chapter-2, Pg. No. C2-15.
vii	Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	Water requirement details are presented in Table -2.5 of Chapter-2, Page No. C2-3. Power requirement are provided in Table-2.3 of Chapter-2, Pg. No.C2-3. Water Balance is provided in Figure-2.1 of Chapter 2, Page No. C2-4.
viii	Process description along with major	Process Flow Sheet with description is

COMPLIANCE TO TERMS OF REFERENCE

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	equipment's and machineries, process flow sheet (quantative) from raw material to products to be provided	presented in Chapter-2, Page No. C2-9 to C2-11.
ix	Hazard identification and details of proposed safety systems	Hazard identification and details of the safety system are provided in Chapter-7, Pg. No.C7-1
x. Expansion / modernization proposals:		
	a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MoEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30 th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing/existing operation of the project from SPCB shall be attached with the EIA-EMP report	The existing industry doesn't attract the environment clearance.
	b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted	The mother consent for the existing unit was obtained from TNPCB in 31.1.1990. Further, the consents are renewed up to date. There is no change in the production capacity since the issue of consents.
4	Site Details	
i	Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered	Environmental setting is presented in Table-1.1 of Chapter-1, Page No. C1-11
ii	A toposheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet (including all eco-sensitive areas and environmentally sensitive places.	The study are map prepared from toposheet is provided in Figure-1.2 of Chapter-1, Page No. C1-5
iii	Co-ordinates (lat-long) of all four corners of the site	Presented in Table 1.1 of chapter 1, Page No. C1-11
iv	Google map-Earth downloaded of the project site	Presented in Figure 1.3 of Chapter 1, Page No. C1-6
v	Layout maps indicating existing unit as	Layout map is presented in Figure -1.7 of

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	well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate	Chapter 1, Page No. C1-10.
vi	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular	The photographs of the existing plant details are presented in Figure-2.3 Chapter-2, Page No. C2-17
vii	Landuse break-up of total land of the project site (identified and acquired), government/private- agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)	Landuse breakup details of the plant site is presented in Table-2.1 of Chapter-2, Page No. C2-2.
viii	A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area	The landuse details of the study area are presented in Chapter-3, Pg. No. C3-9
ix	Geological features and Geo-hydrological status of the study area shall be included	The geological and hydrogeological features of the study area are presented in Chapter-3, Pg. No. C3-2
x	Details of Drainage of the project upto 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)	The drainage details are presented in Chapter-3, Pg. No. C3-9.
xi	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land	The proposed project expansion does not involve any land acquisition, as the entire land required for the proposed project Modernization is available under the ownership of the company.
xii	R & R details in respect of land in line with state Government policy	The proposed project expansion does not involve any Rehabilitation & Resettlement issues, as the entire land required for the proposed project expansion is available under the ownership of the company.
5	Forest and wildlife related issues (if applicable):	
i	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department (if applicable)	No forest land is involved in the proposed expansion. Hence it is not applicable
ii	Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of	Landuse map based on High resolution satellite imagery is presented as Annexure -IV

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	projects involving forest land more than 40 ha)	
iii	Status of application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	Not applicable
iv	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-a-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	Not applicable
v	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area	Not applicable
vi	Copy of application submitted for clearance under the Wildlife Act, 1972, to the Standing Committee of the National Board for Wildlife	Not applicable
6	Environmental Status	
i	Determination of atmosphere inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall	The details presented in Chapter-3, Page No. C3-21.
ii	AAQ data (except monsoon) at 8 locations for PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests	Presented Chapter-3, Page No. C3-28. The AAQ monitoring locations are carried out based on Figure-3.13 of Chapter-3, Pg.No.C3-30.
iii	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report	Presented in Table-3.15 of Chapter-3, Page No. C3-35
iv	Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF & CC guidelines	The surface water was taken from 4 Locations which is shown Table -3.16 of Pg.No C3-37.
v	Whether the site falls near to polluted stretch of river identified by the	Not applicable

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	CPCB/MoEF & CC	
vi	Ground water monitoring at minimum at 8 locations shall be included	The results of the groundwater monitoring locations are presented in Table 3.16 of Chapter 3, Page No. C3-37
vii	Noise levels monitoring at 8 locations within the study area	The noise level monitoring selected in study area are shown in Table -3.19 of Chapter 3, Page No. C3-42
viii	Soil Characteristic as per CPCB guidelines	The results of the 6 soil samples are presented in Table-3.4 of Chapter-3, Page No. C3-16
ix	Traffic study of the area, types of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project parking arrangement etc	Traffic study details are presented in Chapter-4, Page No. C7-23
x	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule - I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished	The ecology details are presented in Chapter-3, Page No. C3-46 to C3-63.
xi	Socio-economic status of the study area	The socio-economic details are presented in Chapter-3, Page No. C3-64 to C3-68.
7	Impact Assessment and Environment Management Plan	
i	Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any	Ground level concentration of pollutants after the proposed expansion are presented in Table-4.2 of Chapter-4, Page No. C4-9. Resultant concentrations after proposed expansion & Modernization are presented in Table-4.3 of Chapter-4, Pg. No. C4-10. Details of the model used and inputs provided are provided in Chapter-4, Pg. No. C4-8 to C4-10. The air quality contours are presented in Figure-4.1 to 4.3, Pg. no. C4-11 to C4-13.
ii	Water Quality modelling - in case, if the effluent is proposed to be discharged in to the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain	There is no proposal for the discharge of effluent in to the local drain. Hence Water Quality Modelling is not required.
iii	Impact of the transport of the raw materials and end products on the	The raw materials are carried through closed trucks so there will not be impact to the

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	surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined	surroundings.
iv	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules	The Entire treated wastewater will be reused / recycled and zero liquid discharge from the plant will be ensured. The expected characteristics of the wastewater are presented in Table-2.11 of Chapter-2, Pg. No. C2-15.
v	Details of stack emission and action plan for control of emissions to meet standards	Details of the anticipated stack emissions are presented in Table 2.9 of Chapter-2, Page No. C2-29. Action plan to meet standards are presented in Chapter-4, Pg. No. C4-2
vi	Measures for fugitive emission control	Action plan to meet standards for fugitive emission are presented Chapter-4, Pg. No. C4-14
vii	Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation and natural resource conservation	The details of the solid waste generation and management are presented in Table-2.12 of Chapter-2, Pg.No. C2-15.
viii	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated	No fly ash will be generated from the proposed activity
ix	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources	The action plan for rainwater harvesting are provided in Chapter-2. Pg. No. C2-18
x	Total capital cost and recurring cost/annum for environmental pollution control measures shall be included	Cost details are presented in Table 6.4 of Chapter-6, Page No. C6-9
xi	Action plan for post-project environmental monitoring shall be submitted	Monitoring during operational phase are presented in Chapter-6, Page No. C6-5

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xii	Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.	Risk Assessment and damage is presented in Chapter-7, Page No. C7-1 Disaster management plan is presented in Chapter-7, Page No. C7-7
8	Occupational health	
i	Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.	The exposure level are within the permissible limits.
ii	Details of exposure specific health status evaluation of worker. If the worker's health is being evaluated by pre designed format, chest X-rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analysed data of above mentioned parameters as per age, sex, duration of exposure and department wise.	The workers will undergo regular periodical examination of health by district health officers with respect to factories act. The sample reports have been attached as Annexure-XXV
iii	Annual report of health status of workers with special reference to Occupational Health and Safety	The annual report of health status will be carried out regularly in the operation phase of the project.
iv	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers	Budget of 10.0 lakhs has been allotted for the OHS of the contract workers
9	Corporate Environment Policy	
i	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report	The company have its own Corporate Social Responsibility policy.
ii	Does the Environment Policy prescribe for standard operating process/procedures to bring into focus any infringement/deviation/violation of the environmental of forest norms/conditions? If so, it may be detailed in the EIA.	Yes, the company has the environment policy
iii	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given	The hierarchical system or administrative order of the company are presented in Chapter-9, Pg. No. C9-2
iv	Does the company have system of reporting of non-compliances/violations of	Yes the company have the system of reporting of non compliance of environmental

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	environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	norms to the Board of Directors
10	Details regarding infrastructure facilities such sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase	Details are presented in Chapter-4, Pg. No. C4-4
11	Enterprise Social Commitment (ESC)	
	i. Adequate funds (atleast 2.5% of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon	Plans for enterprise social commitment will be done based upon the comments received during public hearing.
12	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present of the case	Nil
13	A tabular chart with index for point wise compliance of above TORs	Complied.
14	The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated)	Complied
	The following general points shall be noted:	
i	All documents shall be properly indexed, page numbered	
ii	Period/date of data collection shall be clearly indicated	Complied
iii	Authenticated English translation of all material in Regional lagterial in Regional languages shall be provided	
iv	The letter/application for environmental clearance shall quote the MoEF file No. and also attach a copy of the letter	
v	The copy of the letter received from the Ministry shall be also attached as an	

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	annexure to the final EIA-EMP report	
vi	The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP report	
vii	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) vii. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4 th August, 2009, which are available on the website of this Ministry shall also be followed	
viii	The consultants involved in the preparation of Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP report as well as on the cover of the Hard Copy of the Presentation material for EC presentation	Details Provided in Chapter-XII
ix	ix. TORs prescribed by the Expert Appraisal Committee (industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant information as per the Generic Structure of EIA given in Appendix III and IIIA in the EIA Notification, 2006. Where documents provided are in a language other than English, an English translation shall be provided. The duage other than English, an English translation shall be provided. The draft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerraft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing/pulic consul shall conduct the Public Hearing/pulic consultation, district-wise, as per the pr district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing. The issues raised in	Attached as annexures-I

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	the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be included separately in EIA-EMP report in a separate chapter and summarised in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance	
Additional ToR		
1	The Proponent shall furnish the production detail submitted in the commercial Tax department for the last 5 years.	The production details of the past years has been attached as Annexure-XVII
2	The Proponent shall submit the copy of the consent to operate and latest renewal consent order issued by the TNPCB.	The latest consent to operate has been obtained from TNPCB and renewed up to March 2023. The copy of the document attached as Annexure-II(A)
3	The proponent shall submit the compliance report from TNPCB for the condition imposed in the consent order issued by the TNPCB and the environmental clearance.	The consent compliance has been attached as Annexure -II(B)
4	The proponent shall submit CRZ clearance for the expansion activity under CRZ notification with compliance status since it attract the CRZ notification. The layout of the plant should be super imposed in V map.	The proceedings of the CRZ clearance has been obtained in 2016 for the expansion process. The CRZ map and demarcation of HTL details has been attached as Annexure-VII
5	The proponent shall implement the cleaner technologies for the expansion activity and the detail should be included in the EIA report.	Existing 35 Nos of old stacks has been replaced with the new stacks with appropriate environmental control measures. In order to control the emissions the unit has installed pulse jet bag filters for shot blasting and sand plant. Cyclone separators has been provided to the SNAG grinders and necessary vent provided for the all the process emission areas. Proponent has invested about 1.36 crores for reducing the air pollution.
6	The Proponent shall furnish the flood management plan in consideration with flood level in 2015 at the project site.	The flood management plan has been prepared and attached as Annexure-XVIX
7	The Environmental pollution control measures proposed to deal with increased air pollution, effluent generation and slag generation should be detailed.	Appropriate air pollution control measures has been provided to the machineries to mitigate the emissions from the process area. The effluent generated from the plant process will be treated in the ETP of 32 KLD. The treated water will be reused in plant process. No effluent will be discharged outside the plant premises.

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		The furnace slag generated in the melting process will be sold to authorized vendors. details of Solid waste management are presented in Chaper -2, page no:C2-15
8	Even though the industry has been there for long years, no adequate green belt has been developed. The proponent is directed to submit the detailed report on the present greenbelt developed including number of trees with age, area covered and species. In addition, a detailed proposal for green belt development should be submitted along with EIA. Green belt should be established along the boundaries to neutralize pollutants. Hence green trees with good foliage and broad leaves should be planted. Trees like teak, Coconut, Delonix regia, Rain tree may be avoided. Trees like Neem, poverasu, magilam, ficus retusa. Ficus religiosa, mahogany, pungan may be planted as per norms. The dimensions & DGPS (different global Positioning System) co-ordinates of areas allocated for green belt (33%) shall be provided.	<p>The Industry has planted about 10000 trees in the plant premises. An area of about 4.90ha (35.3 % of the total area) has been allotted for greenbelt development. Various plant species has been planted and maintained in the industry. Recently, ALL has developed Miyawaki method of plantation in an area of 360 m² 960 trees of different species. The survival rate of the plant is species is out 90%.</p> <p>Further, in the expansion phase additionally 1000 trees will be planted in the boundaries of the plant premises to mitigate the pollutions from the industry.</p>
9	Regarding CER activities, the proponent is instructed to submit the details of activities so far carried out with copies of the receipts. They should concentrate more on infrastructure facilities useful to the local community. Detailed proposal shall be submitted.	ALL has involved in various CSR activities such as environmental awarness programmes, development programme for school students, AIDS & road safety awarness for convoy drivers. They have successfully carried out the Road to School, conductance of health camps in nearby villages, Construction of school buildings and community halls etc.,
10	The project proponent has to strengthen the air pollution control measures of the existing system and furnish an adequacy report on the revamped system from a reputed institution like Anna University or IIT, Madras along with the EIA report. The revamping of the existing air pollution control measures should include the interlinking of position of the hood system and furnace to ensure that the emission from the furnace shall be treated and routed through wet scrubber and stack.	<p>ALL has invested about 11 crores on the APC measures to reduce the air pollution by the revamping of dust extraction sysytem of sand plant, core shop, fettling and melting shop.</p> <p>The adequacy report for the existing APC measures has been issued by Annamalai University and attached as Annexure-XX</p>
Additional TORs for Intergrated Steel Plant		
1	The Proponent shall obtain the compliance of the conditions specified in the consent orders obtained for the existing activity.	Complied.
2	The project proponent shall store the raw material and finished goods in closed shed inside the unit's premises.	The raw materials and the finished goods will be stored in the closed sheds areas only. An area of 0.34 ha has been allotted for the

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		storage.
3	The separate energy meter shall be provided for APC measures.	Separate Energy meters will be provided for the APC measures
4	The project proponent shall furnish the details of safety measures proposed for its expansion activity.	The details of the safety measures followed in the proposed expansion activity is given in Chapter- 7, page No-C7-19
5	The project proponent shall furnish the furnace slag utilization details.	The furnace slag generated from the melting process will be collected and send to the authorized vendors for safer disposal.
6	The project proponent shall adhere the SOP for the metallurgical industries issued by MoEF&CC.	Agree to comply.
7	The PP shall incorporate the details of sewage, effluent generation & its disposal details of existing & expansion activities in the EIA report.	The details of sewage, effluent management is given chapter-2, Table-2.11 Page No:C2-15
8	The PP shall furnish the details of existing machineries & proposed machineries for expansion activities in EIA report.	The details of the machineries in the existing industry has been attached as Annexure-XXII . No additional machineries will be proposed in the expansion process except DG set of 2x 1250 KVA
9	PP shall furnish details of existing area for storage of raw material, storage of finished products, storage of hazardous waste, solid waste, ETP & STP, proposed & existing APC measures online monitoring systems provided & proposed in EIA report.	An area of 3400 m ² has been allotted for the raw material, finished product storage area. Online monitoring of APC will be installed in the porposed expansion phase of the project.
10	Proposal of interlock system for the APC measure provided for the furnace.	Interlocking system will be provided for the APC measures attached with the furnace
11	Permissible land use classification certificate for the establishment of this industry from the competent authority.	The land use certificate for the existing industry has been attached as Annexure-IV
12	Proper plans for disposal of slag including the reuse of the slag for purpose which may not create any environmental problem in future.	The slag will be safely disposed to the authorized vendor .The generated slag will be stored in the storage area and no slag shall be disposed outside the plant premises.
13	Environmental cell details shall be provided with Designation and Qualification.	The environment cell has been formed to look after the environment related activities in the plant premises. The details are provided in chapter-10 Page no:C10-2.
14	The details of Environmental Pollution control measures proposed to deal with increased Air pollution, effluent generation and slag generation.	Adequate air pollution control measures will be provided to the process area. An amount of 2620 lakhs has been allotted for the environmnet pollution control measures.
15	Details of adequate solid waste storage area like space requirement. Under what conditions it will be stored and how it will be managed. Detailed methodology for handling and storing of solid waste shall	Used sand ,Furnace slag, Grinding Dust are the waste generated from the plant process. The used sand will be stored in the closed shed area of 950 sq.m and the slag from the furnace will be stored in the 1400 sq.m. The

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	be furnished.	Generated waste will be sold to the authorized vendors for further process. No waste will be discharged outside the plant premises.
16	The proponent shall furnish the record for the disposal of hazardous waste to M/s TNWML for the last five years.	The hazardous waste disposed to the TNWML has been attached as Annexure-XV
17	The project proponent shall furnish the occupational & Health management plan for the existing and the proposed activity.	The details are provided in the chapter-9. The test report of the employees attached as Annexure-XXV
18	The proponent shall furnish the green belt area developed and the details of the trees along with photograph and name of the species, age, number of trees to be furnished. The proponent shall earmark the green belt area with GPS coordinates in the layout plan and the same shall be submitted along with the EIA report.	The details provided in the chapter-6 page no-C6-9

ANNEXURE – II(A)

LATEST CONSENT ISSUED BY TNPCCB



TAMIL NADU POLLUTION CONTROL BOARD

Category of the Industry :

RED

CONSENT ORDER NO. 2108231427918 DATED: 25/08/2021.

PROCEEDINGS NO.T2/TNPCB/F.0381AMB/RL/AMB/A/2021 DATED: 25/08/2021

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT –M/s. ASHOK LEYLAND LIMITED - FOUNDRY DIVISION , S.F.No. 39A & 39B, KATHIVAKKAM village, Thiruvottiyur Taluk and Chennai District - Renewal of Consent for the operation of the plant and discharge of emissions under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987 (Central Act 14 of 1981) –Issued- Reg.

REF: 1. TNPCB Proc No.T5/TNPCB/F.0381AMB/RL/AMB/W&A/2020 dated:10.02.2020
2. Application No.31427918 dated: 17.2.2020 for RCO
3. IR.No : F.0381AMB/RL/AEE/AMB/2021 dated 23.07.2021

RENEWAL OF CONSENT is hereby granted under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987 (Central Act 14 of 1981) (hereinafter referred to as “The Act”) and the rules and orders made there under to

The Factory Manager
M/s.ASHOK LEYLAND LIMITED - FOUNDRY DIVISION,
S.F.No. 39A & 39B,
KATHIVAKKAM village,
Thiruvottiyur Taluk,
Chennai District.

Authorizing the occupier to operate the industrial plant in the Air Pollution Control Area as notified by the Government and to make discharge of emission from the stacks/chimneys.

This is subject to the provisions of the Act, the rules and the orders made there under and the terms and conditions incorporated under the Special and General conditions stipulated in the Consent Order issued earlier and subject to the special conditions annexed.

This RENEWAL OF CONSENT is valid for the period ending March 31, 2024

**For Member Secretary,
Tamil Nadu Pollution Control Board,
Chennai**

SPECIAL CONDITIONS

1. This renewal of consent is valid for operating the facility for the manufacture of products (Col. 2) at the rate (Col. 3) mentioned below. Any change in the products and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
Product Details			
1.	Ferrous and non ferrous castings required for automobile and engineering industries	33500	MT/Annum

2. This renewal of consent is valid for operating the facility with the below mentioned emission/noise sources along with the control measures and/or stack. Any change in the emission source/control measures/change in stack height has to be brought to the notice of the Board and fresh consent/Amendment has to be obtained.

I Point source emission with stack :				
Stack No.	Point Emission Source	Air pollution Control measures	Stack height from Ground Level in m	Gaseous Discharge in Nm3/hr
1	Induction Furnace 1 - 3 T	Wet scrubber with stack	16	
2	Induction Furnace 2 - 3 T	Wet scrubber with stack	16	
3	Induction Furnace 3 - 5 T	Wet scrubber with stack	16	
4	Sand Recycling Plant	Bag Filters with stack	17	
5	Sand Multi Cooler	Bag Filters with stack	8.5	
6	IMF No bake Moulding Line Shack Out	Bag Filters with stack	14.6	
7	Air Blowing Booth 1	Bag Filters with stack	8.5	
8	Paint Booth - 1	Water curtain with stack	7.5	
9	Paint Booth - 2	Water curtain with stack	7.5	
10	Shot Blasting Machine - 1	Bag Filters with stack	12.5	
11	Shot Blasting Machine - 2	Bag Filters with stack	12.5	
12	Tum blasting Machine - 1	Bag Filters with stack	12.5	
13	Tum blasting Machine - 2	Bag Filters with stack	11	
14	Thermic Oven Senior	Stack	12.5	
15	Thermic Oven Junior - 1	Stack	12.5	
16	Thermic Oven Old (Hyundai)	Stack	12.5	
17	Thermic Oven New (Hyundai)	Stack	12.5	
18	Thermic Oven Leg Core	Stack	12.5	
19	Thermic Oven Saddle Core	Stack	12.5	
20	Thermic Oven IMF Core	Stack	12.5	
21	Sand Batch Type Oven	Stack	12.5	
22	SNAG Grinder - 1	Cyclone separator with stack	11.5	
23	SNAG Grinder - 2	Cyclone separator with stack	8.8	
24	SNAG Grinder - 3	Cyclone separator with stack	8.8	
25	SNAG Grinder - 4	Cyclone separator with stack	11.8	
26	SNAG Grinder - 5	Cyclone separator with stack	11.8	
27	SNAG Grinder - 6	Cyclone separator with stack	11.8	
28	Swing Frame Grinders - 1 & 2	Common cyclone separator with stack	12.5	
29	Swing Frame Grinder - 3	Cyclone separator with stack	12.5	

30	Swing Frame Grinder - 4	Cyclone separator with stack	12.5	
31	Head Shake Out & Blowing	Cyclone separator with stack	11.5	
32	Beaver Sand Mill	Vent filter with stack	12.5	
33	New Sand Hopper (Hyundai)	Vent filter with stack	12	
34	Induction Furnace 4 - 5 T	Wet scrubber with stack	17.5	
35	Induction Furnace 5 - 5 T	Wet scrubber with stack	17.5	
36	Sand Recycling Plant 2	Bag Filters with stack	17.5	
37	Sand Multi Cooler - 2	Bag Filters with stack	12.5	
38	GZ Moulding Line Shake Out	Bag Filters with stack	11.5	
39	Air Blowing Booth 2	Cyclone separator with stack	6	
40	Paint Booth - 3	Water curtain with stack	6	
41	Shot Blasting Machine - 3	Bag Filters with stack	11.8	
42	Shot Blasting Machine - 4	Bag Filters with stack	11.8	
43	Shot Blasting Machine - 5	Bag Filters with stack	11.8	
44	Tum blasting Machine - 3	Bag Filters with stack	10.8	
45	Thermic Oven Leg - 1	Stack	13	
46	Thermic Oven Leg - 2	Stack	13	
47	Thermic Oven Escorts	Stack	12.5	
48	Thermic Oven M/C 32	Stack	11.4	
49	Thermic Oven M/C 33	Stack	12.5	
50	Thermic Oven Jr. Jacket	Stack	11.4	
51	Pre heating Welding Oven	Stack	9.5	
52	Post heating Welding Oven	Stack	9.5	
53	SNAG Grinder - 7	Cyclone separator with stack	8.6	
54	SNAG Grinder - 8	Cyclone separator with stack	8.6	
55	Swing Frame Grinders - 5 & 6	Common cyclone separator with stack	9.4	
56	Swing Frame Grinders - 7 & 8	Common cyclone separator with stack	9.3	
57	Swing Frame Grinder - 9	Cyclone separator with stack	9.5	
58	Swing Frame Grinders - 10 & 11	Common cyclone separator with stack	11.8	
59	Sand Mill - 1	Vent filter with stack	11.7	
60	Sand Mill - 2	Vent filter with stack	11.7	

61	WESMAN Stress Relieving Furnace - 1	Stack	9.5	
62	WESMAN Stress Relieving Furnace - 2	Stack	11.7	
63	GZ Line Pouring Exhaust 1	Stack	11.5	
64	GZ Line Pouring Exhaust 2	Stack	11.5	
II	Fugitive/Noise emission :			
Sl. No.	Fugitive or Noise Emission sources	Type of emission	Control measures	

Special Additional Conditions:

The unit shall install the approved retrofit emission control device/equipment with at least 70% Particulate matter reduction efficiency on all DG sets with capacity of 125 KVA and above or otherwise the unit shall be shift to gas based generators within the time frame prescribed in the notification No. TNPCB/Labs/DD(L)02151/2019 dated 10.06.2020 issued by TNPCB.

Additional Conditions:

1. The unit shall maintain the production level of ferrous and non-ferrous castings to the permitted level of 33,500 MT/Annum and furnish records in this regard regularly to TNPCB.
2. The unit shall operate the required furnaces & machineries for achieving permitted production level of 33,500 MT/Annum and conduct study of installed capacity (of the plant thro'' reputed institution and furnish report.
3. The unit shall obtain Environmental Clearance under CRZ Notification and EIA Notification and Consent to Operate (Expansion) under Water Act & Air Act for commissioning of modernisation activity involving increase in production quantity of products.
4. The unit shall operate and maintain the existing Air Pollution Control measures provided to process emission sources effectively and continuously so as to adhere to the National Ambient Air Quality / Stack Emission/ Ambient Noise Level standards prescribed by the Board from time to time.
5. The unit shall improve the existing Air Pollution Control Measures provided in the sand plant I & II for effective control of fugitive emission
6. The unit shall provide adequate APC measure to arrest the leakage of dust/fugitive emission from the sand plant, core shop, felting shop and melting shop and comply with AAQ standards prescribed by the Board.
7. The unit shall maintain Online Emission Monitoring System [OEMS] provided for furnace stack emissions properly for ensuring connectivity with CAC, TNPCB for transmission of emission data without any interruption at all times.
8. It shall be ensured that adequate OEMS are installed at all process emission outlets for continuous monitoring emission parameters such as PM, SO₂ & Nox with CAC, TNPCB
9. The unit shall apply & obtain fresh consent for the alteration in the process stack emissions (reduction in numbers from 64 to 45) due to modernisation activity.
10. The unit shall comply with directions issued by TNPCB vide Proc dated 29.7.2019.
11. The unit's activity shall not attract any complaint from nearby habitations/public. It shall be ensured that the unit's activities shall not cause any adverse environmental impact to the natural ecosystem and shall have remedial action plan for any damages.
12. The unit shall continue to develop adequate greenbelt [25% of the total area] within the premises.

**For Member Secretary,
Tamil Nadu Pollution Control Board,
Chennai**

To
The Factory Manager,
M/s.ASHOK LEYLAND LIMITED - FOUNDRY DIVISION,
NO.1, Sardar Patel Road,
Guindy, Chennai-600 032.,
Pin: 600057

Copy to:

- 1.The Commissioner, CHENNAI CORPORATION, Thiruvottiyur Taluk, Chennai District .
 2. The District Environmental Engineer, Tamil Nadu Pollution Control Board, AMBATTUR.
 3. The JCEE-Monitoring, Tamil Nadu Pollution Control Board, Chennai.
 4. File
-

** This consent order is computer generated by OCMMS of TNPCB and no signature is needed**



TAMIL NADU POLLUTION CONTROL BOARD

Category of the Industry :

RED

CONSENT ORDER NO. 2108131427918 DATED: 25/08/2021.

PROCEEDINGS NO.T2/TNPCB/F.0381AMB/RL/AMB/W/2021 DATED: 25/08/2021

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT – M/s. ASHOK LEYLAND LIMITED - FOUNDRY DIVISION , S.F.No. 39A & 39B, KATHIVAKKAM village, Thiruvottiyur Taluk and Chennai District - Renewal of Consent for the operation of the plant and discharge of sewage and/or trade effluent under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988 (Central Act 6 of 1974) – Issued- Reg.

REF: 1. TNPCB Proc No.T5/TNPCB/F.0381AMB/RL/AMB/W&A/2020 dated:10.02.2020
2. Application No.31427918 dated: 17.2.2020 for RCO
3. IR.No : F.0381AMB/RL/AEE/AMB/2021 dated 23.07.2021

RENEWAL OF CONSENT is hereby granted under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988 (Central Act, 6 of 1974) (hereinafter referred to as “The Act”) and the rules and orders made there under to

The Factory Manager
M/s.ASHOK LEYLAND LIMITED - FOUNDRY DIVISION,
S.F.No. 39A & 39B,
KATHIVAKKAM village,
Thiruvottiyur Taluk,
Chennai District.

Authorising the occupier to make discharge of sewage and /or trade effluent.

This is subject to the provisions of the Act, the rules and the orders made there under and the terms and conditions incorporated under the Special and General conditions stipulated in the Consent Order issued earlier and subject to the special conditions annexed.

This RENEWAL OF CONSENT is valid for the period ending March 31, 2024

**For Member Secretary,
Tamil Nadu Pollution Control Board,
Chennai**

SPECIAL CONDITIONS

1. This renewal of consent is valid for operating the facility for the manufacture of products/byproducts (Col. 2) at the rate (Col 3) mentioned below. Any change in the product/byproduct and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
Product Details			
1.	Ferrous and non ferrous castings required for automobile and engineering industries	33500	MT/Annum

2. This renewal of consent is valid for operating the facility with the below mentioned outlets for the discharge of sewage/trade effluent. Any change in the outlets and the quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Outlet No.	Description of Outlet	Maximum daily discharge in KLD	Point of disposal
Effluent Type : Sewage			
1.	Sewage	350.0	Combined STP
Effluent Type : Trade Effluent			
1.	Trade Effluent	12.0	On land for gardening

Additional Conditions:

1. The unit shall maintain the production level of ferrous and non-ferrous castings to the permitted level of 33,500 MT/Annum and furnish records in this regard regularly to TNPCB.
2. The unit shall operate the required furnaces & machineries for achieving permitted production level of 33,500 MT/Annum and conduct study for the installed capacity of the plant (taking into account of melting capacities of all furnaces, saleable castings produced, induction furnaces with panel board capacities etc) thro'' reputed institution and furnish report.
3. The unit shall obtain Environmental Clearance under CRZ Notification and EIA Notification and Consent to Operate (Expansion) under Water Act & Air Act for commissioning of modernization activity involving increase in production quantity of products.
4. The unit shall ensure that the sewage generated from foundry division (350 KLD) is treated in the combined Sewage Treatment Plant being operated at main plant effectively for achieving the discharge standards prescribed by the Board at all times and treated sewage is utilised for gardening/green belt development within the premises.
5. The unit shall operate and maintain the Effluent Treatment Plant effectively and continuously for the treatment of trade effluent (12 KLD) so as to bring the quality of treated effluent to satisfy the discharge standards prescribed by the Board at all times.
6. The unit shall utilise the treated effluent for gardening/green belt development within the premises as permitted and adopt recycle of treated effluent in the utility areas to the maximum extent possible.
7. The unit shall collect and store the solid wastes such as furnace slag, grinding dust and used sand properly in the closed area and dispose for beneficial use then and there without accumulation within the premises and maintain records of generation & disposal in this regard.
8. The unit shall comply with the provisions of the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016 for handling of hazardous wastes such as used/spent oil, waste containing oil residues, paint sludge, ETP sludge and empty barrels/containers etc and operate with valind Authorisation under HOWM Rules, 2016.
9. The unit shall comply with directions issued by TNPCB vide Proc dated 29.7.2019.
10. The unit's activity shall not attract any complaint from nearby habitations/public. It shall be ensured that the unit's activities shall not cause any adverse environmental impact to the natural ecosystem and shall have remedial action plan for any damages.
11. The unit shall not commence the expansion production without obtaining CTO-Expansion under Water & Air Acts from TNPCB.
12. The unit shall not 'single use and throwaway plastic items' such as plastic sheets used for food wrapping, spreading on dining table etc., plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead unit shall encourage use of eco friendly alternative such as banana leaf, areca nut palm plate, stainless steel, glass, porcelain plates/ cups, cloth bag, jute bag etc.

**For Member Secretary,
Tamil Nadu Pollution Control Board,
Chennai**

To
The Factory Manager,
M/s.ASHOK LEYLAND LIMITED - FOUNDRY DIVISION,
NO.1, Sardar Patel Road,
Guindy, Chennai-600 032.,
Pin: 600057

Copy to:

- 1.The Commissioner, CHENNAI CORPORATION, Thiruvottiyur Taluk, Chennai District .
2. The District Environmental Engineer, Tamil Nadu Pollution Control Board, AMBATTUR.
3. The JCEE-Monitoring, Tamil Nadu Pollution Control Board, Chennai.
4. File

** This consent order is computer generated by OCMMS of TNPCB and no signature is needed**

ANNEXURE – II(B)

COMPLIANCE TO CONSENT



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

Ref: ALFD/EHS/01/22

July 11th, 2022.

To

**The District Environmental Engineer,
TamilNadu Pollution Control Board,
77A, South Avenue Road, Ambattur Industrial Estate,
Chennai — 600 058.**

Sr,

Sub: Certified Compliance Report of the consent for the Environmental Clearance Process - reg.

Ref: PROCEEDINGS NO.T2/TNPCB/F.0381AMB/RI/AMB/A & W/2021 DATED: 25/08/2021

* * *

With reference to the above-mentioned subject, we are operating M/s. ASHOK LEYLAND LIMITED - FOUNDRY DIVISION, S.F.No. 39A & 39B, KATHIVAKKAM village, Thiruvottiyur Taluk. We have obtained the Consent for the existing Foundry unit on 25/08/2021

Further, we would like to inform you that we have proposed for an expansion of our M/s.Ashok Leyland Limited - Foundry Division for the capacity enhancement within the existing premises.

In view of above, for the proposed expansion it is mandatory to submit the Certified Compliance Report from TNPCB. Therefore, we request you to kindly provide the Certified Compliance Report for the consent of existing production capacity of 33500 MT for obtaining the Environmental Clearance for our expansion project.

The compliance to the Consent has been enclosed.

Kindly acknowledge and do the needful at the earliest.

Thanking you

Yours faithfully,
For Ashok Leyland Ltd- Foundry Division,


11/7/22
T.Thangatamilan
EHS Manager



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500

Registered & Corporate Office : No.1, Sardar Patel Road, Guindy, Chennai - 600 032, India | T : +91 44 2220 6000 | F : +91 44 2220 6001

CIN : L34101TN1948PLC000105 | www.ashokleyland.com



HINDUJA GROUP

COMPLIANCE STATUS REPORT

Air CONSENT ORDER NO. 2108231427918 DATED: 25/08/2021.
Water CONSENT ORDER NO. 2108131427918 DATED: 25/08/2021.

AIR CONSENT

Sl. No.	Special Conditions (Air)	Status																																																							
1.	<p>This renewal of consent is valid for operating the facility for the manufacture of products (Col. 2) at the rate (Col. 3) mentioned below. Any change in the products and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 5%;">Sl. No.</th> <th style="width: 45%;">Description</th> <th style="width: 20%;">Quantity</th> <th style="width: 30%;">Unit</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">Product Details</td> </tr> <tr> <td style="text-align: center;">1.</td> <td>Ferrous and non-ferrous castings required for automobile and engineering industries.</td> <td style="text-align: center;">33500</td> <td style="text-align: center;">MT/Annum</td> </tr> </tbody> </table>	Sl. No.	Description	Quantity	Unit	Product Details				1.	Ferrous and non-ferrous castings required for automobile and engineering industries.	33500	MT/Annum	<p>There will not be a change in production capacity or in products.</p>																																											
Sl. No.	Description	Quantity	Unit																																																						
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2.	<p>This renewal of consent is valid for operating the facility with the below mentioned emission/noise sources along with the control measures and/or stack. Any change in the emission source/control measures/change in stack height has to be brought to the notice of the Board and fresh consent/Amendment has to be obtained.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="5" style="text-align: left;">Point source emission with stack :</th> </tr> <tr> <th style="width: 5%;">Stack No.</th> <th style="width: 25%;">Point Emission Source</th> <th style="width: 25%;">Air pollution Control measures</th> <th style="width: 15%;">Stack height from Ground Level in m</th> <th style="width: 30%;">Gaseous Discharge in Nm³/hr</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Induction Furnace 1 - 3 T</td> <td>Wet scrubber with stack</td> <td style="text-align: center;">16</td> <td></td> </tr> <tr> <td style="text-align: center;">2</td> <td>Induction Furnace 2 - 3 T</td> <td>Wet scrubber with stack</td> <td style="text-align: center;">16</td> <td></td> </tr> <tr> <td style="text-align: center;">3</td> <td>Induction Furnace 3 - 5 T</td> <td>Wet scrubber with stack</td> <td style="text-align: center;">16</td> <td></td> </tr> <tr> <td style="text-align: center;">4</td> <td>Sand Recycling Plant</td> <td>Bag Filters with stack</td> <td style="text-align: center;">17</td> <td></td> </tr> <tr> <td style="text-align: center;">5</td> <td>Sand Multi Cooler</td> <td>Bag Filters with stack</td> <td style="text-align: center;">8.5</td> <td></td> </tr> <tr> <td style="text-align: center;">6</td> <td>IMF No bake Moulding Line Shack Out</td> <td>Bag Filters with stack</td> <td style="text-align: center;">14.6</td> <td></td> </tr> <tr> <td style="text-align: center;">7</td> <td>Air Blowing Booth 1</td> <td>Bag Filters with stack</td> <td style="text-align: center;">8.5</td> <td></td> </tr> <tr> <td style="text-align: center;">8</td> <td>Paint Booth - 1</td> <td>Water curtain with stack</td> <td style="text-align: center;">7.5</td> <td></td> </tr> <tr> <td style="text-align: center;">9</td> <td>Paint Booth - 2</td> <td>Water curtain with stack</td> <td style="text-align: center;">7.5</td> <td></td> </tr> </tbody> </table>	Point source emission with stack :					Stack No.	Point Emission Source	Air pollution Control measures	Stack height from Ground Level in m	Gaseous Discharge in Nm ³ /hr	1	Induction Furnace 1 - 3 T	Wet scrubber with stack	16		2	Induction Furnace 2 - 3 T	Wet scrubber with stack	16		3	Induction Furnace 3 - 5 T	Wet scrubber with stack	16		4	Sand Recycling Plant	Bag Filters with stack	17		5	Sand Multi Cooler	Bag Filters with stack	8.5		6	IMF No bake Moulding Line Shack Out	Bag Filters with stack	14.6		7	Air Blowing Booth 1	Bag Filters with stack	8.5		8	Paint Booth - 1	Water curtain with stack	7.5		9	Paint Booth - 2	Water curtain with stack	7.5		<p>Complied. The emission will be controlled using suitable APC measures and let through the Stack.</p> <p>The stack emissions will be maintained within the limits prescribed by the Board.</p>
Point source emission with stack :																																																									
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COMPLIANCE STATUS REPORT

Air CONSENT ORDER NO. 2108231427918 DATED: 25/08/2021.
Water CONSENT ORDER NO. 2108131427918 DATED: 25/08/2021.

10	Shot Blasting Machine - 1	Bag Filters with stack	12.5	
11	Shot Blasting Machine - 2	Bag Filters with stack	12.5	
12	Tum blasting Machine - 1	Bag Filters with stack	12.5	
13	Tum blasting Machine - 2	Bag Filters with stack	11	
14	Thermic Oven Senior	Stack	12.5	
15	Thermic Oven Junior - 1	Stack	12.5	
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30	Swing Frame Grinder - 4	Cyclone separator with stack	12.5	
31	Head Shake Out & Blowing	Cyclone separator with stack	11.5	
32	Beaver Sand Mill	Vent filter with stack	12.5	
33	New Sand Hopper (Hyundai)	Vent filter with stack	12	

COMPLIANCE STATUS REPORT

Air CONSENT ORDER NO. 2108231427918 DATED: 25/08/2021.
Water CONSENT ORDER NO. 2108131427918 DATED: 25/08/2021.

34	Induction Furnace 4 - 5 T	Wet scrubber with stack	17.5	
35	Induction Furnace 5 - 5 T	Wet scrubber with stack	17.5	
36	Sand Recycling Plant 2	Bag Filters with stack	17.5	
37	Sand Multi Cooler - 2	Bag Filters with stack	12.5	
38	GZ Moulding Line Shake Out	Bag Filters with stack	11.5	
39	Air Blowing Booth 2	Cyclone separator with stack	6	
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42	Shot Blasting Machine - 4	Bag Filters with stack	11.8	
43	Shot Blasting Machine - 5	Bag Filters with stack	11.8	
44	Tum blasting Machine - 3	Bag Filters with stack	10.8	
45	Thermic Oven Leg - 1	Stack	13	
46	Thermic Oven Leg - 2	Stack	13	
47	Thermic Oven Escorts	Stack	12.5	
48	Thermic Oven M/C 32	Stack	11.4	
49	Thermic Oven M/C 33	Stack	12.5	
50	Thermic Oven Jr. Jacket	Stack	11.4	
51	Pre heating Welding Oven	Stack	9.5	
52	Post heating Welding Oven	Stack	9.5	
53	SNAG Grinder - 7	Cyclone separator with stack	8.6	
54	SNAG Grinder - 8	Cyclone separator with stack	8.6	
55	Swing Frame Grinders - 5 & 6	Common cyclone separator with stack	9.4	
56	Swing Frame Grinders - 7 & 8	Common cyclone separator with stack	9.3	
57	Swing Frame Grinder - 9	Cyclone separator with stack	9.5	

COMPLIANCE STATUS REPORT

Air CONSENT ORDER NO. 2108231427918 DATED: 25/08/2021.
Water CONSENT ORDER NO. 2108131427918 DATED: 25/08/2021.

58	Swing Frame Grinders - 10 & 11	Common cyclone separator with stack	11.8	
59	Sand Mill - 1	Vent filter with stack	11.7	
60	Sand Mill - 2	Vent filter with stack	11.7	
61	WESMAN Stress Relieving Furnace - 1	Stack	9.5	
62	WESMAN Stress Relieving Furnace - 2	Stack	11.7	
63	GZ Line Pouring Exhaust 1	Stack	11.5	
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II Fugitive/Noise emission :				
Sl. No.	Fugitive or Noise Emission sources	Type of emission	Control measures	
Additional Conditions				
1	The unit shall maintain the production level of ferrous and non-ferrous castings to the permitted level of 33,500 MT/Annum and furnish records in this regard regularly to TNPCB.			Complied. There will not be a change in production capacity or in products.
2	The unit shall operate the required furnaces & machineries for achieving permitted production level of 33,500 MT/Annum and conduct study of installed capacity (of the plant thro" reputed institution and furnish report.			Complied. We carried out the capacity study thru Annamalai university for the capacity installed there will not be a change in production capacity or in products.
3	The unit shall obtain Environmental Clearance under CRZ Notification and EIA Notification and Consent to Operate (Expansion) under Water Act & Air Act for commissioning of modernization activity involving increase in production quantity of products.			Complied.
4	The unit shall operate and maintain the existing Air Pollution Control measures provided to process emission sources effectively and continuously so as to adhere to the National Ambient Air Quality / Stack Emission/ Ambient Noise Level standards prescribed by the Board from time to time.			Complied. The unit has been complying with the AAQ standards prescribed by the board and it will maintain the APC measures continuously and effectively.
5	The unit shall improve the existing Air Pollution Control Measures provided in the sand plant I & II for effective control of fugitive emission			Complied
6	The unit shall provide adequate APC measure to arrest the leakage of dust/fugitive emission from the sand plant, core shop, felting shop and melting shop and comply with AAQ standards prescribed by the Board.			Complied. Overflow sensors are installed to control sand spillage from hopper.
7	The unit shall maintain Online Emission Monitoring System [OEMS] provided for furnace stack emissions properly for ensuring connectivity with CAC, TNPCB for transmission of emission data without any interruption at all times.			Complied We installed the OEMS and data transmission on daily basis.
8	It shall be ensured that adequate OEMS are installed at all process			We installed PM dust analyses in the

COMPLIANCE STATUS REPORT

Air CONSENT ORDER NO. 2108231427918 DATED: 25/08/2021.
Water CONSENT ORDER NO. 2108131427918 DATED: 25/08/2021.

	emission outlets for continuous monitoring emission parameters such as PM, SO ₂ & Nox with CAC, TNPCB	stack (induction furnace) and the daily data is being uploaded to CAC and SO ₂ & NO _x is not applicable to the induction furnace.
9	The unit shall apply & obtain fresh consent for the alteration in the process stack emissions (reduction in numbers from 64 to 45) due to modernisation activity.	Yes we will submitted the fresh application while apply for renewal
10	The unit shall comply with directions issued by TNPCB vide Proc dated 29.7.2019.	Agree to Comply.
11	The unit's activity shall not attract any complaint from nearby habitations/public. It shall be ensured that the unit's activities shall not cause any adverse environmental impact to the natural ecosystem and shall have remedial action plan for any damages.	Complied
12	The unit shall continue to develop adequate greenbelt [25% of the total area] within the premises.	Complied. Greenbelt of more than 33% of the total area has been developed in the plant premises. Native tree species such as Gulmohr, Teak, Neem, Mango, Pungam, Puvarasu are being planted and planted in the plant unit. Agree to Comply.

ANNEXURE - III

AMALGAMATION ORDER

National Company Law Tribunal, Division Bench, Chennai

In the matter of the Companies Act, 2013

And

In the matter of Scheme of Amalgamation

Between

M/s Hinduja Foundries Limited

With

M/s Ashok Leyland Limited

Order under section 232

The above named Petitioner Company filed the Company Applications before the Hon'ble Madras High Court which have been transferred to this Tribunal and renumbered as TP(HC)/CAA/73/2017. All the statutory requirements under law have been fulfilled and the Hon'ble High Court has already completed the process. The Company complied with all the directions given by the Hon'ble High Court. The Petition came up for hearing before this Tribunal on 18.04.2017.

For the purpose of considering and approving without modification, the Scheme of Amalgamation of M/s Hinduja Foundries Limited, the Transferor Company, by transferring and vesting operation with M/s Ashok Leyland Limited, the Transferee company,

Upon perusal and upon hearing P.H. Arvinth Pandian, Counsel for the Petitioner Company on 18.04.2017,

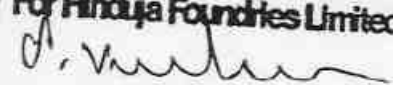
THIS TRIBUNAL DO ORDER

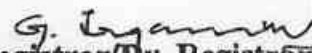
- 1) That the Scheme of Arrangement & Amalgamation as annexed with the Petition alongwith Schedules is hereby sanctioned.
- 2) That all the property, rights and powers of the transferor company specified in the schedule hereto and all other property, rights and powers of the Transferor company be transferred without further act or deed to the Transferee company and accordingly the same shall pursuant to section 232 of the Act, be transferred to and vested in the Transferee company for all the estate and interest of the Transferor company therein but subject nevertheless to all charges now affecting the same ; and
- 3) That all the liabilities and duties of the Transferor company be transferred without further act or deed to the Transferee company and accordingly the same shall pursuant to section 232 of the Act, be transferred to and become the liabilities and duties of the Transferee company; and
- 4) That all proceedings now pending by or against Transferor company be continued by or against the Transferee company; and
- 5) That the Transferee company do without further application allot to such members of the Transferor company as have not given such notice of dissent as is required by the said compromise or arrangement herein the shares in the Transferee Company to which they are entitled under the said Compromise or Arrangement; and
- 6) The same shall be binding on the shareholders and the Secured & Unsecured Creditors of the Transferee Company and the Transferor Company; and
- 7) The Petitioner Companies do file with the Registrar of Companies the certified copy of this Order alongwith the amended Articles of Association within 30 days of the receipt of the order; and
- 8) This Tribunal do further order that the parties to the Scheme of Amalgamation or other persons interested shall be at liberty to apply to this Tribunal for any directions that may be necessary with regard to the working of the said Scheme.

SCHEDULE

The Scheme of Arrangement and Amalgamation as sanctioned by the Tribunal contains the details of the properties, stocks, shares, debentures and other charges in action of the transferor company.

Dated this 24th day of April, 2017, NCLT, DB, Chennai.

CERTIFIED TRUE COPY
For Hinduja Foundries Limited

S.VENKATASUBRAMANIAN
COMPANY SECRETARY


Registrar/Dy. Registrar

DEPUTY REGISTRAR
NATIONAL COMPANY LAW TRIBUNAL
CHENNAI BENCH
CORPORATE BUILDING, 3RD FLOOR
88, RAJAGOPALAI, CHENNAI-600001

ANNEXURE - IV

LANDUSE MAP

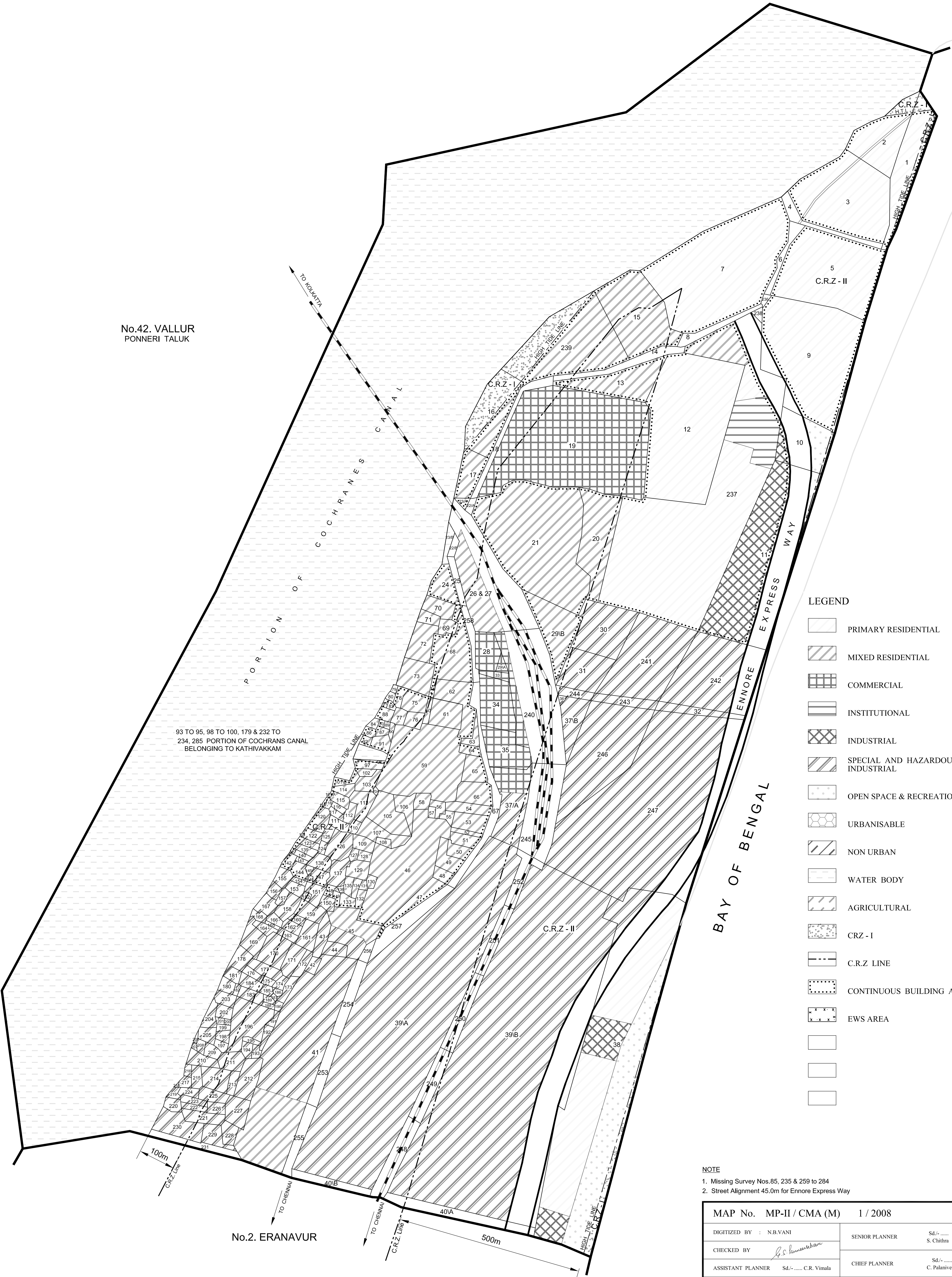
KATHIVAKKAM

VILLAGE No. 1
AMBATTUR TALUK
THIRUVALLORE DISTRICT
KATHIVAKKAM MUNICIPALITY

No.42. VALLUR
PONNERI TALUK

93 TO 95, 98 TO 100, 179 & 232 TO
234, 285 PORTION OF COCHRANS CANAL
BELONGING TO KATHIVAKKAM

No.2. ERANAVUR



LEGEND

- PRIMARY RESIDENTIAL
- MIXED RESIDENTIAL
- COMMERCIAL
- INSTITUTIONAL
- INDUSTRIAL
- SPECIAL AND HAZARDOUS INDUSTRIAL
- OPEN SPACE & RECREATIONAL
- URBANISABLE
- NON URBAN
- WATER BODY
- AGRICULTURAL
- CRZ - I
- C.R.Z. LINE
- CONTINUOUS BUILDING AREA
- EWS AREA

NOTE
 1. Missing Survey Nos.85, 235 & 259 to 284
 2. Street Alignment 45.0m for Ennore Express Way

MAP No. MP-II / CMA (M) 1 / 2008		
DIGITIZED BY : N.B.VANI	SENIOR PLANNER	Sd/- S. Chitra
CHECKED BY : <i>S. Suresh Kumar</i>	CHIEF PLANNER	Sd/- C. Palanivelu
ASSISTANT PLANNER	Sd/- C.R. Vimala	
Sd/- 19.9.2008 Vikram Kapur, I.A.S. MEMBER SECRETARY CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY		
FEET 330 165 0 330 660 100 50 0 100 200 METRES		

MASTER PLAN FOR CMA - 2026

ANNEXURE - V

ENCUMBERANCE CERTIFICATE

சொத்து தொடர்பான வில்லங்கச் சான்றிதழ்

Certificate of Encumbrance on Property

S.R.O/சா.ப.அ: Thiruvottiyur E.C. No./சான்று எண்: **8894** Appln No./மனு எண்: **8894** Date/நாள் : 04/07/2014

Thiru/Tmt. Hinduya Foundaries Chennai having applied to me for a certificate giving particulars of registered acts and encumbrances if any, in respect of undermentioned property.

திரு/திருமதி Hinduya Foundaries Chennai கீழ்க்கண்ட சொத்து தொடர்பாக ஏதேனும் வில்லங்கம் இருப்பின் அதன் பொருட்டு வில்லங்கச் சான்று கோரி விண்ணப்பித்துள்ளார்.

Village/கிராமம்	Survey Details (சர்வே விவரம்)
KATHIVAKKAM	(SNo:39), (SNo:39/A1), (SNo:39/A3A), (SNo:39/A4A), (SNo:39/A6), (SNo:39/A7A), (SNo:39/A7B), (SNo:39/A8), (SNo:39/A9), (SNo:39/A10), (SNo:39/A11.1), (SNo:39/A12.1), (SNo:39/B3), (SNo:39/B5), (SNo:39/B7A1), (SNo:39/B8), (SNo:39/B9B1), (SNo:39/B10A)

Property Description/மனு சொத்து விவரம்: Kathivakkam Village, சர்வே எண். 39A1 = 0.30AC சர்வே எண். 39A3A = 2.31AC சர்வே எண். 39A4A = 1.62AC சர்வே எண். 39A6 = 0.30AC சர்வே எண். 39A7A = 0.16AC சர்வே எண். 39A7B = 4.49AC சர்வே எண். 39A8 = 2.54AC சர்வே எண். 39A9 = 0.95AC சர்வே எண். 39A10.1 = 2.11AC சர்வே எண். 39A11.1 = 0.54AC சர்வே எண். 39A12.1 = 0.06AC சர்வே எண். 39B3 = 5.10AC சர்வே எண். 39B5 = 3.39AC சர்வே எண். 39B7A1 = 0.40AC சர்வே எண். 39B8 = 5.35AC சர்வே எண். 39B9B1 = 4.74AC சர்வே எண். 39B10A = 1.32AC

I hereby certify that a search has been made in Book I and in the indexes relating thereto for 15 years from 01/01/2000 to 02/07/2014 for acts and encumbrances affecting the said property and that on such search the following acts and encumbrances appear / no encumbrance appears.

1 புத்தகம் மற்றும் அதன் தொடர்புடைய அட்டவணைகள் 15 ஆண்டுகளுக்கு 01/01/2000 முதல் 02/07/2014 நாள் வரை இச்சொத்தைப் பொறுத்து பதிவு செய்திட்ட நடவடிக்கைகள் மற்றும் வில்லங்கங்கள் குறித்து தேடுதல் மேற்கொள்ளப்பட்டது. அத்தேடுதல்களின் விளைவாக மனுவில் விவரித்த சொத்தைப் பொறுத்து பின்வரும் விபரங்களும்/வில்லங்கங்களும் உள்ளன எனச் சான்றளிக்கிறேன்.

EC No. : 8894/2014

SLNo/வ.எண்	Description of Prop./ சொத்து விவரம் (Survey No & Area)	ச.சொ.நா / DOE & பதிவு நாள் / DOR	Nature & Value/ தன்மை & மதிப்பு	Name of Executants - எழுதி கொடுத்தவர் (E)/ Claimants - எழுதி வாங்கியவர் (C)	Vol.No- தொகுதி/P.No- பக்கம்	DNo-ஆ.எண் / Yr / ஆண்டு
1	Survey No(s):39/ B3 Survey No(s):39/ B5	04/07/2007 04/07/2007	Conveyance Metro/UA Rs.795672	(E)/M/s. Ennore Foundaries Ltd., (C)The President of India		7748 2007

சொத்தின் தன்மை :
HOUSE SITE
கையாளும் மதிப்பு ரூ.: 795672

ஷேட்பூல் : 1
விஸ்தீரணம் :6168

2	Survey No(s):39/ A Survey No(s):39/ A/1 Survey No(s):39/ A/3 Survey No(s):39/ A/7 Survey No(s):39/ A/8 Survey No(s):39/ A/9 Survey No(s):39/ A/10PART Survey No(s):39/ A/11PART Survey No(s):39/ A/12	18/10/2013 18/10/2013	Deposit of Title Deeds if loan is repayable on demand Rs.1684000000	(E)/M/S. HINDUJA FOUNDRIES LTD., - K.R. RAVI SHANKAR (C)STATE BANK OF INDIA		7596 2013
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சொத்தின் தன்மை :
HOUSE SITE
கையாளும் மதிப்பு ரூ.: 1684000000
ஆவண விவரம் : deposit of title deeds
ஷேட்பூல் : 1

SLNo/ வ எண்	Description of Prop./ சொத்து விவரம் (Survey No & Area)	ச.மொ.நா / DOE & பதிவு நாள் / DOR	Nature & Value/ தன்மை & மதிப்பு	Name of Executants - எழுதி கொடுத்தவர் (E)/ Claimants - எழுதி வாங்கியவர் (C)	Vol.No- தொகுதி/P.No- பக்கம்	DNo-ஆ எண்/ Yr / ஆண்டு
	விஸ்தீரணம் :30 cents					
	எல்லைகள் : வடக்கில் : சர்வே எண்.37-A - தெற்கில் : சர்வே எண்.39/A/2 - கிழக்கில் : Ennore High Road - மேற்கில் : Railway Lands					
	ஷேட்பூல் விவரம் : இதன் மத்தியில் சர்வே எண்.39-A/3 -ல் அடங்கிய ஏக்.2.31 செண்ட் நிலம் ஷேட்பூல் : 2 விஸ்தீரணம் :2.31 Acres					
	எல்லைகள் : வடக்கில் : சர்வே எண்.39/A/2 - தெற்கில் : சர்வே எண்.39/A/4 - கிழக்கில் : Ennore High Road - மேற்கில் : சர்வே எண்.39/A/5 belonging to Southern Railway					
	ஷேட்பூல் விவரம் : இதன் மத்தியில் சர்வே எண்.39/A/3 -ல் கூடிய 2.31 ஏக்கர் நிலம். ஷேட்பூல் : 3 விஸ்தீரணம் :10.70 Acres					
	எல்லைகள் : வடக்கில் : R.S.No.39-A/6 and 39-A/7 (A) - தெற்கில் : parts of R.S.No. 39-A/10 and 39-A/11 and 39-A/12 belonging to M/s. Ashok Leyland Ltd., - கிழக்கில் : Railway lands - மேற்கில் : Ennore High Road and RS No.39-A/7/(A)					
	ஷேட்பூல் விவரம் : இதன் மத்தியில் சர்வே எண்.39-A/7, 39-A/8, 39-A/9, 39/A/10 part, 39A/11 part, 39-A/12-ல் கூடிய ஏக்.10.70 செண்ட் நிலம்					
3	Survey No(s)::39/ A/10 Survey No(s)::39/ A/11 Survey No(s)::39/ A/12 Survey No(s)::39/ A/13 Survey No(s)::39/ A/14 Survey No(s)::39/ B/1 Survey No(s)::39/ B/11 Survey No(s)::39/ B/12 Survey No(s)::39/ B/13 Survey No(s)::39/ B/14 Survey No(s)::41/ 6 Survey No(s)::41/ 7 Survey No(s)::175 Survey No(s)::185/ 1 Survey No(s)::174 Survey No(s)::176 Survey No(s)::177 Survey No(s)::214 Survey No(s)::178 Survey No(s)::183 Survey No(s)::189 Survey No(s)::182 Survey No(s)::184 Survey No(s)::185/ 3 Survey No(s)::186/ 1 Survey No(s)::190 Survey No(s)::191 Survey No(s)::188/ 2 Survey No(s)::192/ 1 Survey No(s)::192/ 2 Survey No(s)::193 Survey No(s)::194 Survey No(s)::195 Survey No(s)::212/ 1 Survey No(s)::213 Survey No(s)::42/ 1 Survey No(s)::42/ 2 Survey No(s)::43 Survey No(s)::171/ 1	11/12/2013 20/01/2014	Deposit of Title Deeds if loan is repayable on demand Rs.300000000	(E)ASHOK LEYLAND LTD - P.K.RANGANATHAN (C)STANDARD CHARTED BANK.,		237 2014

SLNo/ வ எண்	Description of Prop./ சொத்து விவரம் (Survey No & Area)	எ.கொ.நா / DOE & பதிவு நாள் / DOR	Nature & Value/ தன்மை & மதிப்பு	Name of Executants - எழுதி சொடுத்தவர் (E)/ Claimants - எழுதி வாங்கியவர் (C)	Vol.No- தொகுதி/P.No- பக்கம்	DNo-ஆ எண் / Yr / ஆண்டு
	Survey No(s):172					
	Survey No(s):160					
	Survey No(s):161					
	Survey No(s):163					
	Survey No(s):170/ 2					
	Survey No(s):171/ 2					
	Survey No(s):210					
	Survey No(s):165					
	Survey No(s):166					
	Survey No(s):168					
	Survey No(s):169					
	Survey No(s):170					
	Survey No(s):215					
	Survey No(s):216					
	Survey No(s):217					
	Survey No(s):162					
	Survey No(s):180					
	Survey No(s):185/ 4					
	Survey No(s):187					
	Survey No(s):203					
	Survey No(s):181/ 2					
	Survey No(s):185/ 2					
	Survey No(s):41/ 8B					
	Survey No(s):419/ B					
	Survey No(s):173					
	Survey No(s):207					
	Survey No(s):212/ 2					
	Survey No(s):181/ 1					
	Survey No(s):208					
	Survey No(s):209					
	Survey No(s):41/ 11					
	Survey No(s):41/ 12					
	Survey No(s):44/ 1					
	Survey No(s):44/ 2					
	Survey No(s):45/ 2					
	Survey No(s):164					
	Survey No(s):45/ 1					
	Survey No(s):45/ 4					
	Survey No(s):218					
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	Survey No(s):226					
	Survey No(s):227					
	Survey No(s):228/ 1					
	Survey No(s):228/ 2					
	Survey No(s):229					
	Survey No(s):230					
	Survey No(s):196/ 1					
	Survey No(s):197					
	Survey No(s):198					
	Survey No(s):199					
	Survey No(s):200					
	Survey No(s):196/ 2					
	Survey No(s):201					
	Survey No(s):202					
	Survey No(s):204					
	Survey No(s):205					

SLNo/ வ எண்	Description of Prop./ சொத்து விவரம் (Survey No & Area)	ச. சொ.நா / DOE & பதிவு நாள் / DOR	Nature & Value/ தன்மை & மதிப்பு	Name of Executants - எழுதி கொடுத்தவர் (E)/ Claimants - எழுதி வாங்கியவர் (C)	Vol.No- தொகுதி/P.No- பக்கம்	DNo-ஆ எண் / Yr / ஆண் ①
	Survey No(s):206					
	Survey No(s):153					
	Survey No(s):154					
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	Survey No(s):156					
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	Survey No(s):167					
	Survey No(s):150					
	Survey No(s):151					
	Survey No(s):152					
	Survey No(s):158					
	Survey No(s):159					
	Survey No(s):221/ 3B					
	Survey No(s):221/ 4A					
	Survey No(s):259/ 1					
	Survey No(s):260/ 1					
	Survey No(s):161/ 1					
	Survey No(s):1163					
	Survey No(s):221/ 4B					
	Survey No(s):253/ 1					
	Survey No(s):253/ 2					
	Survey No(s):253/ 3					
	Survey No(s):250/ 1					
	Survey No(s):256/ 2					
	Survey No(s):261/ 3					
	Survey No(s):257/ 1					
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	Survey No(s):257/ 3					
	Survey No(s):258/ 1					
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	Survey No(s):258/ 5					
	Survey No(s):258/ 6					
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	Survey No(s):260/ 2					
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	Survey No(s):261/ 4					
	Survey No(s):260/ 3					
	Survey No(s):260/ 4					
	Survey No(s):261/ 8					
	Survey No(s):251/ 2					
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	Survey No(s):261/ 6					
	Survey No(s):261/ 7					
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	Survey No(s):262/ 2					
	Survey No(s):263/ 1					
	Survey No(s):263/ 2					
	Survey No(s):263/ 3					
	Survey No(s):1165					
	Survey No(s):1166					
	Survey No(s):1167					
	Survey No(s):257/ 2					
	Survey No(s):260/ 6					
	Survey No(s):259/ 2					

சொத்தின் தன்மை :
HOUSE SITE

சைமாரும் மதிப்பு ரூ.: 300000000

SLNo/ வ எண்	Description of Prop./ சொத்து விவரம் (Survey No & Area)	ச.கொ.நா / DOE & பதிவு நாள் / DDR	Nature & Value/ தன்மை & மதிப்பு	Name of Executants - எழுதி கொடுத்தவர் (E)/ Claimants - எழுதி வாங்கியவர் (C)	Vol.No- தொகுதி/P.No- பக்கம்	DNo-ஆ எண் / Yr / ஆண்டு
	ஆவண விவரம் : deposit of title deeds ஷெட்யூல் : 1 விஸ்தீரணம் : AC.85.83 + 47.38 CENTS					
	ஷெட்யூல் விவரம் : சர்வே எண்.39A/10-0.04 CENTS, 39A/11-0.51, 39A/12-28.37, 39A/13-6.60, 39A/14-6.90, 39B/1-1.30, 39B/11-2.62, 39B/12-1.31, 39/13-29.47, 39B/14-8.69, 41/6-1.29, 41/7-1.81, 175-0.19, 185/1-0.05, 174-0.20, 176-0.25, 177-0.42, 214-1.11, 178-0.74, 183-0.65, 189-0.17, 182-0.08, 184-0.53, 185/3-0.08, 186/1-0.53, 188/1-0.08, 190-0.18, 191-0.29, 188/2-0.07, 192/1-0.14, 192/2-0.28, 173-0.23, 194-0.22, 195-0.20, 212/1-0.56, 213-0.40, 211-0.74, 42/1-0.21., 42/2-0.07, 43-0.41, 171/1-0.53, 172-0.44, 160-0.25, 161-0.96, 163-0.38, 170/2-0.71, 171/2-0.32, 210-0.78, 165-0.16, 166-0.20, 168-0.24, 169-1.32, 170/1-0.67, 215-0.47, 216/0.20, 217-0.27, 162-0.34, 180-0.45, 185/4-0.06, 187-0.07, 203-0.57, 181/2-0.31, 185/2-0.08, 41/8B-1.17, 419B-0.58, 173-0.37, 207-0.05, 212/2-1.00, 181/1-0.24, 208-0.16, 209-0.43, 41/11-0.85, 41/12-0.92, 44/1-0.30, 44/2.0.29, 45/2-1.40, 164/0.39, 45/1-0.21, 45/4-0.34, 218-0.02, 219-0.25, 220-0.36, 221-0.86, 222-0.26, 223-0.28,224-0.31, 225-0.59, 226-0.51, 227-1.03, 228/1-0.33, 228/2-0.27, 229-0.79, 230-1.64,196/1-2.75, 197-0.18,198-0.34, 199-0.09. 200-0.19, 196/2-0.04, 201-0.08,202-0.40,204-0.43, 205-0.50, 206-0.07, 153-0.35, 154-0.14, 155-0.52, 156-0.38, 157-0.23, 167-0.71, 150-0.36, 151-0.53, 152-0.13, 158-0.61, 159-0.68 ஆக மொத்தம் AC.85.83 + 47.38 CENTS. (1,91,746.86 Sq.Mtr).					
	ஷெட்யூல் : 2 விஸ்தீரணம் : Ac.56.24 cents					
	ஷெட்யூல் விவரம் : இதன் மத்தியில் சர்வே எண்.221/3B-17.86, 221/4A-4.33, 259/1-1.23, 260/1-2.12, 161/1-0.35, 1163-1.30, 221/4B-1.47, 253/1-0.48, 253/2-0.33, 253/3-0.37, 250/1-0.85, 256/2-0.02, 261/3-0.80,257/1-1.05, 258/2-0.59,258/3B-0.48,257/3-1.02, 258/1-0.72, 260/7-0.37, 258/4-0.77, 258/5-0.55, 258/6-0.91, 259/3-1.09, 259/4-0.76, 260/2-0.65, 260/5-0.17, 261/4-0.67, 260/3-0.33, 260/4-0.13, 261/8-0.66, 251/2-0.53, 261/5-0.58, 261/6-1.07, 261/7-0.75, 262/1-1.17, 262/2-1.20, 263/1-0.96, 263/1-1.05, 1165-0.55, 1166-0.75, 1167-0.40, 221/4B-1.00, 257/2-1.06, 260/6-0.50, 259/2-1.04 TOTAL AC.56.24 CENTS					
4	Survey No(s):.39/ A10	06/05/2014 28/05/2014	Deposit of Title Deeds if loan is repayable on demand	(E)ASHOK LEYLAND LTD - P.K.RANGANATHAN (C)STANDARD CHARTED BANK.,		3413 2014
	சொத்தின் தன்மை : HOUSE SITE		Rs.300000000			
	சைமாரும் மதிப்பு ரூ.: 5000000000 ஆவண விவரம் : deposit of title deeds. ஷெட்யூல் : 1 விஸ்தீரணம் : AC.85.83 + 47.38 CENTS					
	ஷெட்யூல் விவரம் : சர்வே எண்.39A/10-0.04 CENTS, 39A/11-0.51, 39A/12-28.37, 39A/13-6.60, 39A/14-6.90, 39B/1-1.30, 39B/11-2.62, 39B/12-1.31, 39/13-29.47, 39B/14-8.69, 41/6-1.29, 41/7-1.81, 175-0.19, 185/1-0.05, 174-0.20, 176-0.25, 177-0.42, 214-1.11, 178-0.74, 183-0.65, 189-0.17, 182-0.08, 184-0.53, 185/3-0.08, 186/1-0.53, 188/1-0.08, 190-0.18, 191-0.29, 188/2-0.07, 192/1-0.14, 192/2-0.28, 173-0.23, 194-0.22, 195-0.20, 212/1-0.56, 213-0.40, 211-0.74, 42/1-0.21., 42/2-0.07, 43-0.41, 171/1-0.53, 172-0.44, 160-0.25, 161-0.96, 163-0.38, 170/2-0.71, 171/2-0.32, 210-0.78, 165-0.16, 166-0.20, 168-0.24, 169-1.32, 170/1-0.67, 215-0.47, 216/0.20, 217-0.27, 162-0.34, 180-0.45, 185/4-0.06, 187-0.07, 203-0.57, 181/2-0.31, 185/2-0.08, 41/8B-1.17, 419B-0.58, 173-0.37, 207-0.05, 212/2-1.00, 181/1-0.24, 208-0.16, 209-0.43, 41/11-0.85, 41/12-0.92, 44/1-0.30, 44/2.0.29, 45/2-1.40, 164/0.39, 45/1-0.21, 45/4-0.34, 218-0.02, 219-0.25, 220-0.36, 221-0.86, 222-0.26, 223-0.28,224-0.31, 225-0.59, 226-0.51, 227-1.03, 228/1-0.33, 228/2-0.27, 229-0.79, 230-1.64,196/1-2.75, 197-0.18,198-0.34, 199-0.09. 200-0.19, 196/2-0.04, 201-0.08,202-0.40,204-0.43, 205-0.50, 206-0.07, 153-0.35, 154-0.14, 155-0.52, 156-0.38, 157-0.23, 167-0.71, 150-0.36, 151-0.53, 152-0.13, 158-0.61, 159-0.68 ஆக மொத்தம் AC.85.83 + 47.38 CENTS. (1,91,746.86 Sq.Mtr).					
	ஷெட்யூல் : 2 விஸ்தீரணம் : Ac.56.24 cents					
	ஷெட்யூல் விவரம் : இதன் மத்தியில் சர்வே எண்.221/3B-17.86, 221/4A-4.33, 259/1-1.23, 260/1-2.12, 161/1-0.35, 1163-1.30, 221/4B-1.47, 253/1-0.48, 253/2-0.33, 253/3-0.37, 250/1-0.85, 256/2-0.02, 261/3-0.80,257/1-1.05, 258/2-0.59,258/3B-0.48,257/3-1.02, 258/1-0.72, 260/7-0.37, 258/4-0.77, 258/5-0.55, 258/6-0.91, 259/3-1.09, 259/4-0.76, 260/2-0.65, 260/5-0.17, 261/4-0.67, 260/3-0.33, 260/4-0.13, 261/8-0.66, 251/2-0.53, 261/5-0.58, 261/6-1.07, 261/7-0.75, 262/1-1.17, 262/2-1.20, 263/1-0.96, 263/1-1.05, 1165-0.55, 1166-0.75, 1167-0.40, 221/4B-1.00, 257/2-1.06, 260/6-0.50, 259/2-1.04 TOTAL AC.56.24 CENTS					

Sl.No/ வ எண்	Description of Prop./ சொத்து விவரம் (Survey No & Area)	எ.மொ.நா / DOE & பதிவு நாள் / DOR	Nature & Value/ தன்மை & மதிப்பு	Name of Executants - எழுதி கொடுத்தவர் (E)/ Claimants - எழுதி வாங்கியவர் (C)	Vol.No- தொகுதி/P.No- பக்கம்	DNo-ஆ எண் / Yr / ஆண்டு
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Note :- Number of Entries : 4

குறிப்பு: பதிவுகளின் எண்ணிக்கை: 4

I also certify that save the aforesaid acts & encumbrances no other act & encumbrances affecting the said property have been found.

Search Made and Certificate prepared by / தேடுதல் மேற்கொண்டு
சான்று தயாரித்தவர்

Search verified and certificate examined by / தேடுதலைச் சரிபார்த்து
சான்றினை ஆய்வு செய்தவர்

Office Seal & Date / அலுவலக முத்திரை & நாள்



Signature of Registering Officer
பதிவு அலுவலரின் கையொப்பம்
சார்பதிவாளர்
திருவொற்றியூர்



ANNEXURE - VI

CRZ PROCEEDINGS

Annexure - III

PROCEEDINGS OF THE MEMBER SECRETARY,
TAMIL NADU STATE COASTAL ZONE MANAGEMENT AUTHORITY
& DIRECTOR OF ENVIRONMENT, CHENNAI 600 015
PRESENT: DR. H. MALLESHAPPA., I.F.S.

Proc.No.P1/544/2015 dated 19.02.2016

Sub: Coastal Regulation Zone - Proposed Modernization of foundry division and capacity enhancement of Ferrous castings (melting capacity from 2790 TPM to 10400 TPM & production capacity from 33,500 MTA to 73,500 MTA) at S.No. 39A & 39 B, Kathivakkam village, Ambattur Taluk, Thiruvallur District by Hinduja Foundries Limited - Clearance under CRZ Notification 2011 - recommended - orders issued.

- Read: 1. From the District Environmental Engineer, TNPCB, Ambattur Industrial Estate, Chennai 600 058 Ir. No. DEE/TNPCB/AMB/CRZ-2 - Hinduja/ F0113/2015-2 dated 09.02.2015.
2. Minutes of the 88th meeting of the Tamil Nadu State Coastal Zone Management Authority held on 15.02.2016.

ORDER:

M/s. Hinduja Foundries Limited, Ennore, Chennai has proposed for the modernization and capacity enhancement due to modernization of Ferrous and Non-ferrous casting manufacturing activity from 33,500 MTA to 73,500 MTA for Clearance under CRZ Notification 2011. The unit is located at S.F. No. 39 A & 39B, Kathivakkam Village, Ambattur Taluk, Thiruvallur district. The project site is falling in CRZ-II.

2) The applicant has stated that the Central Electricity Authority has issued directions to go for induction furnaces to minimize power surges and harmonic distortion in the incoming feeders. Hence the Hinduja Foundries has proposed for the replacement of existing furnaces with the induction furnaces as follows:

Existing furnaces	After modernization
Arc furnace 4 tons - 3 Nos. 14 tons - 1 No. Pillar MF furnace 3 Tons - 2 Nos. 2 Tons - 3 Nos.	Induction furnace 3 Tons - 2 Nos. 5 Tons - 3 Nos.

Annexure - III

2.

Production capacity - 33,500 MTA	73,500 MTA
Melting Capacity - 2790 TPM	10,400 TPM
Number of Employees - 2450	1950

3) The applicant has stated that to maintain the existing production level to 33,500 TPA, the proposed induction furnaces 5 Nos., is required. However with the full utilization of the said furnaces, production capacity of 73500 MTA shall be achieved. Adapting the clean technology in induction furnaces, the applicant has stated that the pollution load will get reduced drastically around 66%. (A comparison chart is enclosed). The applicant has informed there is no new constructions and the induction furnaces will be located in the same location.

4) As per CRZ Notification 2011 vide para 3 (i) Setting up of new industries and expansion of existing industries is prohibited activity.

5) The DCZMA for CMDA areas have refer the proposal to the TNSCZMA under the following conditions:

- i) The unit shall furnish an undertaking to install only 5 Nos. of induction furnaces for the purpose of modernization activity (i.e) 3 Tons capacity - 2 Nos., & 5 Tons capacities - 3 Nos.
- ii) The unit shall not produce more than 33,500 MTA of ferrous casings at any point of time.
- iii) The unit shall ensure that the power consumption per ton of product produced during modernization activity shall be lesser than the existing process equipments.
- iv) The unit shall ensure that the pollution load in respect of wastewater generation, sewage generation, Air pollution and solid waste is reduced due to the modernization activity.
- v) The quantity of raw material shall not be increased due to modernization with respect to the existing activity.

Annexure - III

.3.

6) As per CRZ Notification 2011 vide para 3 (i) Setting up of new industries and expansion of existing industries is prohibited activity. However the TNSCZMA agreed for modernization, the above activities require Environmental Clearance under EIA Notification 2006 and hence the recommendations of the TNSCZMA should be sent to SEIAA for taking further action.

7) The proposal was placed before the 88th meeting of the Tamil Nadu State Coastal Zone Management Authority held on 15.02.2016 and the State Coastal Zone Management Authority resolved to recommended the above proposals for the modernization and capacity enhancement due to modernization of Ferrous and Non-ferrous casting manufacturing activity to State Level Impact Assessment Authority for clearance.

8) Accordingly, as resolved in the 88th meeting of the State Coastal Zone Management Authority, the above proposal for the modernization and capacity enhancement due to modernization of Ferrous and Non-ferrous casting manufacturing activity, is recommended the Tamil Nadu State Environmental Impact Assessment Authority for Clearance under para 4 (2) (ii) (a) of CRZ Notification 2011, subject to the following specific conditions:

- a) The unit shall furnish an undertaking to install only 5 Nos. of induction furnaces for the purpose of modernization activity (i.e) 3 Tons capacity - 2 Nos., & 5 Tons capacities - 3 Nos., which are essential for the operation of existing capacity.
- b) The unit shall ensure that the power consumption per ton of product produced during modernization activity shall be lesser than the existing process equipments.
- c) The unit shall ensure that the pollution load in respect of wastewater generation, sewage generation, Air pollution and solid waste is reduced due to the modernization activity.

Annexure - III

4.

- d) Under Corporate Social Responsibility, Pulicat Wild Life Sanctuary can be taken into account and to contact Wildlife Warden, Chennai to do some works in the above area.

Sd/- Dr. H. Malleshappa.,
Member Secretary,
Tamil Nadu State Coastal Zone Management Authority
& Director of Environment

To
The Managing Director,
Hinduja Foundries Limited
Kathivakkam High Road, Ennore, Chennai 600 057

Copy to:

The Member Secretary, Tamil Nadu State Environmental Impact Assessment Authority,
3rd Floor, Panagal Building, Saidapet, Chennai 600 015.

/forwarded by order/


For Director of Environment

ANNEXURE - VII

**DEMARACATION OF HTL FROM ANNA
UNIVERSITY**

**DEMARCATON OF HIGH TIDE LINE FOR THE
PROJECT SITE AT KATTIVAKKAM VILLAGE,
AMBATTUR TALUK, TIRUVALLUR DISTRICT**

SPONSORED BY

**M/S Hinduja Foundries Limited
Kathivakkam High Road
Ennore
Chennai - 57**



**INSTITUTE OF REMOTE SENSING
ANNA UNIVERSITY, CHENNAI-25**

JUNE 2014

DEMARCATON OF HIGH TIDE LINE FOR THE PROJECT SITE AT KATTIVAKKAM VILLAGE, AMBATTUR TALUK, TIRUVALLUR DISTRICT

ABSTRACT

On the request of Indian M/S Hinduja Foundries Limited, Chennai a survey was carried out to demarcate the High Tide Line (HTL) for the project site at Kattivakkam Village, Ambattur Taluk, Tiruvallur District. The satellite imagery of the study area was interpreted for geomorphic features in the vicinity of the survey site. The cadastral map of the area provided by the client was used as the Base Map. Based on the topography, HTL has been identified and traced in the field by Kinematic GPS survey. The HTL was superimposed on to georeferenced cadastral map to prepare a local level HTL map. The Project site boundary provided by the client was superimposed on to HTL map and enclosed. The spherical co-ordinates of the HTL in WGS84 system are presented in the Annexure.

PROGRESS THROUGH KNOWLEDGE

DEMARCATIION OF HIGH TIDE LINE FOR THE PROJECT SITE AT KATTIVAKKAM VILLAGE, AMBATTUR TALUK, TIRUVALLUR DISTRICT

1. INTRODUCTION

The coastal zone is the area of interaction between land and sea. The coastal Zone of Tamilnadu has a very high concentration of population along with ecologically sensitive areas like mangroves. There is a spurt of developmental activities arising from huge residential colonies, new industries and tourism centres along the coast and in coastal zone. There is a need to protect the coastal environment while ensuring continuing production and development. This zone is extremely vulnerable and has to be managed judiciously striking a balance between ecological and developmental needs.

Government of India has issued a notification during February 1991 for regulating the developments along the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action. The land between 500 meters from the High Tide Line (HTL) and the Low Tide Line (LTL) is identified as Coastal Regulation Zone (CRZ).

The Ministry of Environment and Forest has provided guidelines for demarcation of High Tide Line in the CRZ Notification, 2011. As per the guidelines, Cadastral (village) maps in 1:3960 or the nearest scale shall be used as the base maps. HTL and LTL will be demarcated in the cadastral map based on detailed physical verification using coastal geomorphological signatures or features in accordance with the CZM Maps approved by the

Central Government. 500metre and 200metre lines shall be demarcated with respect to the HTL.

In order to facilitate classification of Coastal Regulation Zones Government of India has approved few agencies/institutions across the Country vide Lr. No. J17011/8/92-1A III, dated 10.05.1999 of Ministry of Environment and Forests. Institute of Remote Sensing, Anna University being one of them, has been carrying out HTL and LTL mapping following the guidelines issued by Ministry of Environment and Forests, Government of India.

2. BACKGROUND OF THE STUDY

M/S Hinduja Foundries Limited, Chennai has requested Institute of Remote Sensing, Anna University to demarcate High Tide Line on 1:4,000 scale for project site at Kattivakkam Village, Ambattur Taluk, Tiruvallur District.

3. STUDY AREA AND EXTENT

The aforesaid project site is located project site at Kattivakkam Village, Ambattur Taluk, Tiruvallur District, Tamil Nadu.

4. NEED FOR THE STUDY

The property of M/S Hinduja Foundries Limited, Chennai needs to be evaluated to assess whether the proposed site is falls under regulations of CRZ Notification, 2011. Keeping in view of the requirements of notification, Institute of Remote Sensing, Anna University under took the project with following agreed scope of work:

- Demarcation of HTL near project site along the stretches of Bay of Bengal by conducting field survey using DGPS survey.

parts per thousand (ppt). Insitu observations of the salinity were used to delineate the HTL for backwaters.

6. GPS SURVEYING

The Trimble 5700 and 4000 SSE (Geodetic Surveyor Series) GPS receivers were used to conduct the surveying at the project site. The survey involves three components namely, 1. Establishing Base Station, 2. Control Survey for Village Maps and 3. Real Time Kinematic Survey for HTL Demarcation.

6.1 Establishing Base Station

The survey involves establishing one base station for Static Survey. The base stations were identified on stable locations with clear view of sky for uninterrupted access to GPS satellite signals. The control point with known elevation was used as initial reference station. The base station for the project site was established on from ground and observed with static GPS survey from the known coordinates of the control point. The observations times were fixed based on the length of base lines to obtain highest possible accuracies.

6.2 Static Survey

The conduct of Static Survey using GPS requires two GPS receivers, one to be setup over the control point (with known co-ordinate) and another one over a reference station whose coordinates and distance from the control point are to be determined. Both these receivers must record data simultaneously. These known co-ordinates of the control point were fed and fixed for processing of the logged data to accurately determine the co-ordinates of the base stations.

6.3 Control Survey for Georeferencing Village Maps

The cadastral map pertaining to the project site was provided by the client. The hard copy cadastral map was scanned and georeferenced with the help of GPS coordinates of boundary points provided by the client and used for the preparation of local level HTL Maps.

6.4 Real Kinematic Survey for HTL Demarcation

Kinematic Surveying enables a very rapid survey of a number of base lines in areas where there is good satellite visibility. At least, two GPS receivers are required to perform a kinematic survey. One receiver is designated as the reference receiver and is set up over the Base Station. All baselines are measured relative to this station. The other receivers, called rovers, are moved in succession to trace and record the HTL on ground through ground profiling.

7. DEMARCATION OF HTL

Surrogate data such as Coastal Geomorphologic features identified from the satellite imagery, indicators available on the ground and Tidal data obtained from Survey of India were used to verify the HTL demarcated by Kinematic Survey. The High Tide Line is demarcated using a Kinematic GPS through complete field verification.

8. OUTPUT

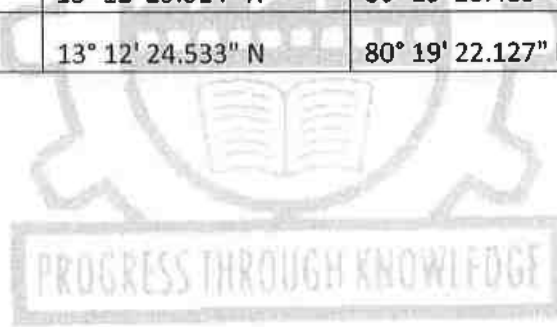
The observed baselines were processed using TGO software. The same were plotted at large scale using the ArcGIS 9.3 software and the same was superimposed in the georeferenced cadastral map. The processed HTL co-ordinates in WGS 84 system are presented in Annexure.

ANNEXURE I

**DEMARICATION OF HIGH TIDE LINE FOR THE
PROJECT SITE AT KATTIVAKKAM VILLAGE,
AMBATTUR TALUK, TIRUVALLUR DISTRICT**

COORDINATES OF HTL POINTS

Point No	Latitude	Longitude
H288	13° 12' 55.775" N	80° 19' 33.439" E
H289	13° 12' 51.256" N	80° 19' 32.061" E
H290	13° 12' 45.826" N	80° 19' 29.848" E
H291	13° 12' 42.053" N	80° 19' 28.412" E
H292	13° 12' 37.991" N	80° 19' 26.834" E
H293	13° 12' 34.778" N	80° 19' 24.247" E
H294	13° 12' 32.314" N	80° 19' 21.544" E
H295	13° 12' 29.014" N	80° 19' 23.485" E
H296	13° 12' 24.533" N	80° 19' 22.127" E



[Signature]
DIRECTOR, IRS

CRZ MAPPING FOR THE PROJECT SITE AT KATTIVAKKAM VILLAGE, AMBATTUR TALUK, TIRUVALLUR DISTRICT

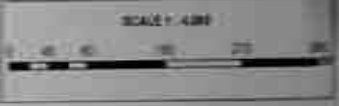


Legend

- CONTROL LINE
- HIGH TIDE LINE AND LOW TIDE LINE
- CANAL
- ROAD
- RAILWAY
- TELEPHONE
- POWER LINE
- METAL ROAD
- DRAINAGE
- TANK
- WELLS
- SAND BARREN
- MUD BARREN
- ZONE B
- ZONE A
- ZONE II
- ZONE III
- ZONE IV
- ZONE V
- WILDERNESS PORT

SCALE

--- PROJECT SITE BOUNDARY



PROJECT OF
 NATIONAL WATERWAYS DEVELOPMENT BOARD
 CHENNAI

BY
 M/S. SRI LAKSHMI ENGINEERS LIMITED
 CHENNAI

DESIGNED BY: *[Signature]*

CHECKED BY: *[Signature]*

APPROVED BY: *[Signature]*

M/S. SRI LAKSHMI ENGINEERS LIMITED
 CHENNAI

ANNEXURE - VIII

FIRE LICENSE

FIRE SERVICE LICENCE

(Under Section 13 of the Tamil Nadu Fire Service Act 1985 and with Tamil Nadu Fire Service Rules 1990 Appendix III)

R.C.No : 019063/C1/2021

LICENCE No. **4032/2021**

Date: . . 2021

Licence is hereby granted under section 13 of the Tamil Nadu Fire Service Act, 1985, for **FOUNDRY DIVISION MOULDING WORKS (G+1 ONLY)** in the name of **M/S ASHOK LEYLAND LIMITED (FOUNDRY DIVISION) K.H.ROAD ,ENNORE, CHENNAI-600 057** within the jurisdiction of **ENNORE** at panchayat survey no: ennore high road ennore Chennai-57 with subject to the conditions mentioned below noted there on and such other conditions as may be prescribed. The above premises is inspected By **Assistant district officer (HQ) Mr.A.THANABAL AND Ennore Station Officer Mr.V.PALAKARARAMASAMY** on **31.12.2021**.


CONDITIONS

As per Tamil Nadu Fire Service Act 1985 Section 13 of Chapter II and appendix V of this Act.

1. This Licence is valid for ONE YEAR from the date of issue.
2. Regular Licence has to be obtained from the competent authority.
3. Fire & Life Safety Systems/arrangements have to be provided
 - 1.portable fire extinguisher-206 no's
 - 2.electrical and diesel pump -2900lpm
 - 3.fire hydrants-91 no's
 - 4.jockey pump-1800lpmhydrant system should be maintained regularly and keep all the fire fighting equipments in working conditions
4. If there is any deviation from the Govt. Rule and Act the Licence issued will stand Cancelled.
5. Fire Fighting trained employee/Personal must be available in the premises to Operate the equipments /Systems.

Office Seal with Date




District Officer
Fire & Rescue Services
Chennai Suburban District
Chennai58
6/1/22

To
M/S ASHOK LEYLAND LIMITED
(FOUNDRY DIVISION) K.H.ROAD,
ENNORE, CHENNAI-600 057

ANNEXURE - IX

SUMMARY OF AAQ DATA

SUMMARY OF AAQ BASELINE DATA

TABLE-1							
Location : plant site (AAQ1)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	86.1	31.2	31.3	24.8	226	245	254
03.07.2020	85.9	30.9	30.9	24.3	231	250	246
09.07.2020	86.1	30.5	30.2	24.1	240	257	243
10.07.2020	85.9	31.2	31.6	25.1	233	245	247
16.07.2020	85.2	30.8	30.7	26.3	228	243	251
17.07.2020	86.3	30.1	31.4	25.8	220	237	245
23.07.2020	85.4	31.4	30.5	24.9	224	241	243
24.07.2020	86.2	32.0	32.4	25.4	219	234	246
30.07.2020	86.7	31.9	32.8	26.3	245	251	270
31.07.2020	87.1	30.7	31.9	25.8	239	267	277
06.08.2020	85.9	31.9	30.8	24.9	236	256	260
07.08.2020	87.2	32.5	32.1	26.1	230	245	253
13.08.2020	85.5	30.1	30.7	25.3	240	248	272
14.08.2020	86.2	30.8	31.6	27.5	228	244	263
20.08.2020	87.1	31.0	31.4	26.1	236	257	260
21.08.2020	85.8	30.2	30.9	27.9	241	253	259
27.08.2020	86.9	31.4	32.1	25.6	235	242	258
28.08.2020	85.3	30.7	33.4	27.3	265	303	268
03.09.2020	87.2	31.6	31.6	26.8	270	271	256
04.09.2020	85.4	32.8	30.7	25.9	267	287	254
10.09.2020	86.1	32.0	32.6	28.7	298	298	277
11.09.2020	87.9	31.9	31.7	27.3	256	281	304
17.09.2020	88.6	32.4	33.1	26.8	280	330	268
18.09.2020	88.1	30.8	32.4	27.1	277	284	267
24.09.2020	87.8	32.1	32.7	28.3	310	286	283
25.09.2020	88.1	31.9	33.4	27.4	260	270	258
Maximum	88.6	32.8	33.4	28.7	330		
Minimum	85.2	30.1	30.2	24.1	219		
Average	86.6	31.3	31.7	26.2	257		
98 %tile	88.4	32.7	33.4	28.5	307		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-2							
Location : Periyakuppam (AAQ2)							
Date of sampling	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO		
					I	II	III
02.07.2020	82.6	26.7	21.6	26.7	207	234	245
03.07.2020	82.1	25.2	20.5	25.9	203	256	244
09.07.2020	82.8	25.8	20.3	25.8	218	251	248
10.07.2020	82.0	27.1	21.8	27.1	212	238	247
16.07.2020	83.4	26.9	22.0	26.9	219	248	233
17.07.2020	82.6	25.4	21.5	25.4	211	253	241
23.07.2020	82.4	27.3	20.9	27.3	216	236	231
24.07.2020	82.8	26.9	22.3	26.9	205	237	255
30.07.2020	82.4	25.8	20.7	25.8	208	225	243
31.07.2020	83.1	27.1	21.4	27.1	211	245	238
06.08.2020	82.9	28.0	21.8	28.0	249	261	265
07.08.2020	82.1	29.3	20.7	29.3	232	262	256
13.08.2020	82.6	28.6	22.3	28.6	223	247	240
14.08.2020	83.2	27.6	21.5	27.6	216	263	237
20.08.2020	83.4	25.9	20.8	25.9	225	270	258
21.08.2020	82.6	26.3	20.6	26.3	211	246	237
27.08.2020	82.3	28.1	22.9	28.1	243	278	238
28.08.2020	82.7	27.6	23.9	27.6	248	278	265
03.09.2020	82.6	26.8	22.1	26.8	251	240	235
04.09.2020	82.1	27.3	20.7	27.3	263	275	286
10.09.2020	83.5	29.1	23.6	29.1	247	257	269
11.09.2020	83.1	28.3	20.9	28.3	263	292	247
17.09.2020	83.2	29.6	21.4	29.6	278	264	243
18.09.2020	82.9	30.9	22.7	30.8	234	278	269
24.09.2020	82.4	28.5	23.1	28.5	240	234	261
25.09.2020	83	29.3	22.8	29.3	242	254	240
Maximum	83.5	30.9	23.9	30.8	292		
Minimum	82.0	25.2	20.3	25.4	203		
Average	82.7	27.5	21.7	27.5	244		
98 %tile	83.5	30.3	23.8	30.2	282		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-3							
Location :Kathivakkam (AAQ3)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	82.3	25.8	20.9	26.7	208	224	248
03.07.2020	82.1	25.6	20.5	25.9	203	256	244
09.07.2020	83.0	25.7	20.8	26.1	218	251	245
10.07.2020	83.2	27.1	21.8	27.1	215	238	247
16.07.2020	83.4	26.9	22.0	26.9	219	248	233
17.07.2020	82.4	25.4	21.5	26.1	211	253	241
23.07.2020	82.9	27.3	20.9	27.3	216	236	231
24.07.2020	82.8	26.4	22.3	26.9	205	237	255
30.07.2020	82.4	25.8	20.7	26.4	219	234	243
31.07.2020	83.1	27.1	21.4	27.1	211	245	238
06.08.2020	82.9	28.0	22.8	28.0	249	261	274
07.08.2020	82.1	29.3	20.7	29.3	232	262	256
13.08.2020	82.6	28.6	22.3	28.6	223	247	261
14.08.2020	83.2	27.6	21.5	27.6	216	263	237
20.08.2020	83.4	25.9	20.8	28.3	225	270	258
21.08.2020	82.6	26.3	20.6	26.3	211	246	237
27.08.2020	82.3	28.1	22.9	28.1	243	278	238
28.08.2020	83.1	27.6	24.1	27.6	245	278	265
03.09.2020	82.6	26.8	22.1	26.8	251	261	235
04.09.2020	82.1	27.3	20.7	27.3	263	275	286
10.09.2020	84.5	30.4	23.6	29.1	247	257	269
11.09.2020	83.1	28.3	20.9	28.3	263	292	258
17.09.2020	83.2	31.8	21.4	29.6	278	264	243
18.09.2020	82.9	32.5	22.7	31.5	234	281	269
24.09.2020	84.2	30.7	23.1	28.5	240	234	261
25.09.2020	82.9	29.3	23.9	30.5	244	263	273
Maximum	84.5	32.5	24.1	31.5	292		
Minimum	82.1	25.4	20.5	25.9	203		
Average	82.9	27.8	21.8	27.8	246		
98 %tile	84.4	32.2	24.0	31.0	283		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-4							
Location :Thulsikuppam (AAQ4)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	75.6	20.5	18.6	28.5	215	231	254
03.07.2020	76.2	21.9	19.2	29.7	207	245	263
09.07.2020	79.3	22.2	18.5	28.7	205	237	249
10.07.2020	78.9	21.8	18.1	27.4	197	217	234
16.07.2020	80.3	23.1	19.6	29.6	193	224	246
17.07.2020	79.1	20.3	19.0	30.2	217	238	258
23.07.2020	81.2	22.8	18.4	29.6	208	215	238
24.07.2020	80.5	22.9	18.5	30.5	215	232	249
30.07.2020	79.3	21.6	19.5	29.8	236	272	277
31.07.2020	81.4	23.4	19.3	30.4	240	256	270
06.08.2020	80.8	21.4	18.4	28.4	224	268	264
07.08.2020	79.8	21.8	19.5	28.9	217	243	258
13.08.2020	81.5	24.0	18.2	29.6	232	238	255
14.08.2020	81.8	22.0	18.9	30.2	211	251	268
20.08.2020	80.9	21.1	19.6	30.5	226	234	271
21.08.2020	79.6	21.9	19.0	30.8	235	246	258
27.08.2020	80.5	21.4	19.7	31.9	294	302	291
28.08.2020	81.6	23.6	18.4	30.7	295	287	297
03.09.2020	81.9	21.9	20.3	28.7	278	298	265
04.09.2020	80.6	22.0	18.6	29.6	298	288	292
10.09.2020	79.3	22.5	19.6	30.5	287	294	297
11.09.2020	81.6	22.9	20.1	32.6	267	281	296
17.09.2020	80.7	23.4	19.5	32.8	289	295	301
18.09.2020	81.3	23.1	21.4	31.7	294	289	303
24.09.2020	79.8	21.6	19.7	33.5	264	283	285
25.09.2020	80.9	23.5	18.5	30.9	259	268	294
Maximum	81.9	24.0	21.4	33.5	303		
Minimum	75.6	20.3	18.1	27.4	193		
Average	80.1	22.2	19.2	30.2	257		
98 %tile	81.9	23.8	20.9	33.2	301		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-5							
Location : Kattukuppam (AAQ5)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	66.3	15.6	7.2	8.9	210	239	239
03.07.2020	67.2	16.0	7.1	8.5	207	232	238
09.07.2020	67.4	15.9	7.6	9.5	205	226	246
10.07.2020	66.8	15.1	7.9	8.7	201	219	237
16.07.2020	66.5	17.2	7.6	10.6	194	224	243
17.07.2020	67.1	16.5	7.3	9.8	197	230	248
23.07.2020	67.9	19.3	7.8	11.0	195	217	232
24.07.2020	66.8	18.6	8.2	10.7	199	227	228
30.07.2020	67.1	20.7	7.7	8.8	234	265	263
31.07.2020	68.0	22.4	7.9	9.2	231	271	281
06.08.2020	67.9	19.1	9.1	12.0	228	275	278
07.08.2020	68.2	18.6	8.7	11.6	217	256	264
13.08.2020	66.5	17.9	7.4	10.5	226	243	265
14.08.2020	67.3	19.2	7.6	9.9	213	249	256
20.08.2020	68.1	20.8	10.0	12.6	219	257	253
21.08.2020	67.5	21.5	9.6	11.1	224	235	245
27.08.2020	68.4	22.4	8.1	10.3	277	305	270
28.08.2020	67.2	20.8	7.9	12.1	287	304	265
03.09.2020	68.3	24.3	9.6	13.0	277	304	278
04.09.2020	69.3	25.0	10.2	12.6	304	288	279
10.09.2020	68.2	20.7	9.9	12.8	279	281	273
11.09.2020	67.5	23.8	8.4	14.3	283	278	270
17.09.2020	66.9	25.3	10.8	13.6	278	268	270
18.09.2020	67.1	24.9	9.5	12.9	285	307	291
24.09.2020	68.5	23.8	9.8	13.0	265	281	271
25.09.2020	68.3	23.4	10.1	13.8	249	278	267
Maximum	69.3	25.3	10.8	14.3	307		
Minimum	66.3	15.1	7.1	8.5	194		
Average	67.6	20.3	8.6	11.2	252		
98 %tile	68.9	25.2	10.5	14.1	304		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-6							
Location : Sivakami Nagar (AAQ6)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	79.6	21.3	18.6	29.6	213	231	248
03.07.2020	80.2	21.9	19.2	28.5	203	226	242
09.07.2020	79.3	22.5	18.5	28.7	205	237	249
10.07.2020	79.8	21.8	18.1	28.1	197	217	234
16.07.2020	80.3	23.1	19.6	29.6	193	224	246
17.07.2020	79.1	21.4	19.0	30.2	217	238	258
23.07.2020	81.2	22.8	18.4	29.6	208	225	238
24.07.2020	80.5	22.9	18.0	30.5	215	232	249
30.07.2020	79.3	21.6	19.5	29.8	236	272	277
31.07.2020	81.4	23.4	19.3	29.5	240	256	270
06.08.2020	82.1	21.4	18.4	28.4	224	261	264
07.08.2020	79.8	21.8	19.5	28.9	217	243	258
13.08.2020	81.5	24.0	18.2	29.6	232	238	255
14.08.2020	81.8	22.0	18.9	30.2	211	251	268
20.08.2020	82.5	21.1	19.6	30.5	226	234	271
21.08.2020	79.6	22.5	19.0	30.8	235	246	253
27.08.2020	82.1	21.4	19.7	31.9	294	302	291
28.08.2020	81.6	23.6	18.4	30.7	295	287	297
03.09.2020	81.9	21.9	18.9	28.7	278	298	259
04.09.2020	80.6	22.0	18.0	29.6	298	288	292
10.09.2020	82.9	24.3	19.6	30.5	287	294	297
11.09.2020	81.6	22.9	20.1	32.6	267	281	287
17.09.2020	80.7	23.4	19.5	32.8	289	294	301
18.09.2020	81.3	23.1	20.8	31.7	294	289	303
24.09.2020	79.8	21.6	19.7	32.9	265	283	271
25.09.2020	80.9	24.1	18.5	32.5	249	267	281
Maximum	82.9	24.3	20.8	32.9	303		
Minimum	79.1	21.1	18.0	28.1	193		
Average	80.8	22.5	19.1	30.3	256		
98 %tile	82.7	24.2	20.5	32.9	301		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-7

Location : Edayanchavadi (AAQ7)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	62.0	23.7	12.8	20.0	245	300	237
03.07.2020	65.6	21.6	13.7	20.6	258	279	224
09.07.2020	67.8	22.4	12.8	24.5	245	279	245
10.07.2020	70.8	23.7	13.4	20.0	279	249	224
16.07.2020	70.2	23.8	13.7	20.4	245	224	232
17.07.2020	70.9	23.4	12.5	24.9	245	242	237
23.07.2020	67.5	22.3	10.9	20.1	224	234	239
24.07.2020	66.9	22.1	11.1	24.7	232	300	234
30.07.2020	70.9	23.4	11.4	22.1	240	237	236
31.07.2020	69.7	23.0	11.3	21.1	230	248	245
06.08.2020	67.0	22.1	12.8	22.9	237	264	245
07.08.2020	69.2	22.8	12.7	24.2	300	273	252
13.08.2020	66.7	22.0	12.8	24.7	279	275	245
14.08.2020	63.6	20.5	12.3	25.2	223	279	232
20.08.2020	65.3	21.6	12.5	24.3	240	224	264
21.08.2020	66.7	22.0	12.8	24.7	237	236	248
27.08.2020	71.0	23.4	13.7	23.7	264	237	224
28.08.2020	70.8	23.7	13.0	24.7	244	237	232
03.09.2020	67.1	22.2	12.7	24.1	252	245	237
04.09.2020	67.8	22.4	12.8	20.0	279	279	279
10.09.2020	65.8	21.7	12.0	24.1	264	245	272
11.09.2020	68.4	22.6	11.6	20.2	245	224	237
17.09.2020	70.6	24.0	12.3	23.7	237	245	279
18.09.2020	70.4	23.2	12.1	21.3	224	264	245
24.09.2020	66.5	21.9	13.2	24.9	232	245	224
25.09.2020	65.8	21.7	12.5	23.7	244	273	265
Maximum	71.0	24.0	13.7	25.2	300		
Minimum	62.0	20.5	10.9	20.0	223		
Average	67.8	22.6	12.5	22.9	249		
98 %tile	71.0	23.9	13.7	25.1	300		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

TABLE-8							
Location : Vichoor (AAQ8)							
Date of sampling	PM₁₀	PM_{2.5}	SO₂	NO_x	CO		
					I	II	III
02.07.2020	59.7	23.0	10.4	19.0	240	278	234
03.07.2020	60.1	21.0	10.9	18.2	248	263	248
09.07.2020	62.2	21.7	11.1	23.0	240	240	240
10.07.2020	61.5	23.0	10.3	18.8	263	263	246
16.07.2020	60.5	23.1	10.8	19.8	240	248	269
17.07.2020	62.4	22.7	9.8	18.0	240	292	234
23.07.2020	61.9	21.6	9.3	16.9	246	237	234
24.07.2020	61.3	21.4	9.7	17.7	234	278	275
30.07.2020	62.5	22.7	10.2	23.6	240	234	281
31.07.2020	61.4	22.3	10.5	18.5	263	263	240
06.08.2020	61.4	21.5	10.8	18.2	264	292	310
07.08.2020	62.6	22.2	11.3	20.6	278	304	240
13.08.2020	61.2	21.4	11.4	23.3	263	234	240
14.08.2020	61.1	21.3	11.9	18.0	292	263	292
20.08.2020	61.5	21.0	11.9	19.8	299	240	263
21.08.2020	62.6	21.4	11.8	23.3	276	234	307
27.08.2020	62.3	22.8	11.9	19.6	240	263	234
28.08.2020	63.1	23.0	11.8	20.6	246	234	304
03.09.2020	61.6	21.5	11.7	23.3	234	240	234
04.09.2020	62.2	21.7	10.4	19.0	263	263	263
10.09.2020	60.4	21.1	11.0	20.1	234	240	263
11.09.2020	61.3	21.9	11.3	20.6	240	237	234
17.09.2020	62.4	23.3	11.5	23.3	234	240	263
18.09.2020	62.1	22.6	10.1	18.5	248	234	263
24.09.2020	61.0	21.3	10.6	23.6	263	240	240
25.09.2020	60.4	21.1	10.8	19.8	292	263	263
Maximum	63.1	23.3	11.9	23.6	310		
Minimum	59.7	21.0	9.3	16.9	234		
Average	61.6	22.0	10.9	20.2	256		
98 %tile	62.9	23.2	11.9	23.6	305		
Benzene (C₆H₆), Benzo(a)Pyrene (BaP) ng/m³, Lead (Pb), Ozone (O₃)							
Ammonia (NH₃), Arsenic (As) ng/m³ and Nickel (Ni) ng/m³							
are Below the Detectable Limit							
All the values except BaP, As, Ni are expressed as µg/m³							

ANNEXURE - X

MATERIAL BALANCE

**Proposed expansion of foundry unit by Ashok Leyland Limited at S.F.No. 39A,
39B, Kathivakkam Village, Ennore, Tiruvallur District, Tamil Nadu**

TABLE-1
MATERIAL BALANCE – (AFTER EXPANSION)

**All Values are in Tonnes/Month

Input/Raw materials		Output Products/Waste	
Pig Iron	565.0	Ferrous Castings	6125.0
CI Borings, CI Scrap	2825.0	Furnace Slag	330.0
Mild Steel	3300.0	Melting Loss	235.0
Total	6690.0	Total	6690.0

ANNEXURE - XI

GROUNDWATER APPROVAL LETTER

FORM-V

[See rule 4 (6)]

Provisional Licence for extraction or use of groundwater for purpose other than domestic purposes under section 5 (4) (a) (i) of the '[Chennai] Metropolitan Area Groundwater (Regulation) Act, 1987 (Tamil Nadu Act 27 of 1987).

Licence No. MW/A-I/E/09/2019-20

Thiru.P.Venkatesan, Son of Thiru.R.Ponnusamy, resident of Ashok Leyland – Foundry Division, Ennore, Chennai-57 is hereby granted provisional Licence for extraction or use of groundwater from a well (Well no. 1) of 5m in dia and 25ft in depth in T.S. No 39/B, in Ennore village Tiruvallur Taluk, Tiruvallur district for the purpose of Industrial use.

This licence is granted for a well and pump conforming, to the specifications given below and is valid for a period of 90 days of part thereof from the date of issue.

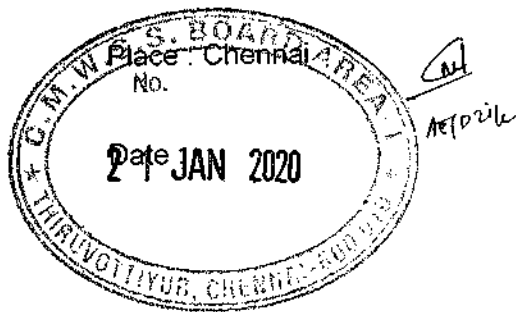
(1) Type of well	-	Open well
(2) Diameter	-	5m
(3) Depth	-	25ft
(4) Pump	-	12HP
(5) Type of pump	-	Centrifugal
(6) Horse power	-	12 HP
(7) Number of hours of Pumping	-	15hrs

This provisional licence is subject to the following conditions :-

- (i) The owner should not deviate in any way from the specifications regarding well, pump, etc., mentioned above.
- (ii) The drawal of groundwater under this provisional licence shall not interfere with the normal activities of the locality nor should it cause any traffic hazard.
- (iii) The competent authority or any person duly authorized by it shall have the right to enter and inspect the place with such assistance as may be necessary to satisfy itself orhimself whether the conditions and restrictions specified in the licence are being compliedwith.
- (iv) The competent authority shall have right to restrict the use or withdraw or cancel the licence giving 15 days notice to the licensee specifying the reasons for doing so.

The Licence is also Subject to the following Conditions,

- 1) TANGEDCO Service connection on Commercial basis to be Produced.




Signature of the Competent Authority.

**Area Engineer-I
C.M.W.S.S. BOARD,
AREA-I, THIRUVOTTIYUR,
CHENNAI-600 019.**

FORM-V

[See rule 4 (6)]

Provisional Licence for extraction or use of groundwater for purpose other than domestic purposes under section 5 (4) (a) (i) of the '[Chennai] Metropolitan Area Groundwater (Regulation) Act, 1987 (Tamil Nadu Act 27 of 1987).

Licence No. MW/A-I/E/10/2019-20

Thiru.P.Venkatesan, Son of Thiru.R.Ponnusamy, resident of Ashok Leyland – Foundry Division, Ennore, Chennai-57 is hereby granted provisional Licence for extraction or use of groundwater from a well (Well no. 2) of 5m in dia and 25ft in depth in T.S. No 39/B, in Ennore village Tiruvallur Taluk, Tiruvallur district for the purpose of Industrial use.

This licence is granted for a well and pump conforming, to the specifications given below and is valid for a period of 90 days of part thereof from the date of issue.

(1) Type of well	-	Open well
(2) Diameter	-	5 m
(3) Depth	-	25 ft
(4) Pump	-	12HP
(5) Type of pump	-	Centrifugal
(6) Horse power	-	12 HP
(7) Number of hours of Pumping	-	15hrs

This provisional licence is subject to the following conditions :-

- (i) The owner should not deviate in any way from the specifications regarding well, pump, etc., mentioned above.
- (ii) The drawal of groundwater under this provisional licence shall not interfere with the normal activities of the locality nor should it cause any traffic hazard.
- (iii) The competent authority or any person duly authorized by it shall have the right to enter and inspect the place with such assistance as may be necessary to satisfy itself orhimself whether the conditions and restrictions specified in the licence are being compliedwith.
- (iv) The competent authority shall have right to restrict the use or withdraw or cancel the licence giving 15 days notice to the licensee specifying the reasons for doing so.

The Licence is also Subject to the following Conditions,

- 1) TANGEDCO Service connection on Commercial basis to be Produced.

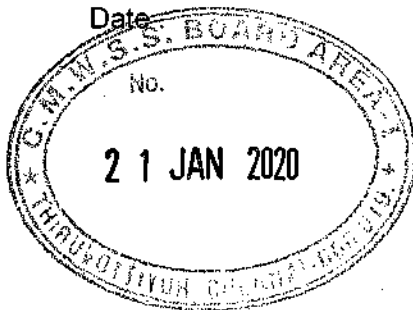
Place : Chennai

CA
AE/Date



Signature of the Competent Authority.

Date



Area Engineer-I
C.M.W.S.S. BOARD,
AREA-I, THIRUVOTTIYUR,
CHENNAI-600 019.

FORM-V

[See rule 4 (6)]

Provisional Licence for extraction or use of groundwater for purpose other than domestic purposes under section 5 (4) (a) (i) of the '[Chennai] Metropolitan Area Groundwater (Regulation) Act, 1987 (Tamil Nadu Act 27 of 1987).

Licence No. MW/A-I/E/11/2019-20

Thiru.P.Venkatesan, Son of Thiru.R.Ponnusamy, resident of Ashok Leyland – Foundry Division, Ennore, Chennai-57 is hereby granted provisional Licence for extraction or use of groundwater from a well (Well no. 3) of 5m in dia and 25ft in depth in T.S. No 39/B, in Ennore village Tiruvallur Taluk, Tiruvallur district for the purpose of Industrial use.

This licence is granted for a well and pump conforming, to the specifications given below and is valid for a period of 90 days of part thereof from the date of issue.

- | | | |
|--------------------------------|---|--------------------|
| (1) Type of well | - | Open well |
| (2) Diameter | - | 5 m |
| (3) Depth | - | 25ft |
| (4) Pump | - | 12HP |
| (5) Type of pump | - | Centrifugal |
| (6) Horse power | - | 12 HP |
| (7) Number of hours of Pumping | - | 15hrs |

This provisional licence is subject to the following conditions :-

- (i) The owner should not deviate in any way from the specifications regarding well, pump, etc., mentioned above.
- (ii) The drawal of groundwater under this provisional licence shall not interfere with the normal activities of the locality nor should it cause any traffic hazard.
- (iii) The competent authority or any person duly authorized by it shall have the right to enter and inspect the place with such assistance as may be necessary to satisfy itself orhimself whether the conditions and restrictions specified in the licence are being compliedwith.
- (iv) The competent authority shall have right to restrict the use or withdraw or cancel the licence giving 15 days notice to the licensee specifying the reasons for doing so.

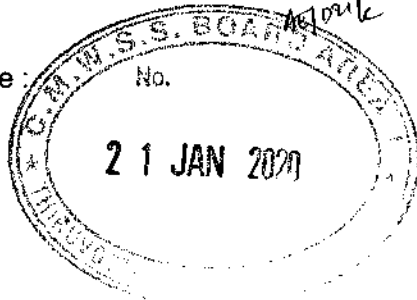
The Licence is also Subject to the following Conditions,

- 1) TANGEDCO Service connection on Commercial basis to be Produced.

Place : Chennai

Date :

No.



Signature of the Competent Authority.

Area Engineer-I
C.M.W.S.S. BOARD,
AREA-I, THIRUVOTTIYUR,
CHENNAI-600 019.

FORM-V

[See rule 4 (6)]

Provisional Licence for extraction or use of groundwater for purpose other than domestic purposes under section 5 (4) (a) (i) of the '[Chennai] Metropolitan Area Groundwater (Regulation) Act, 1987 (Tamil Nadu Act 27 of 1987).

Licence No. MW/A-I/E/12/2019-20

Thiru.P.Venkatesan, Son of Thiru.R.Ponnusamy, resident of Ashok Leyland – Foundry Division, Ennore, Chennai-57 is hereby granted provisional Licence for extraction or use of groundwater from a well (Well no. 4) of 5m in dia and 25ft in depth in T.S. No 39/B, in Ennore village Tiruvallur Taluk, Tiruvallur district for the purpose of Industrial use.

This licence is granted for a well and pump conforming, to the specifications given below and is valid for a period of 90 days of part thereof from the date of issue.

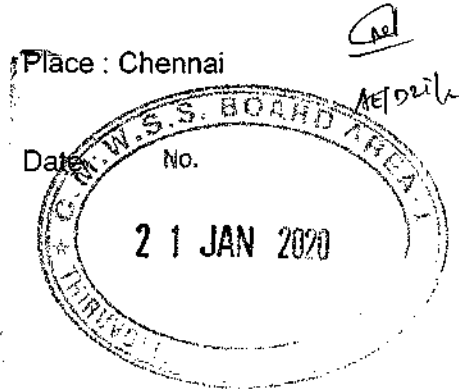
- | | | |
|--------------------------------|---|-------------|
| (1) Type of well | - | Open well |
| (2) Diameter | - | 5 m |
| (3) Depth | - | 25ft |
| (4) Pump | - | 12HP |
| (5) Type of pump | - | Centrifugal |
| (6) Horse power | - | 12 HP |
| (7) Number of hours of Pumping | - | 15hrs |

This provisional licence is subject to the following conditions :-

- (i) The owner should not deviate in any way from the specifications regarding well, pump, etc., mentioned above.
- (ii) The drawal of groundwater under this provisional licence shall not interfere with the normal activities of the locality nor should it cause any traffic hazard.
- (iii) The competent authority or any person duly authorized by it shall have the right to enter and inspect the place with such assistance as may be necessary to satisfy itself orhimself whether the conditions and restrictions specified in the licence are being compliedwith.
- (iv) The competent authority shall have right to restrict the use or withdraw or cancel the licence giving 15 days notice to the licensee specifying the reasons for doing so.

The Licence is also Subject to the following Conditions,

- 1) TANGEDCO Service connection on Commercial basis to be Produced.



[Handwritten Signature]

Signature of the Competent Authority.

Area Engineer-I
C.M.W.S.S. BOARD,
AREA-I, THIRUVOTTIYUR,
CHENNAI-600 019.

FORM-V

[See rule 4 (6)]

Provisional Licence for extraction or use of groundwater for purpose other than domestic purposes under section 5 (4) (a) (i) of the '[Chennai] Metropolitan Area Groundwater (Regulation) Act, 1987 (Tamil Nadu Act 27 of 1987).

Licence No. MW/A-I/E/13/2019-20

Thiru.P.Venkatesan, Son of Thiru.R.Ponnusamy, resident of Ashok Leyland – Foundry Division, Ennore, Chennai-57 is hereby granted provisional Licence for extraction or use of groundwater from a well (Well no. 5) of 5m in dia and 25ft in depth in T.S. No 39/B, in Ennore village Tiruvallur Taluk, Tiruvallur district for the purpose of Industrial use.

This licence is granted for a well and pump conforming, to the specifications given below and is valid for a period of 90 days of part thereof from the date of issue.

- | | | |
|--------------------------------|---|--------------------|
| (1) Type of well | - | Open well |
| (2) Diameter | - | 5 m |
| (3) Depth | - | 25ft |
| (4) Pump | - | 12HP |
| (5) Type of pump | - | Centrifugal |
| (6) Horse power | - | 12 HP |
| (7) Number of hours of Pumping | - | 15hrs |

This provisional licence is subject to the following conditions :-

(i) The owner should not deviate in any way from the specifications regarding well, pump, etc., mentioned above.

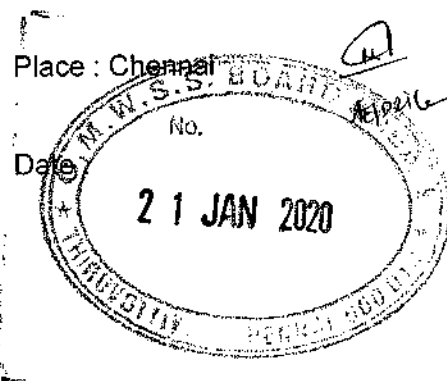
(ii) The drawal of groundwater under this provisional licence shall not interfere with the normal activities of the locality nor should it cause any traffic hazard.

(iii) The competent authority or any person duly authorized by it shall have the right to enter and inspect the place with such assistance as may be necessary to satisfy itself orhimself whether the conditions and restrictions specified in the licence are being compliedwith.

(iv) The competent authority shall have right to restrict the use or withdraw or cancel the licence giving 15 days notice to the licensee specifying the reasons for doing so.

The Licence is also Subject to the following Conditions,

- 1) TANGEDCO Service connection on Commercial basis to be Produced.




Signature of the Competent Authority.

Area Engineer-I
C.M.W.S.S. BOARD,
AREA-I, THIRUVOTTIYUR,
CHENNAI-600 019.

ANNEXURE - XII

AGREEMENT FOR COMBINED STP



ASHOK LEYLAND

December 27, 2013

To whomsoever it may concern

We wish to inform that Ashok Leyland Limited and Hinduja Foundries Limited are part of the Hinduja group of companies. The Ennore unit of Hinduja Foundry is situated adjacent to the Ennore unit of Ashok Leyland.

The Ennore unit of Ashok Leyland has a Sewage Treatment Plant of 1600 KL capacity. The Sewage Treatment Plant was installed in 1987 and the capacity was planned considering treatment of sewage arising out of both the Ennore unit of Ashok Leyland and Ennore unit of Hinduja Foundries.

The details of the quantity of Sewage generated are furnished below:

Quantity of Sewage and treated trade effluent from		
Ennore unit of Ashok Leyland Limited	:	1200 KL
Quantity of sewage from Ennore unit of Hinduja Foundries Limited	:	320 KL
	Total	: 1520 KL

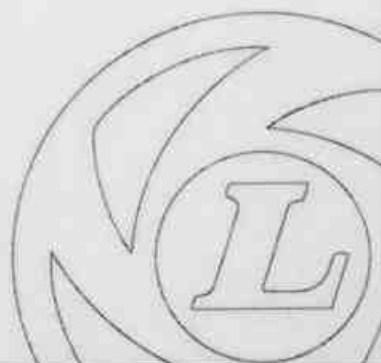
The capacity of STP is more than the quantity of sewage received. The discharge from our STP satisfies the standards prescribed by Tamil Nadu Pollution Control Board.

The STP at the Ennore unit of Ashok Leyland Limited has been treating the sewage discharged by the Ennore unit of Hinduja Foundries for the past 26 years and Ashok Leyland has absolutely no objection to discharge of sewage by the Ennore unit of Hinduja Foundries Limited into our Sewage Treatment Plant in the future.

Yours Truly
For Ashok Leyland Limited

K Sridharan Balaji
Plant Director

ASHOK LEYLAND LIMITED
Ennore, Chennai - 600 057, India.
t : +91.44.2575 1001 / 0233 f : +91.44.2575 1798 / 2273
Regd. Office: No.1, Sardar Patel Road, Guindy,
Chennai - 600 032, India. t : +91.44.2220 6000 f : +91.44.2220 6001
www.ashokleyland.com

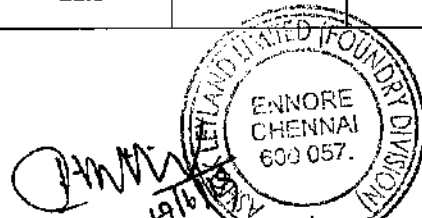


ANNEXURE - XIII

STACK DETAILS WITH APC MEASURES

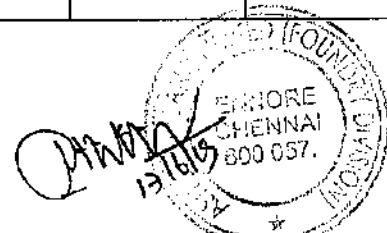
Annexure V

Additional/Modified Emission sources						
Stack No	Source of emission	Pollution Control measures	Stack top dimension (in Metres)	Stack Height above ground level(meters)	Material of Construction	Year of Installation
1	Induction Furnace I - 3 T	Wet scrubber with stack	0.5	16	MS	14.08.2003
2	Induction Furnace II - 3 T	Wet scrubber with stack	0.5	16	MS	14.08.2003
3	Induction Furnace III - 5 T	Wet scrubber with stack	0.5	16	MS	14.08.2003
4	Sand Recycling Plant	Bag Filters with stack	1	17	MS	03.01.2012
5	Sand Multi Cooler	Bag Filters with stack	0.7	8.5	MS	04.01.2012
6	IMF No bake Moulding Line Shack Out	Bag Filters with stack	0.9	14.6	MS	05.01.2012
7	Air Blowing Booth 1	Bag Filters with stack	0.7	8.5	MS	12.01.2012
8	Paint Booth - 1	Water curtain with stack	0.6	7.5	MS	15.01.2012
9	Paint Booth - 2	Water curtain with stack	0.6	7.5	MS	15.01.2012
10	Shot Blasting Machine - 1	Bag Filters with stack	0.6	12.5	MS	02.02.2012
11	Shot Blasting Machine - 2	Bag Filters with stack	0.6	12.5	MS	04.02.2012
12	Tum blasting Machine - 1	Bag Filters with stack	0.4	12.5	MS	06.02.2012
13	Tum blasting Machine - 2	Bag Filters with stack	0.4	11	MS	06.02.2012
14	Thermic Oven Senior	Stack	0.3	12.5	MS	09.02.2012
15	Thermic Oven Junior - 1	Stack	0.25	12.5	MS	11.02.2012
16	Thermic Oven Old (Hyundai)	Stack	0.25	12.5	MS	11.02.2012



Annexure V

17	Thermic Oven New (Hyundai)	Stack	0.25	12.5	MS	15.02.2012
18	Thermic Oven Leg Core	Stack	0.25	12.5	MS	15.02.2012
19	Thermic Oven Saddle Core	Stack	0.25	12.5	MS	18.02.2012
20	Thermic Oven IMF Core	Stack	0.25	12.5	MS	18.02.2012
21	Sand Batch Type Oven	Stack	0.25	12.5	MS	20.02.2012
22	SNAG Grinder - 1	Cyclone separator with stack	0.5	11.5	MS	24.02.2012
23	SNAG Grinder - 2	Cyclone separator with stack	0.34	8.8	MS	26.02.2012
24	SNAG Grinder - 3	Cyclone separator with stack	0.34	8.8	MS	26.02.2012
25	SNAG Grinder - 4	Cyclone separator with stack	0.43	11.8	MS	26.02.2012
26	SNAG Grinder - 5	Cyclone separator with stack	0.43	11.8	MS	27.02.2012
27	SNAG Grinder - 6	Cyclone separator with stack	0.43	11.8	MS	27.02.2012
28	Swing Frame Grinders - 1 & 2	Common cyclone separator with stack	0.36	12.5	MS	02.03.2012
29	Swing Frame Grinder - 3	Cyclone separator with stack	0.36	12.5	MS	04.03.2012
30	Swing Frame Grinder - 4	Cyclone separator with stack	0.36	12.5	MS	06.03.2012
31	Head Shake Out & Blowing	Cyclone separator with stack	0.36	11.5	MS	09.03.2012
32	Beaver Sand Mill	Vent filter with stack	0.6	12.5	MS	10.03.2012
33	New Sand Hopper (Hyundai)	Vent filter with stack	0.29	12	MS	10.03.2012
34	Induction Furnace IV - 5 T	Wet scrubber with stack	0.5	17.5	MS	08.03.2004



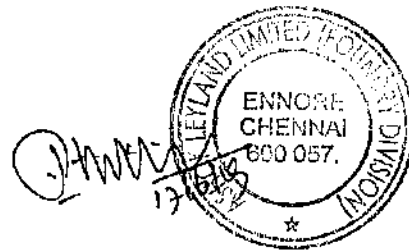
Annexure V

35	Induction Furnace V - 5 T	Wet scrubber with stack	0.5	17.5	MS	08.03.2004
36	Sand Recycling Plant 2	Bag Filters with stack	0.5	17.5	MS	03.03.2012
37	Sand Multi Cooler - 2	Bag Filters with stack	0.5	12.5	MS	03.03.2012
38	GZ Moulding Line Shake Out	Bag Filters with stack	0.8	11.5	MS	04.03.2012
39	Air Blowing Booth 2	Cyclone separator with stack	0.6	6	MS	05.03.2012
40	Paint Booth - 3	Water curtain with stack	0.6	6	MS	07.03.2012
41	Shot Blasting Machine - 3	Bag Filters with stack	0.5	11.8	MS	07.03.2012
42	Shot Blasting Machine - 4	Bag Filters with stack	0.5	11.8	MS	07.03.2012
43	Shot Blasting Machine - 5	Bag Filters with stack	0.5	11.8	MS	07.03.2012
44	Tum blasting Machine - 3	Bag Filters with stack	0.4	10.8	MS	11.03.2012
45	Thermic Oven Leg - 1	Stack	0.25	13	MS	13.03.2012
46	Thermic Oven Leg - 2	Stack	0.25	13	MS	15.03.2012
47	Thermic Oven Escorts	Stack	0.3	12.5	MS	09.03.2012
48	Thermic Oven M/C 32	Stack	0.24	11.4	MS	09.03.2012
49	Thermic Oven M/C 33	Stack	0.3	12.5	MS	11.03.2012
50	Thermic Oven Jr. Jacket	Stack	0.25	11.4	MS	11.03.2012
51	Pre-heating Welding Oven	Stack	0.4	9.5	MS	11.03.2012
52	Post heating Welding Oven	Stack	0.4	9.5	MS	11.03.2012
53	SNAG Grinder - 7	Cyclone separator with stack	0.38	8.6	MS	13.03.2012
54	SNAG Grinder - 8	Cyclone separator with stack	0.38	8.6	MS	13.03.2012
55	Swing Frame Grinders - 5 & 6	Common cyclone separator with stack	0.6	9.4	MS	13.03.2012



Annexure V

56	Swing Frame Grinders - 7 & 8	Common cyclone separator with stack	0.6	9.3	MS	17.03.2012
57	Swing Frame Grinder - 9	Cyclone separator with stack	0.4	9.5	MS	17.03.2012
58	Swing Frame Grinders - 10 & 11	Common cyclone separator with stack	0.5	11.8	MS	17.03.2012
59	Sand Mill - 1	Vent filter with stack	0.5	11.7	MS	18.03.2012
60	Sand Mill - 2	Vent filter with stack	0.5	11.7	MS	18.03.2012
61	WESMAN Stress Relieving Furnace - 1	Stack	0.8	9.5	MS	20.03.2012
62	WESMAN Stress Relieving Furnace - 2	Stack	0.5	11.7	MS	20.03.2012
63	GZ Line Pouring Exhaust 1	Stack	0.6	11.5	MS	19.03.2012
64	GZ Line Pouring Exhaust 2	Stack	0.6	11.5	MS	19.03.2012



ANNEXURE – XIV

HWA FROM TNPCB



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

October 24, 2019

To

The District Environmental Engineer,
TamilNadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai — 600 058.

Sub: Resubmission of application to get renewal authorization under Hazardous Wastes (Management and Transboundary Movement) Rules for our Foundry unit located at Kathivakkam High Road, Ennore, Chennai-600 057 - reg.

Ref: Authorization No: 4099 Dated. 08.02.2012 Proceedings No: T7 /TNPCB / F.3251 / HWM /TVL/2011, Dated: 08.02.2012. Our earlier application to get renewal authorization dated 31.05.2016 & 25.01.2017.

Dear Sir,

This has reference to the above-mentioned subject and our earlier application to get authorization under Hazardous Waste Rules, please find enclosed a copy of fresh application (Form-1) generated in online under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 duly filled along required enclosures for our Foundry unit.

Kindly arrange to issue the Renewal Authorization to generate, storage and dispose the hazardous waste in our plant at the earliest.

Thanking you,

Yours faithfully,

Yours faithfully,
For Ashok Leyland Ltd- Foundry Division,


24/10/19
P.Venkatesan
Plant Head



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Ameri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500

Registered & Corporate Office: No.1, Sardar Patel Road, Guindy, Chennai - 600 032, India | T : +91 44 2220 6000 | F : +91 44 2220 6001



Tamil Nadu Pollution Control Board

[See Rules 6(1)]

APPLICATION REQUIRED FOR GRANT/RENEWAL OF AUTHORISATION FOR GENERATION OR COLLECTION OR STORAGE OR TRANSPORT OR RECEPTION OR RECYCLING OR REUSE OR RECOVERY OR PRE PROCESSING OR CO- PROCESSING OR UTILISATION OR TREATMENT OR DISPOSAL OF HAZARDOUS AND OTHER WASTE

From

P Venkatesan
The Factory Manager
ASHOK LEYLAND LIMITED - FOUNDRY DIVISION
KATHIVAKKAM HIGH ROAD, ENNORE, CHENNAI

To

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
AMBATTUR

Sir

I/We hereby apply for authorisation/renewal of authorisation under the Sub-rule (1) of Rule 6 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

PART -A : General Details		
1 a)	Name and address of the unit and location of the facility	ASHOK LEYLAND LIMITED - FOUNDRY DIVISION KATHIVAKKAM HIGH ROAD, ENNORE, CHENNAI
b)	Name of the Occupier of the facility /Operator of disposal facility	P Venkatesan
c)	Designation	The Factory Manager
d)	Mobile No	9551687866
e)	e-mail Id	venkatesan.p@ashokleyland.com
f)	Authorization Type Applied For	Renew
g)	Authorisation required for	Generation,Collection,Storage,Disposal
2.	Nature and quantity of Hazardous waste handled in T/Annum (or) KL/Annum	

Name of Process	Name of Hazardous Waste (Category No)	Quantity	Waste Type	Waste Storage	Waste Disposal	Source of generation of waste	Physical status	Quantity stored at any time	Quantity accumulated as on 31st March
5. Industrial operations using mineral or synthetic oil as lubricant in hydraulic systems or other applications	5.1-Used or spent oil	20 KL/Annunum	Recyclable	MS Drums	Recovery and Reuse-Authorized recyclers	Production and Utilities	Oily	2 KL	2 KL
5. Industrial operations using mineral or synthetic oil as lubricant in hydraulic systems or other applications	5.2-Wastes or residues containing oil	2 T/Annunum	Incinerable	MS Drums	Pre-processors- GEPIL, Ranipet	Production and Utilities	Solid	0.4 T	0.5 T
33. Handling of hazardous chemicals and wastes	33.1-Empty barrels/canisters/liners contaminated with hazardous chemicals/wastes	190 T/Annunum	Recyclable	Concrete Tanks	Recovery and Reuse-Authorized recyclers	Production and Utilities	Solid	4 T	5 T
35. Purification and treatment of exhaust air/gases, water and waste water from the processes in this schedule and common industrial effluent treatment plants (CETP's)	35.3-Chemical sludge from waste water treatment	2 T/Annunum	Landfillable	Concrete Tanks	Common Landfill-TSDF, Gummidipundi	Effluent Treatment Plant	Solid	0.3 T	0.5 T

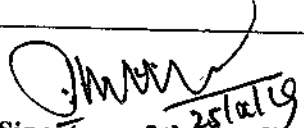
	21. Production and/or industrial use of paints, pigments, lacquers, varnishes and inks	21.1- Process wastes, residues and sludges	100 T/Annum	Recyclable	Concrete Tanks	Pre-processors- GEPIL, Ranipet	Paint Booth	Solid	10 T	10 T
3 a)	Year of commissioning and commencement of Production?						01/04/1961			
b)	Whether the industry works 1 shift/2 shifts/round the clock?						Round the clock/s			
4	<p>Provide copy of the Emergency Response Plan (ERP) which should address procedures for dealing with emergency situations (viz. Spillage or release or fire) as specified in the guidelines of Central Pollution Control Board. Such ERP shall comprise the following, but not limited to:</p> <ul style="list-style-type: none"> • Containing and controlling incidents so as to minimise the effects and to limit danger to the persons, environment and property; • Implementing the measures necessary to protect persons and the environment; • Description of the actions which should be taken to control the conditions at events and to limit their consequences, including a description of the safety equipment and resources available; • Arrangements for training staff in the duties which they are expected to perform; • Arrangements for informing concerned authorities and emergency services; and • Arrangements for providing assistance with off-site mitigatory action. <p>(To be attached separately)</p>						Attached			
5	Provide undertaking or declaration to comply with all provisions including the scope of submitting bank guarantee in the event of spillage, leakage or fire while handling the hazardous and other waste (To be attached separately)						Attached			
PART - B : Hazardous Waste Generators						Not Applicable				
6 a)	Products and By products manufactured Per Annum									
b)	Process description including process flow sheet indicating inputs and outputs (raw materials, chemicals, products, by-products, wastes, emissions, waste water etc) please attach separate sheets						Attached			
c)	Characteristics (waste-wise) and Quantity of waste generation per annum									
d)	Mode of management of waste									
e)	Details of the environmental safeguards and environmental facilities provided for safe handling of wastes									

Schedule	Name of Process	Name of Hazardous Waste (Category No)	Quantity	Characteristics of each waste	Details of utilization within the plant such as SLF, etc	If not utilised within the plant, provide details of what is done with this waste	Details of arrangements for transportation to actual users/ TSDF	Details of the environmental safeguards and environmental facilities provided for safe handling
f)	Hazardous and other wastes generated as per these rules from storage of hazardous chemicals as defined under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989							
PART - C : Treatment, Storage and Disposal Facility (TSDF) Operators					Not Applicable			
7 a.	Location address of TSDF site							
i)	Safe storage of the waste and storage capacity							
ii)	The treatment processes and their capacities							
iii)	Secured Landfills							
iv)	Incineration, if any							
v)	Leachate Collection and Treatment System							
vi)	Fire Fighting Systems							
vii)	Environmental management plan including monitoring							
viii)	Arrangement for transportation of waste from Generators							
ix)	Any other activities undertaken at the Treatment, storage and disposal facility site							
b)	Layout map of the TSDF				ATTACHED			
c)	Copy of prior Environmental Clearance				ATTACHED			
d)	PART-D : Recyclers/Pre-processors/Co-processors/Users of hazardous or other wastes : No							
8 i)	Nature and quantity of different wastes received per annum from domestic sources or imported or both:							
	Hazardous & Other Wastes Type		Passbook Type		Quantity		Source(Domestic/Imported)	
ii)	Installed capacity as per registration issued by the District Industries Centre or any other authorised Government agency				ATTACHED			
iii)	Details of secured storage of wastes including the storage capacity							
iv)	Process description including process flow sheet indicating equipment details, inputs and outputs (input wastes, chemicals, products, by-products, waste generated, emissions, waste water, etc.)				ATTACHED			
v)	Details of end users of products or by-products							

vi)	Details of pollution control systems such as Effluent Treatment Plant, scrubbers, etc. including mode of disposal of waste	
vii)	Details of occupational health and safety measures	
viii)	Has the facility been set up as per Central Pollution Control Board guidelines? If yes, provide a report on the compliance with the guidelines	
ix)	Arrangements for transportation of waste to the facility	

5. 2/19

Place: Ennore
Date: 25/10/19


25/10/19
Signature of the Applicant
Name and Designation

Enclosures :

1. Covering Letter (Attached)
2. Copy of the latest consent order/renewal issued (Attached)
3. Manufacturing process with flow sheet indicating Input, Output and sources of generation of hazardous waste (Attached)
4. Copy of Agreement made with the TSDF/Actual users (Attached)
5. Emergency Response Plan (ERP) which should address procedures for dealing with emergency situations (viz. Spillage or release or fire) as specified in the guidelines of CPCB (Attached)
6. Undertaking or declaration to comply with all provisions including the scope of submitting bank guarantee in the event of spillage, leakage or fire while handling the hazardous and other waste (Attached)
7. Compliance report on the CPCB guidelines for setting up the Actual user facility- For Actual Users (Attached)
8. Agreement for used empty barrel 33.1 (Attached)
9. 5.1 Used/ Spent oil agreement copy (Attached)
10. consent order ack copy (Attached)
11. ack copy of fees receipt 2019 (Attached)
12. consent order application copy air (Attached)
13. consent order application copy water (Attached)



15 FEB 2012



TAMILNADU POLLUTION CONTROL BOARD

Authorization Number:4099/Dated:08.02.2012.

Proceedings No. T7/TNPCB/F.3251/HWM/TVL/2011,Dated: 08.02.2012

Sub: TNPC Board – Occupiers – **M/s. Hinduja Foundries Limited**, Ernavoor Village, Ambattur Taluk, Thiruvallur District - Authorization for operating a facility for collection, storage and disposal of Hazardous Wastes under Rule 5(4) of the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 enacted under Environment (Protection) Act, 1986.

Ref: 1) Application, Dated 17.11.2011

2) IR No. F.AMB0001/RL/DEE/AMB/HWM/2011, Dated 19.12.2011

3) Authorization, Dated 28.11.2006

In accordance with, under the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008, Authorization is issued to

Thiru. K.Raman, Plant Director,
M/s. Hinduja Foundries Limited,
Ernavoor Village,
Ambattur Taluk,
Thiruvallur District.

He shall handle hazardous wastes as specified below:

Sl. No.	Details of unit process generating hazardous wastes as indicated in Column-2 of Schedule-1/ Class of waste substance as per Schedule-2	Details of waste stream as indicated in Column-3 of Schedule-1/ Identity of waste as per Schedule-2	Solid/ Semi Solid/ Liquid/ Oily/ Tarry/ Slurry/ Others	Quantity	Activity for which issue of Authorisation is considered
1	5 Industrial operations using mineral/ synthetic oil as lubricant in hydraulic systems or other applications	5.1 Used/ spent oil	Oily	100 KL/a	Collection, storage & disposal thro' authorized recyclers.
2	5 Industrial operations using mineral/ svnthetic oil as	5.2 Waste/ residues containing	Slurry	2 T/a	Collection, storage & disposal for co-processing in



TAMILNADU POLLUTION CONTROL BOARD

3	21	Production and/or industrial use of paints, pigments, lacquers, varnishes, plastics and inks	21.1	Wastes and residues	Semi Solid	1.2 T/a	Collection, storage & disposal for co-processing in cement kiln.
4	33	Disposal of barrels/containers used for handling of hazardous wastes/ chemicals	33.3	Discarded containers/ barrels/ liners contaminated with hazardous wastes/ chemicals	Solid	60,000 Nos./a	Collection, storage & disposal thro' authorized recyclers

The authorization is issued subject to the terms and conditions specified in Form-2 and special conditions annexed.

//Forwarded By Order//

Sd./-xxxxxx,
MEMBER SECRETARY.


for MEMBER SECRETARY.





TAMILNADU POLLUTION CONTROL BOARD

FORM 2

[See rule 5 (4)]

FORM FOR GRANT/RENEWAL OF AUTHORISATION BY SPCB/PCC FOR OCCUPIERS, REPROCESSORS, REUSERS AND OPERATORS OF FACILITIES FOR COLLECTION, STORAGE, AND DISPOSAL OF HAZARDOUS WASTE

1. Number of authorization and date of issue :4099/Dated: 08.02.2012
2. Thiru. K.Raman, Plant Director, of M/s. Hinduja Foundries Limited, is hereby granted an authorization to operate a facility for collection, storage and disposal of hazardous waste on the premises situated at Ernavoor Village, Ambattur Taluk, Thiruvallur District.
3. The authorization granted to operate a facility for collection, storage and disposal of hazardous wastes.
4. The authorization shall be in force for a period of Five years.
5. The authorization is subject to the conditions stated below and such conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

Sd./-xxxxxx,
MEMBER SECRETARY.

//Forwarded By Order//

[Handwritten Signature]
for MEMBER SECRETARY.

[Handwritten Initials]
TS/2

Terms and conditions of authorisation:

1. The authorisation shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.
2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board/ Pollution Control Committee.
3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the hazardous wastes without obtaining prior permission of the State Pollution Control Board/ Pollution Control Committee.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of this authorisation.
5. It is the duty of the authorized person to take prior permission of the State Pollution



TAMILNADU POLLUTION CONTROL BOARD

7. Any other conditions for compliance as per the guide lines issued by the Ministry of Environment and Forests or Central Pollution Control Board.
8. The unit shall take effective raw material and water conservation measures to minimize the generation of hazardous wastes.
9. The hazardous wastes shall be stored in an impervious and closed facility in order to prevent pollution of ground water and surface soil due to migration of wastes and probable leachate.
10. The unit shall ensure that used/spent oil and discarded containers/barrels/liners contaminated with hazardous wastes/chemicals are disposed only to facilities having valid Authorization of the Tamil Nadu Pollution Control Board/ other State Pollution Control Boards under the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and are registered as actual user facilities adopting environmentally sound management practices for reclaiming used oil.
11. The unit shall comply with all the provisions of the Rules and due attention shall be given towards compliance with Rule 7 while disposing oil wastes. The unit shall maintain relevant manifest system, which shall be operated in compliance with Rule 21. The manifest shall be endorsed by the transporter, dispatcher and receiver of oil wastes. The endorsed copy of the manifest shall be furnished to the Tamil Nadu Pollution Control Board as and when such disposal is made.
12. The used oil sent for reprocessing/recycling shall meet the specifications of Schedule V.
13. The unit shall ensure complete detoxification, removal and treatment of discarded containers before end use.
14. The unit shall collect, store and dispose suitably the hazardous waste stream of waste/residues containing oil and paint wastes/residues for co-processing in the cement kiln of the cement manufacturer having valid authorization for co-processing. The unit shall be permitted to store the hazardous wastes not more than 90 days as per CPCB Norms.
15. Records of hazardous wastes shall be maintained in Form 3 and Annual returns (for the period from January to December) shall be furnished to the Tamil Nadu Pollution Control Board by the date ending 31st January in Form 4.



TAMILNADU POLLUTION CONTROL BOARD

SPECIAL CONDITIONS

PART - 1

ON SITE GENERAL STORAGE REQUIREMENTS

1. Any increase in quantity, change in category, handling operations shall be brought to the notice of the Board and fresh authorization is to be obtained.
2. The unit may store hazardous waste on site for a maximum period of 90 days a maximum quantity of 10,000kgs. or a truck load whichever is less.
3. The unit shall not store the hazardous waste on open ground. It shall be stored in closed containers in an isolated area earmarked for the purpose within the premises (it shall not be accessible to rain water)
4. The unit shall mark each container holding the hazardous wastes with marking "Hazardous Wastes" both in English and Tamil. The containers shall be labeled as per the rules prescribed in the Motor Vehicles Rules, 1989.
5. The storage area should be fenced properly and a sign of danger should be placed at the storage site.
6. The containers holding the hazardous wastes should be kept in good condition and made of materials which can withstand the physical and environmental conditions during storage and transportation.
7. The unit shall provide requisite safety devices like safety mask, goggles, hand gloves, gumboots, fire fighting systems and maintain the same in working condition.
8. The containers holding the hazardous waste should be closed with lids during storage, except when it is necessary to add or remove wastes.
9. Only properly cleaned containers should be used for storage of hazardous wastes.
10. The unit shall notify to the Tamil Nadu Pollution Control Board in Form -1 at least once in 90 days as per the permitted on site storage period regarding the quantity of waste generated and total accumulated quantity. A containment system should be provided at the area of storage of hazardous waste within three months from the date of issue of authorization. It shall be designed and operated as follows.
 - a) The base underlying the containers should be constructed in such a way that it is free of cracks or gaps and it is sufficiently impervious to contain leaks spills and accumulated precipitation until the collected material is detected and removed.
 - b) The system should be designed and operated to drain and remove liquids which may result from leak, spillage or precipitation unless the containers are elevated or otherwise protected from contact with accumulated solids.



TAMILNADU POLLUTION CONTROL BOARD

- d) Run-on into the containment systems should be prevented unless the collection system has sufficient excess capacity in addition to that mentioned in paragraph (c) of this section to contain any run-on which might enter the system.
 - e) The containment should have a sump to collect any leak, spillage or precipitation. Spilled or leaked waste and accumulated precipitation should be removed from sump or collection area timely as it is necessary to prevent overflow of the collection system.
11. a) Containers holding ignitable or reactive waste should be stored at least 15 meters (50 feet) away from the plant operational area. "No Smoking" signs should be placed conspicuously wherever ignitable or reactive waste is stored.
- b) Container holding the wastes other than ignitable or reactive should be stored at least 6 meters (20 feet) away from the plant operation area.

12. SPECIAL REQUIREMENT FOR NON-COMPATIBLE WASTES:

Non-compatible hazardous wastes and materials should not be mixed in the same transportation or storage container.

13. Hazardous wastes should not be placed in an unwashed container that previously held any chemical material or non-compatible wastes. A storage container holding hazardous waste that is non-compatible with any waste or other materials stored nearby in other containers, piles, open tanks or surface impoundments should be separated from other materials or protected from them by means of a dike, berm, wall or other suitable devices.
14. The unit shall analyze the hazardous wastes for the parameters such as specific gravity, percentage solids, chemical composition, flash point, reactivity, toxicity, explosivity, calorific value and bio-degradability whichever is applicable. In addition the leachate generated shall also be analyzed. The report of analysis is to be maintained at the facility.

PART - II

GENERAL PACKAGING REQUIREMENTS

1. Packaging materials and contents shall be such that there will be no significant chemical and galvanic reaction among any of the materials in the package.
2. The closing system shall be adequate enough to prevent inadvertent leakage of



TAMILNADU POLLUTION CONTROL BOARD

4. The packaging should be secure enough to prevent leaks, spills and vapouration during transportation. The hazardous wastes shall be stored in clamp-lid containers. The container should be coated in black paint.
5. It shall be ensured that whenever hazardous wastes are offered for transportation the containers are marked specified under Special Condition 4 of Part -1.
6. a) Containers used more than once(refilled and reshipped after having previously emptied) must be in such condition that they comply in all respects with the prescribed requirements as specified under Special condition 1,2 and 3 above.
b) Containers previously used for any hazardous material having old marking and labels must be thoroughly removed or obliterated before being reused for storing hazardous wastes.
c) Containers specified for single trip and non-reusable containers from which contents have been removed must not be used for transportation of hazardous wastes.
d) Each container must be thoroughly cleaned to remove all residues and foreign matters, inspected for defects and deterioration. All closing devices and parts must be removed (if possible), inspected for defects and replaced if necessary.

PART – III

TRANSPORTATION REQUIREMENTS

The unit shall follow the guidelines for transportation as detailed below:

1. a) Containers offered for transportation are to be checked for their suitability and properly labelled as per Motor Vehicle Act, 1988 and rules 1989.
b) Ignitable, reactive or non-compatible hazardous wastes may not be transported along with other wastes.
c) Approximate number of portable fire extinguishers, safety goggles, gum boots, hand gloves, first aid kits, etc., shall be provided.
d) Adequate training to the drivers and helpers regarding handling and transportation requirements of hazardous wastes should be provided.
e) Necessary special lining, cushioning, shock absorbers, etc., to be provided to all



TAMILNADU POLLUTION CONTROL BOARD

3. Records pertaining to transportation of hazardous waste shall be maintained.
4. In an event of accidental spillage of hazardous waste during transit, the driver of the vehicle should follow the instructions issued in TREM card. Also he should intimate the fact immediately to fire brigade station, Police/ District authorities about the nature of the accident wherever necessary.
5. The unit is responsible for taking appropriate steps to clean up spillage occurring during transit as specified in TREM card.
6. Onsite Emergency Plan to be prepared and furnished to Tamil Nadu Pollution Control Board for storage and transportation of wastes.

PART - IV

RECORD KEEPING AND REPORTING

1. Complete record of collection, reception, treatment, storage and disposal of the hazardous waste shall be maintained in Form -3. The records shall be produced to the inspecting officer of the Board as and when required.
2. Annual returns for the facility shall be sent to the Board in Form-4.
3. Any occurrence of accident has to be communicated to the Board in Form-5.
4. Containers holding hazardous waste should be marked as per Form-8.
5. Disposal of hazardous waste shall be carried out by operating the manifest in Form-9.
6. All consignments of hazardous wastes shall be transported with transport emergency card as specified in Form -10.

Sd/- xxxxxx
MEMBER SECRETARY,

To

Thiru. K.Raman,
Plant Director,
M/s. Hinduja Foundries Limited,
Ennore, Chennai - 600 057.

Copy to:

1. The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
Ambattur.

2. BMS

3. Spare

ANNEXURE – XV

**AGREEMENT FOR DISPOSAL OF HAZARDOUS
WASTE**



தமிழ்நாடு தமில்நாடு TAMILNADU
27533 HINDUJA FOUNDRIES LTD
26.11.2014 Chennai-57

AT 620895
V. கௌசல்யா
மக்திகரத்தாள் விற்பனையா
வ.மா.ஸ்தி திருவொற்றியூர், செ
உ.எ.5392. 84/88

AGREEMENT

THIS AGREEMENT made on this 27th day of November the year Two thousand and fourteen

Between

M/s TAMILNADU WASTE MANAGEMENT LIMITED, A RAMKY GROUP COMPANY having its Corporate office at 6-3-1089/G/10 & 11, Gulmohar Avenue, Rajbhavan Road, Somajiguda, Hyderabad – 500 082, represented by its AUTHORISED SIGNATORY (herein after called (“TNWML”) of the FIRST PART (which expression include their successors and assigns, unless such inclusion is inconsistent with the context of meaning thereof)

AND

HINDUJA FOUNDRIES LIMITED having their production units at Kathivakkam High Road, Ennore, Chennai - 600 057, represented by its (Occupier) Mr.T.V.Nagaraju (herein after referred to as the (“GENERATOR”) OF THE SECOND PART (which expression include their successors and assigns, unless such inclusion is inconsistent with the context or meaning thereof).



T.V. Nagaraju
Plant Head - Ennore



WHEREAS the TNWML is extending an engineered facility to collect, Treat, Store and Dispose off Hazardous WASTE generated by the GENERATOR. The facility is situated at SIPCOT Gummudipoondi, Thiruvallur District, TamilNadu and had been established as per the TNPCB's Consent to Establish Order AND WHEREAS the GENERATORS desire to get their Hazardous WASTE (herein after referred as WASTE) being generated at their premises collected, treated, stored and disposed off, by utilizing the services of the TNWML.

NOW THEREFORE THESE PRESENTS WITNESSETH AND IT IS HEREBY DECLARED AND AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

01. The Scope of service to be provided by the TNWML is limited to collect, Transport, Treat, Store and Dispose Hazardous WASTE of the Generators.
02. The GENERATOR shall be member of Industrial Waste Management Association (herein after referred to as IWMA) and enter into an agreement with TNWML, and the agreement is non transferable.
03. The registered member's - Generator's obligation for utilizing the facility are to:
 - i) Provide details about the WASTE and its characteristics regarding presence of Explosive / Ignitable / Corrosive / Toxic / Odour Compounds in the Transport Manifest (Form - 13) as per Hazardous Waste (M&H) Rules, 1989 as amended in 2007 provided to the transporter for safe transportation and disposal and a TREM card (Form 11 - as per Hazardous Waste (M&H) Rules 1989 as amended in 2007 - provided by TNWML at cost to the transporter of the WASTE.
 - ii) Provide comprehensive analysis of WASTE on parameters identified in Item 04 of Annexure. TNWML shall also analyze the WASTE for finger print analysis at its own cost. The parameters for comprehensive and finger print analysis are provided in Item 4 & 5 of Annexure. In the event there are differences in the analysis results, the Waste Generators may send their samples to a mutually agreed third party at their own cost. Fresh Comprehensive analysis reports shall be provided by Waste Generators when there is a change in the waste characteristics, manufacturing processes, changes in product mix etc.
04. The Charges for Collection, Treatment, Storage and / or Disposal (herein after referred as USER CHARGE) will be applicable to Generators as per cost mentioned in ANNEXURE Item 03. The applicable charge is for direct disposal into landfill only.
05. The Waste Generators have to pay the deposit against providing containers at their premises. TNWML will supply the containers to help segregate the wastes and arrange the transport of such containers from the waste generator's premises. The deposit amount for the containers has been mentioned in Annexure item 02b.



T.V. [Signature]
T.V. [Signature]
Plant Head - Ennore



[Signature]

06. The GENERATORS have to pay additional STABILISATION CHARGES if the WASTE needs to be stabilized before landfill, as per the formula mentioned in ANNEXURE item No.03b. The bulking factor shall be calculated and mutually agreed to between TNWML and Generator based upon the material added for stabilization.
07. The Waste Generators have to pay the TRANSPORTATION CHARGES to the TNWML at the rate mentioned in Annexure, the distance being calculated from TNWML to collection point and back. Minimum distance considered for transportation one way is 10 KM.
08. TNWML shall collect the waste from the generator's premises within 7 days from the date of receipt of information from the generator. Safety of community during transportation is prime and thus safety information will have to be provided by the generator in Form 8, Waste transportation Manifest (Form 13) and TREM Card (Form 11) for every WASTE as per Hazardous Waste (Management and Handling) Rules, 1989 as amended in 2007. In the event of false information, all liabilities accrue to generators.
09. In case, for any reason, if TNWML's vehicle is sent back to the TNWML without giving the WASTE after being requisitioned by the Generator, the Waste Generators have to pay the TRANSPORT CHARGES for that trip as mentioned under Annexure item 03e.
10. The Waste Generators are responsible to store / accumulate the WASTE in the container provided by TNWML in a sanitary manner and so also, the container area should be accessible to the TNWML vehicle, to come and collect the container. The transporter reserves the right to reject pickup of waste spilled over the ground and container whose exteriors are soiled by waste spillage.
11. The waste generators will have to pay an amount of Rs. 1165 - per month as minimum service charges, the same shall be adjusted against every month bill. In case of any reason, the Generators, are unable to use the facility for a particular month/ period, the Generators have to pay minimum monthly service charges to TNWML.
12. In case the generator is unable to send the assured quantity of waste, as per their declaration the actual waste quantity will be charged as per the rate agreed and the difference between the assured quantity and actual quantity received, the charges shall be at the rate of 15% of the rate per M.T.
13. The monthly bill will be sent to the Waste Generators on or before 5th of every succeeding month and the bill amount shall be paid within 15 days of receipt of bill.



T.V. Nagaraju
T. V. Nagaraju
Plant Head, Chennai



14. The payments delayed beyond the date stipulated vide (15) above, shall be levied at the rate of 1.5% per month for the outstanding amount. If the outstanding amount has not been paid during the month TNWML reserves the right to refuse to extend the facility's services to the Waste Generators.
15. TNWML reserves the right to cancel the agreement if the Waste Generators fail / refuse to pay the bills/dues within three months of raising the bill and collect past dues with penal interest of 15% per annum.
16. WASTES which require alternate destruction technologies like reuse / recycle etc, shall be handled at this facility with generator's written approval. However, the prices for such treatment techniques shall be determined on a case to case basis purely based on their characteristics with mutual consent.
17. All information provided as well as obtained from the generator or from the analysis of its waste shall be kept confidential and only be disclosed under written consent of the generator, except where statutory requirement calls for disclosure under intimation to IWMA.
18. TNWML indemnifies the Generators from all the liabilities associated with Transport, Treatment, Storage and Disposal of Wastes outside the generator's premises, subject to compliance with all the conditions of the agreement and subject to the Laws of the Land.
19. The prices, quantity and other charges mentioned in this agreement and the Annexure shall be valid for a period of one year from the date of commissioning of the project. Any revision shall be done as per guidelines arising out of discussion between TNWML and IWMA.
20. TNWML and GENERATOR shall by mutual discussion preclose the agreement.
21. All questions, differences or disputes arising out of this Agreement or any matter connected thereto arising between the Parties or their respective representatives, whether as to construction or otherwise, shall be referred to arbitration of a Sole Arbitrator to be appointed by the Parties. The provisions of the Arbitration & Conciliation Act, 1996 or any re-enactment or statutory modification thereof for the time being in force shall be applicable for settlement of the dispute. The decision of the Sole Arbitrator shall be final and binding on the Parties. The venue of arbitration shall be Chennai and the language of arbitration shall be English. The arbitration proceedings will be on a fast track- basis. Any of the parties going for arbitration will submit its claim petition and documents to the Sole Arbitrator within one week of the reference being made to the Sole Arbitrator, with a copy to the Opposite Party. The Opposite Party will submit a copy to the party initiated the arbitration proceedings, within one week thereafter. The parties shall file their further replies or documents within one week thereafter.



T.V. Nagaraju
T.V. Nagaraju
Plant Head - Ennore



[Handwritten signature]

Immediately after the third week, the Sole Arbitrator will endeavour to commence the hearing on the 22nd day and will endeavour to go on with the hearing of the case on day to day basis without any adjournment, as far as possible. The Sole Arbitrator will also endeavour to give his award as early as possible in view of the urgency of the matter. The arbitration proceedings will be completed as far as possible within 40 days from the date of reference. The decision of the Sole Arbitrator will be final and binding on the parties.

22. Subject to Clause No.21 on Arbitration, the Parties hereto unconditionally and irrevocably agree to submit to the exclusive jurisdiction of the competent courts in Chennai.

01 FOR TAMILNADU WASTE MANAGEMENT LIMITED, THE FIRST PART.

(AUTHORISED SIGNATORY)

02 FOR



T.V. Narayana
President

(AUTHORISED SIGNATORY)
WASTE GENERATOR, THE SECOND PART.

In Witnesseth Thereof:

1. (G. VENKATARAJA)
Asst. Mgr. - EHS

2. (K. MAHADEVAN)
HRC

ANNEXURE ENCLOSED. Executive - HR

ANNEXURE

THE DEPOSITS AND CHARGES OF THE TNWML FACILITY WILL BE AS FOLLOWS.

1. MEMBERSHIP FEE : There shall be no membership fee. However, all industries shall have to become registered members of IWMA to enter into agreement.
2. ADVANCES: The Waste Generators have to pay one time deposit as mentioned below.

a) Security Deposit:

$$\frac{\text{Annual Assured Qty}}{12} \times 1.5 \times \text{Rs. } 1165.00$$

b) Container deposit: The Container deposits are

1.0 MT Containers	- Rs.10000.00
2.0 MT Containers	- Rs.15000.00
5.0 MT Containers	- Rs.23000.00
10.0 MT Hook Loaders	- Rs.125000.00

The generator may however fabricate / purchase containers from any other source, subject to using the design and meeting all the design criteria provided by TNWML. In such case, the container deposit shall not be collected from the generators. However, such containers shall be used as a common property of the facility and shall be replaced with an equivalent alternative only. The Generator will not have the right to seek the same container supplied by him.

3. CHARGES:

- a) The Waste Generators have to pay Rs.1165 - per tonne.
- b) Stabilization Charges: The cost of direct land filling (1-Bulking Factor) + Cost of stabilization Reagents + Rs.180 - Tonne re-handling expenses. Process and price for stabilization to be mutually agreed upon.
- c) Soluble salts: Soluble salts shall be disposed into the landfill by either creating a HDPE vault or shall be bagged in HDPE bags and disposed into the landfill with prior approval from TNPCB. Cost per tonne for soluble salts waste shall be Rs.200 plus user charges (not required if satisfactorily bagged).
- d) Service Charges:
The waste generator has to pay the minimum service charges of Rs.1165 - every month. The same shall be adjusted against bill of every month.

Note: Bulking factor: This will be percentage of the quantum of stabilizing materials like lime to be added to the wastes to make it fit for land filling.



T. V. N. N. N. N.
Plant Head - Elnore



- e) Transport charges: Rs.4.30 / KM/ Tonne calculated both ways
(Minimum for 10 KMS one way).
- f) The above charges are subject to deduction of Tax at source.

4. Parameters to be analyzed for comprehensive analysis of WASTE:

Calorific Value
Flash Point
% Moisture content (Loss on ignition at 105° C)
% Organic Content (Loss on ignition at 550° C)
Paint Filter Liquid Test (PFLT)
pH
Reactive Cyanide (PPM)
Total Cyanide
Reactive Sulphide (ppm)
Sulphur elemental
Concentration of individual inorganics (Metals)
Oil and Grease
Extractable Organics
% Carbon, % Nitrogen, % Sulphur, % Hydrogen
Concentration of Individual Organics
TCLP Concentrations of individual materials & Organic tests

5. Parameters to be analyzed for finger print analysis:

Physical State of the WASTE
Identification of different phases of WASTE
Colour and Texture
Specific Gravity
Viscosity
Flash Point
% Moisture content (Loss on ignition at 105°C)
% Organic Content (Loss on ignition at 550°C)
Paint Filter Liquid Test (PFLT)
Liquid Release test
pH
Reactive Cyanide (PPM)
Reactive Sulphide (ppm)



T. V. Manoj Kumar
T. V. Manoj Kumar
Plant Head - Ennore



We M/s. HINDUJA FOUNDRIES LIMITED hereby declare that we shall be sending 0.2 MT of accumulated Hazardous WASTE and 2 MT of generated hazardous waste per year to Tamil Nadu Waste Management Limited.

Sl.No	Category No	Waste Type	Disposal Method	Accumulated Quantity(MT)	Annual Generation (MT)
1	34.3	Chemical Sludge Waste water treatment	To be analyzed (Direct Landfill)	0.2 MT	2 MT

AUTHORISED SIGNATORY

- a) Discounts:
2% discount on regular and timely monthly payments.
- b) Any new levies on account of Governmental regulations / legislations shall be applicable from time to time which will be charged to the generators after mutual agreement between TNWML and IWMA.

FOR TAMILNADU WASTE MANAGEMENT LIMITED (FIRST PART)

(AUTHORISED SIGNATORY)



(AUTHORISED SIGNATORY)

Second Part – Waste Generator.

In Witnesses thereof:

1. (K. MAHADEVAN
Executive - HR)
2. (G. VENKATESH
Asst. Mgr. - EMT
BFC)



தமிழ்நாடு தமில்நாடு TAMILNADU

AMOUNT : 100

NO : 12247

DATE : 18-10-19

GUJARAT ENVIRO PROTECTION & INFRASTRUCTURE LTD.
Plot No. S-60, Phase-II, SIPCOT Industrial Complex
Ranipet - 632 405, Vellore District, Tamilnadu

BW 745085

L. DHANAKOT
Stamp Vendor
104, GANDHI ROAD,
RANIPET, T.N.L.No.250

AGREEMENT

THIS AGREEMENT is made on this 22nd day of October 2019 (hereinafter referred to as the "Effective Date") between Gujarat Enviro Protection and Infrastructure Limited (Unit - Ranipet), a company incorporated and registered under the provisions of the Companies Act, 1956 and having its registered office at 370, S V P Road, Cigaretwala Building, Opp. CBI, Prathna Samaj, Nr Harkishandas Hospital, MUMBAI - 400004, Maharashtra, INDIA (CIN: U74999MH1999PLC285408) (hereinafter referred to as "GEPIL" which expression shall unless repugnant to the context or meaning thereof shall mean and include its successors, permitted assigns) of the FIRST PART;

AND

M/s. Ashok Leyland-Foundry Division which is a Company / Partnership Firm / Proprietary Concern / Society / Association / Co-operative Management duly incorporated under the Provisions of Companies Act, 1956 and having its registered office and factory/works at Foundry Division, Kathivakkam High Road, Ennore, Chennai-600057 (hereinafter referred to as "the Generator" which expression shall unless repugnant to the context or meaning thereof, shall mean and include its successors, assigns and affiliates) of the OTHER PART.

Gujarat Enviro Protection & Infrastructure Ltd

Signed for & on behalf of GEPIL

Director / Authorised Signatory

Page 1 of 13

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)

Signed for & on behalf of Generator

Authorised Signatories

GEPIL and the Generator shall be individually referred to as Party and collectively as Parties, hereinafter.

WHEREAS:

- A. GEPIL is, *inter alia*, engaged in the business activity of development, operations and maintenance of infrastructure projects for hazardous waste management and has been granted Consent to Operate an 'Alternate Fuel Resource Facility' at Plot NO. S-60, Phase-III, SIPCOT Industrial Estate, Ranipet, District Vellore, Tamil Nadu (India) (hereinafter referred to as "AFRF") by Tamil Nadu Pollution Control Board (hereinafter "TNPCB") as per **The Environment (Protection) Act, 1986** and **Hazardous Waste (Management and Transboundary Movement) Rules, 2016** and amended thereafter (hereinafter referred to as "the Rules").
- B. The Generator is a member of the Industrial Waste Management Association (hereinafter called as "IWMA"), Tamil Nadu and is, *inter alia*, engaged in business activity relating to **Castings (Heads, Blocks)** and is generating Hazardous Liquid/Semi Solid/Solid Waste (hereinafter referred to as "Hazardous Waste") as specified in the Rules.
- C. GEPIL represented that it is fully capable and competent to treat and dispose of the Hazardous Waste in full compliance of applicable laws, rules and regulations and accordingly the Generator is desirous of sending its Hazardous Waste to the AFRF for necessary treatment and safe disposal of the same by GEPIL.
- D. GEPIL has agreed to manage, treat and dispose of the Hazardous Waste of the Generator at its AFRF and whereas the Generator agrees to send its Hazardous Waste to GEPIL on the terms and conditions stated hereunder.

NOW, THEREFORE, IN CONSIDERATION OF THE MUTUAL COVENANTS AND OBLIGATIONS SET FORTH HEREIN, BY THE PARTIES HERETO, IT IS AGREED AS FOLLOWS:

1. DEFINITIONS & INTERPRETATIONS

DEFINITIONS

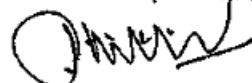
- 1.1. "**Authorisation**" shall mean any governmental or related regulatory authority's permission, in written format, for complying with any of the obligations envisaged under the terms of this Agreement;
- 1.2. "**Day**" means a period of Twelve (12) consecutive hours beginning at 08.00 hours and ending at 20.00 hours;
- 1.3. "**Effective Date**" shall mean the date on which this Agreement has been entered into and takes effect between the Generator and GEPIL;

Signed for & on behalf of GEPIL
Gepil Environmental Protection & Infrastructure Ltd Page 2 of 13


Director / Authorised Signatory

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)


Authorised Signatory

- 1.4. "Financial Year" means a year starts from 1st day of April month of the year and ending on 31st day of March month of next year;
- 1.5. "Month" means a period beginning at 08.00 hours on the first day of a Calendar Month and ending at 20.00 hours on the last day of same Calendar Month;
- 1.6. "Time" shall be stated in hours and minutes and shall mean Indian Standard Time;
- 1.7. "Week" means a period of Seven (7) consecutive days beginning from a specific day;
- 1.8. "Year" means a period of Three Hundred and Sixty Five (365) consecutive days or Three Hundred and Sixty Six (366) consecutive days when such period includes a Twenty Ninth (29th) day of February beginning at 8.00 hours from a day.

INTERPRETATIONS

- 1.9. The descriptive headings of Clauses are inserted solely for convenience of reference and are not intended as complete or accurate descriptions of the content of such Clauses;
- 1.10. The use of words in the singular or plural, or with a particular gender, shall not limit the scope or exclude the application of any provision of this Agreement to such person or persons or circumstances unless the context otherwise permits;
- 1.11. References to a Party hereunder shall include such Party's successors, permitted assigns and any Persons deriving title under it;
- 1.12. References to any agreement or document including this Agreement shall include such agreement or document as amended, modified, varied, novated, supplemented or replaced from time to time in writing signed by the concerned parties;
- 1.13. The terms "hereof", "hereto" and "hereunder" and similar expressions mean and refer to this Agreement and not to any particular Clause of this Agreement. The terms "Recital", "Schedule" or "Clause" mean and refer to the specified Recital of, Schedule to, and Clause of, respectively, this Agreement;
- 1.14. Any grammatical form of a defined term herein shall have the same meaning as that of such term;
- 1.15. The words "including" and "includes" herein shall always mean "including, without limitation" and "includes, without limitation", respectively;

2. SCOPE OF AGREEMENT

GEPIL shall collect, treat, dispose and fully manage the Hazardous Waste of Generator at its Alternate Fuel Resource Facility, Ranipet, Tamil Nadu in full compliance of all applicable laws, rules and regulations and the norms and standards prescribed thereon.

3. DATE OF AGREEMENT & PERIOD OF CONTRACT:

Valid until 9th day of September 2024 and the present agreement shall remain in force for a period of 05 years ("Term").

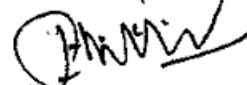
Signed for & on behalf of GEPIL

For Gujarat Enviro Protection & Infrastructure Ltd.


Director / Authorised Signatory

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)


Authorised Signatory

4. EXTENSION OF AGREEMENT

- a. After expiry of the above Term, the Agreement can be renewed at the option of the Generator on the same terms and conditions and for which the Generator shall give 60 days advance notice before the expiry of the Term and a fresh agreement at least one month before the date of expiry of this agreement shall be entered into.
- b. The agreement shall stand terminated even during the minimum period prescribed under Clause 14.1 herein below in case of the following eventualities:
- (i) On Authorization to GEPIL being cancelled, refused, or not granted by TNPCB.
 - (ii) On expiry of Authorization granted to the Generator and the same having not been renewed by the Generator or of the same having been not granted by TNPCB.
 - (iii) On expiry of the present Agreement, where no fresh agreement is signed and executed between parties hereto as mentioned above.
- c. Both the parties hereto further agree, in case of the present agreement coming to an end owing to any of the aforesaid eventualities, it will be the sole responsibility of the Generator to manage its Hazardous Waste in accordance with the relevant provisions of law and that GEPIL will not be responsible in any manner whatsoever with respect to Hazardous Waste of the Generator, unless the eventuality stated in sub-clause (i) of clause 4.b. above occurs due to any fault, lapse or negligence on the part of GEPIL or any reasons attributable to GEPIL and in which case GEPIL shall be fully responsible to duly indemnify and hold the Generator harmless for all claims, loss, damages and consequences..

5. PURPOSE OF THE AGREEMENT

GEPIL shall manage the Hazardous Waste of the Generator at its Alternate Fuel Resource Facility, Ranipet, Tamil Nadu, otherwise referred to as the AFRF, as specified in the Rules.

6. REGISTRATION FEE AND SECURITY DEPOSIT

- 6.1. The Generator shall have to make the payment of **Rs.50,000/- (Fifty Thousand Rupees Only) 18% GST extra***, exclusive of all taxes, towards its registration with GEPIL, for availing GEPIL's services (hereinafter "Registration"), which shall not be refundable in any event.
- 6.2. The Registration under this agreement shall not be transferable in any manner whatsoever, except in the event of change in name of the Generator's company or firm name, as applicable, without change in the management or control of Generator's organisation.

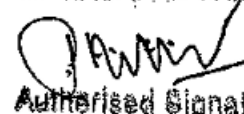
Signed for & on behalf of GEPIL

Gepil Enviro Protection & Infrastructure Ltd.


Director / Authorised Signatory

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)


Authorised Signatory

7. MANAGEMENT CHARGES

- 7.1. The management charges, exclusive of all taxes (hereinafter "Management Charges"), which is presently in force in accordance with the type of Hazardous Wastes that is suitable for co-processing and that which has been agreed to be sent to GEPIL by the Generator, is described as follows:

Sr. No.	Type of Wastes	Schedule Name	Accumulated QTY. in MT	Annual Generation QTY. in MT	Management Charges* (Rs. per MT)
1.	PAINT SLUDGE	21.1	2	12	Rs.11,000/-

(Attach sheets in case of more types of wastes)

*

- 7.2. The Generator shall be liable to pay GST apart from the above Management Charges.
- 7.3. The Management Charges that the Generator shall pay to GEPIL, shall be subject to revision every year/from time to time. The Management Charges that the member shall pay to GEPIL shall be subject to annual upwards revision by 5% (percent) per annum. The annual upward revision shall be effective from 1st April of each financial year. The annual upward revision shall be applicable irrespective of the clients become member during any month of a financial year.
- 7.4. GEPIL shall test and provide a comprehensive analysis of Hazardous Wastes, on identified parameters, as required for the AFRF, at standard rates agreed to with IWMA. This payment shall be in addition to the T&M Charges (as defined below).
- 7.5. The Comprehensive Analysis Report as specified above shall determine the acceptance of waste based on the waste characteristics and waste acceptance criteria given by GEPIL.

8. TRANSPORTATION


- 8.1. GEPIL shall provide Dumpers or Tractors or Tankers or Trucks for waste lifting, if the Hazardous Waste that is to be transported, available with Generator, is equal to or more than one vehicle capacity. Generator should ensure full capacity loading of the vehicle provided for waste lifting. If the vehicle is returned empty or partially filled, full capacity of vehicle will be charged.

Signed for & on behalf of GEPIL

Signed for & on behalf of Generator

Gujarat Enviro Protection & Infrastructure Ltd.

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Director / Authorised Signatory

For ASHOK LEYLAND LIMITED (FURNACE DIVISION)

Authorised Signatory

- 8.2. Transportation cost per metric tonne (hereinafter "MT") of Hazardous Waste / per kilometer transportation of such Hazardous Waste from the location of the Generator's unit to GEPIL, (Two way) shall be recovered at the following rates (hereinafter "Transportation Charges")

Sr.No.	Description	Rate *
1.	Transportation	Rs.4.5*KM*MT (Vehicle capacity or waste capacity whichever is higher)

- *
8.3. The Transportation Charges are subject to revision, only in consultation with and consent of IWMA. The annual increase in Transportation Charges shall be effective from 1st April of each financial year.
- 8.4. GEPIL shall provide Dumpers or Tractors or Tankers or Trucks for waste lifting, if the Hazardous Waste that is to be transported, available with Generator, is equal to or more than one vehicle capacity. In other circumstances GEPIL shall provide Dumpers or Tractors or Tankers or Trucks for waste lifting once a month. In either case, the Generator shall be charged on the capacity of the vehicle being provided for waste lifting.

9. OBLIGATION OF THE GENERATORS

- 9.1. While entering into the present agreement with GEPIL, the Generator shall submit all categories of Hazardous Waste they desire to send to AFRF, in writing. The said categories of Hazardous Waste shall be as per the parameters specified in the Schedules of the Rules. The Generator shall also give true and correct information related to the quantity, physical and chemical characteristics, nature, and toxicity of such Hazardous Waste substance(s).
- 9.2. The Generator shall get the Authorization from TNPCB, permitting the Generator to send its Hazardous Waste to GEPIL and it shall be the responsibility of the Generator to get the said Authorisation renewed from time to time.
- 9.3. The Generator has agreed to declare the Hazardous Waste quantities, to be sent for processing to AFRF, on an annual or monthly basis (as per the Rules) and confirm to a set schedule of waste supply to GEPIL.
- 9.4. The Generator shall provide basic information of the process of generating its Hazardous Waste or the chemicals used, along with Material Safety Data Sheet (hereinafter "MSDS"), for each of its products and its characterization to GEPIL or facility operator.
- 9.5. GENERATOR shall maintain detailed records and provide details of Hazardous Waste as follows:
- 9.5.1. Provide details of Hazardous Waste in the storage container as per Form 8 of the Rules.

Signed for & on behalf of GEPIL

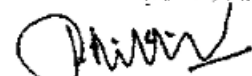
for Gujarat Enviro Protection & Infrastructure Ltd.


Director / Authorised Signatory

Page 6 of 13

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (GENUINELY INDIAN)


Authorised Signatory

- 9.5.2. Provide details about the Hazardous Waste and its characteristics like Explosive or Ignitable or Corrosive or Toxic or Odor compounds in the Transport Manifest Form (Form 10 of the Rules).
- 9.5.3. TREM card (Form 9 of the Rules) to the transporter of Hazardous Waste.
- 9.6. In the event of declaration of false information or withholding any information by the Generator, while transporting wastes to the AFRF, all liabilities that may arise during Transportation of the Hazardous Waste shall remain vested upon the Generator.

The Generator is obliged to intimate GEPIL, Three (3) days in advance, to arrange for Dumpers or Tractors or Tankers or Trucks for transportation of Hazardous Waste and on arrival of the same at the Generator's site, the Generator shall be responsible for loading its Hazardous Waste into the said Dumpers or Tractors or Tankers or Trucks within Three (3) hours of such arrival, or less, as may be notified by GEPIL from time to time. If the detention of the said Dumpers / Tractor /Tankers/ Trucks at the Generator's site exceeds the notified time, there shall be levied detention charges at the rate of Rs. 200 per extra hour. If the vehicle is halted in the night, the generator is liable to pay Rs.2000/- per night. The term or rates shall be revised by GEPIL from time to time and intimated to generator in advance.

- 9.7. The Generator shall give a written undertaking to GEPIL that the Generator shall take all precautions while packing and loading the Hazardous Wastes, in order to ensure that there shall be no leakage or spillage. The Generator shall take all practical steps to ensure that such Hazardous Waste is properly loaded in the fleet, without any adverse impacts that may result from such Hazardous Waste on the environment and the health of those around. In the event of such adverse impacts having been caused within the factory premises of the Generator, it shall be the sole liability of the Generator. Provided, the Generator shall not be liable if such adverse impact is due to any deficiencies with respect to the Dumpers/Tractors or Tankers.
- 9.8. GEPIL shall have the right to reject the Hazardous Waste and the Generator shall be bound to accept such Hazardous Waste back and bear all the cost associated with return of the Hazardous Waste rejected by GEPIL, if the same is rejected by GEPIL due to the any of the following reasons:
- 9.8.1. The variation in waste characteristics is beyond 5% (Five Per Cent) of the agreed percentage and is found unsuitable for AFRF.
- 9.8.2. The improper packing and loading of the Hazardous Wastes resulted in spillage and leakage.
- 9.8.3. The Registration with GEPIL for processing of the Generator's Hazardous Wastes has expired.

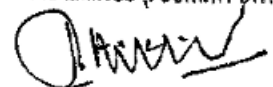
Signed for & on behalf of GEPIL

~~for Gujarat Enviro Protection & Infrastructure Ltd.~~


Director / Authorised Signatory

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)


Authorised Signatory

- 9.9. The Generator is obliged to maintain waste characteristics as intimated by GEPIL and/or as specified in the first analysis report (attached as Annexure 1 to this Agreement). The variation beyond 5% (Five Per Cent) of GEPIL's waste characteristic terms shall not be accepted by GEPIL. GEPIL is authorized to send the Hazardous Waste back to the Generator's facility, or is authorized to levy additional charges from the Generator, for the deviation from the waste characteristics list formulated by GEPIL.
- 9.10. The Generator shall have the right to have the analysis rechecked within 2 (Two) days of receipt of GEPIL's analysis of the Generator's Hazardous Waste, by a National Accreditation Board for Testing and Calibration Laboratories (hereinafter "NABL") accredited third party, which shall be accepted by GEPIL.
- 10. BILLING AND PAYMENT OF TRANSPORTATION AND MANAGEMENT CHARGES**
- 10.1. The Generator shall be required to make the payment within 15 (fifteen) days of receipt of the bill on Transportation Charges and Management Charges (hereinafter "T&M Charges"), by GEPIL.
- 10.2. GEPIL shall charge the Generator on the basis of weightment (the weight includes the container (drums/bags etc.,) of the waste) to be done at the GEPIL's site. If the Weigh Bridge is not working, then the Hazardous Waste shall be weighed at a Weigh Bridge located in a third-party location, approved by GEPIL.
- 10.3. The Generator shall pay an interest on the T&M Charges, in case of any delayed payment at a rate of 18% (Eighteen Per Cent) per annum. It is hereby agreed that within the stipulated due date of any invoice raised, against the Generator by GEPIL, GEPIL shall reserve its right to discontinue the arrangement under this agreement, on account of non-payment of any of its outstanding T&M Charges, in consultation with IWMA.

11. QUALITY

- 11.1. The Generator hereby covenants to see that its Hazardous Waste shall, under all circumstances, conform to the norms specified by TNPCB and as prescribed under the provisions of law, at that time being in force.
- 11.2. The following listed Hazardous Waste may not be accepted by GEPIL, unless otherwise expressly specified by GEPIL:
- 11.2.1. Wastes containing explosive substances;
 - 11.2.2. Waste which has an obnoxious odor;
 - 11.2.3. Waste which is flammable (Flash point below 65° C);
 - 11.2.4. Waste which contains shock sensitive substances;
 - 11.2.5. Waste which contains volatile substance of significant toxicity; and
 - 11.2.6. Waste which contains cyanide compounds.

Signed for & on behalf of GEPIL

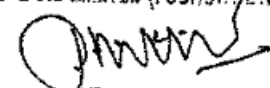
~~For Gujarat Enviro Protection & Infrastructure Ltd~~


Director / Authorised Signatory

Page 8 of 13

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (PUNJAB DIVISION)


Authorised Signatory

- 11.3. In the event the Hazardous Waste sent by the Generator is found to be unsuitable for AFRF application, then GEPIL, in consultation with the Generator, shall send the said unsuitable Hazardous Waste to an authorized third-party Treatment, Storage and Disposal Facility (hereinafter "TSDF"), on mutually agreed terms. The responsibility for coordinating with the TSDF shall lie with the Generator.

12. QUANTITY

- 12.1. Subject to the conditions mentioned under this clause in this agreement, the Generator shall send to GEPIL, its own Hazardous Waste, subject to a minimum quantity of 01 MT per month and 12 MT per annum, which shall be called the contracted quantity (hereinafter "Contracted Quantity").
- 12.2. If the Generator desires to send the requisite Hazardous Waste at a quantity lesser than 80% (Eighty Per cent) of the aforesaid annually Contracted Quantity, then the Generator shall be liable to pay to GEPIL for the minimum quantity of Hazardous Waste of 80% (Eighty Per Cent) of the annually Contracted Quantity.
- 12.3. If the Generator desires to send more than the annually Contracted Quantity of Hazardous Waste and if the GEPIL is capable of and prepared to receive the same, then the GEPIL may accept an additional quantity of up to 10% (Ten Per Cent) more than the annually Contracted Quantity, at the same price as that of the annually Contracted Quantity.

13. GEPIL'S OBLIGATIONS

- 13.1. GEPIL has agreed to manage and process the Hazardous Waste of the Generator, as per the applicable laws and after receipt of the necessary Authorization to be granted by TNPCB, from time to time.
- 13.2. GEPIL shall, on receipt of information from the Generator, plan and schedule for sending the transport for collection of the Hazardous Waste, within 3 (three) days of receipt of intimation from the Generator.
- 13.3. GEPIL shall appoint a responsible person and notify the Generator and the relevant regulatory agencies or statutory authorities for receiving, authorize unloading and signing of the relevant documents, like manifests and establish communication with the Generator and such relevant agencies or statutory authorities.

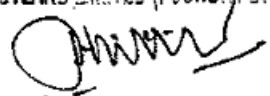
Signed for & on behalf of GEPIL

For Gujarat Enviro Protection & Infrastructure Ltd


Director / Authorised Signatory

Signed for & on behalf of Generator

For ASHOK LAYLAND LIMITED (FOUNDER) PRIVATE LTD

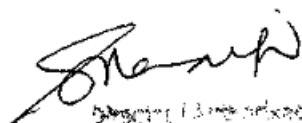

Authorised Signatories

14. TERM AND TERMINATION OF THE AGREEMENT

- 14.1. The term of this Agreement shall commence on the Effective Date and shall continue for a minimum period of **5 years**, unless terminated earlier as provided in this Agreement. Neither Party can terminate this Agreement during the initial period of **1 year** from the date of this Agreement, except as expressly provided in this Agreement. In the event that the Generator is desirous of sending its Hazardous Waste, suitable for co-processing, to GEPIL after the expiry of the present Agreement, it shall give Three (3) months advance notice in writing to GEPIL, of its desire of extend the period of of usage of GEPIL's facility and GEPIL shall, subject to the available capacity, consider the request and may in its absolute discretion, offer terms for fresh agreement. Both the Parties hereto shall after reaching an agreement on the offered terms shall execute a fresh agreement at least one month before the date of expiry of this agreement.
- 14.2. Subject to the initial period as aforesaid, either Party may terminate this Agreement with a written notice of 30 (thirty) days to the other Party, for any reason Termination of this Agreement shall be in addition to and not in limitation of any other rights or remedies to which either Party is or may be entitled to at law or in equity.
- 14.3. The Agreement may be terminated by either Party, in the event the performance of the obligations under this Agreement becomes impossible, due to reasons beyond the control of either Party.
- 14.4. The agreement to be terminated in the following eventualities:
- 14.4.1. On Authorization to GEPIL being cancelled, refused, or not granted by TNPCCB.
 - 14.4.2. On expiry of Authorization granted to the Generator and the same having not been renewed by the Generator or of the same having been not granted by TNPCCB.
 - 14.4.3. On expiry of the present Agreement, where no fresh agreement is signed and executed between parties hereto as mentioned above.
- 14.5. In the event of the Generator's defaulting any of the terms of this Agreement, GEPIL shall, in consultation with and consent of IWMA, delist the Generator from its registration records and terminate this Agreement.
- 14.6. Both the parties hereto further agree, in case of the present agreement coming to an end owing to any of the aforesaid eventualities, it will be the sole responsibility of the Generator to manage its Hazardous Waste in accordance with the relevant provisions of law and that GEPIL shall not be responsible in any manner whatsoever with respect to Hazardous Waste of the Generator.

Signed for & on behalf of GEPIL

~~ref~~ ~~General~~ ~~Enviro~~ ~~Protect~~ ~~and~~ ~~Infrastructure~~ ~~Ltd.~~



Director, General Services

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)



Authorised Signatories

15. INDEMNITIES

15.1. The Generator and GEPIL shall, at all times, comply with all the provisions of the relevant environmental Acts and Rules and other such notifications, guidelines and amendments that may be made by the relevant statutory authority, in this regard, from time to time. In the event of the Generator or GEPIL committing any breach of the terms of this Agreement or applicable laws, the Generator or GEPIL, as the case may be (hereinafter "**Indemnifying Party**"), shall indemnify and keep indemnified the other Party (hereinafter "**Indemnified Party**") from and against all claims, payments, costs and actions sustained or incurred by such Indemnified Party, .

16. FORCE MAJEURE

Neither Party shall be liable for any delay in meeting or for failure to meet its obligations under the Agreement due to any cause outside its reasonable control including, without limitation, acts of nature or war, riot, or any act of a governmental authority. If the Party is prevented from meeting its obligations due to any cause outside its reasonable control, it shall notify the other Party of the circumstances and the other Party shall grant a reasonable extension for the performance of the Agreement.

17. MISCELLANEOUS

17.1. **Entire Agreement.** This Agreement shall be deemed to represent the entire Agreement between the parties hereto regarding the subject matter hereof and shall supersede, cancel and replace any and all prior agreements or arrangements, if any, in this behalf, by and between the Parties hereto.

17.2. **No Partnership.** Nothing contained herein shall be deemed to constitute a partnership, joint venture or agency by and between the Parties hereto.

17.3. **Amendment.** This Agreement may be modified or amended only by writing, duly executed by or on behalf of the Parties hereto.

17.4. **Waiver.** Any terms and conditions of this Agreement may be waived at any time by the party that is entitled to the benefit thereof. Such waiver must be in writing and must be executed by an authorized officer of such party. A waiver on one occasion will not be deemed to be a waiver of the same or any other breach or non-fulfillment on a future occasion.

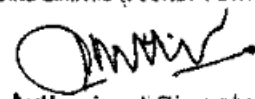
17.5. **Severability.** In the event that any provisions of this Agreement is held to be illegal, invalid or unenforceable under any present or future law such provisions shall be deemed terminable and the remaining parts & provisions of this Agreement shall remain in full force & effect.

Signed for & on behalf of GEPIL
Gujarat Enviro Protection & Infrastructure Ltd Page 11 of 13


Director / Authorised Signatory

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)


Authorised Signatories

17.6. **Assignment.** Neither Party shall assign the whole or part of its rights nor any benefits or obligations under this Agreement without the consent in writing by the other Party. In the event GEPIL transfers any part of its rights, benefits or obligations under this Agreement to a third Party, the Generator shall retain the right to terminate this Agreement immediately upon receiving notice of such intentions of transfer by GEPIL. Each Party shall at all times remain responsible for the performance of its obligations hereunder.

17.7. The following list of Mandatory documents are to be submitted by the Generator along with this agreement to become eligible for Member & for waste lifting.

1. Membership Application form
2. Waste Data Sheet.
3. PCB Authorization
4. Membership Agreement
5. Board Resolution Signed by the Director (or) Board of Directors
6. Memorandum of Article (MOA) (or) Article of Association.
7. Copies of PAN Card & GST details.

18. DISPUTE RESOLUTION

18.1. In the event of any dispute, disagreement or misunderstanding arising between the parties on the basis of this Agreement or upon any matter in connection with the terms of this Agreement, Parties shall seek to resolve the same, amicably through a mutual discussion. If said dispute, disagreement or misunderstanding remains unresolved within [30 (thirty)] days of notice being sent by one Party to the other, then the same shall be referred to a sole arbitrator for arbitration under the Arbitration and Conciliation Act, 1996, to be mutually appointed by both Parties.

18.2. The arbitral proceedings shall be in English and the venue shall be Chennai.

18.3. The terms of the sole arbitrator shall be final and binding on both Parties.

18.4. The Parties shall bear their own costs and expenses for the conduct of the arbitration proceedings.

19. GOVERNING LAW AND JURISDICTION

The terms of this Agreement shall be governed by the laws of India and the Courts of Chennai shall have exclusive jurisdiction to decide upon any matters arising from the terms of this Agreement, or having any connection thereto.


Signed for & on behalf of GEPIL

~~Central Waste Treatment & Infrastructure Ltd~~

Page 12 of 13

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (FOUNDRY DIVISION)



Director / Authorised Signatory


Authorised Signatory

IN WITNESS WHEREOF the parties hereto acting through their properly constituted representatives have set their hands to cause this AGREEMENT signed and executed in their respective names and on their behalf.

**For and on behalf of GEPIL
(Sign & Stamped by Authority)**

**For and on behalf of GENERATOR
(Sign & Stamped by Authority)**

Name : 

Designation :

Address :

Name :

Designation :

Address :

Witness:

1)

Name :

Designation :

Address :

Name :

Designation :

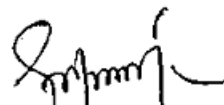
Address :

2)

Name :

Designation :

Address :


GINCE ANTONY
AREA MANAGER
GEPIL, BANIPET


Name :

Designation :

Address :

Signed for & on behalf of GEPIL

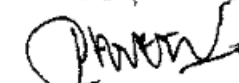
for Gujarat Enviro Protection & Infrastructure Ltd


Director / Authorised Signatory

Page 13 of 13

Signed for & on behalf of Generator

For ASHOK LEYLAND LIMITED (POWER DIVISION)


Authorised Signatories

ANNEXURE – XVI

ANNUAL RETURNS OF THE HAZARDOUS WASTE



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

20th July 2020

To
The District Environmental Engineer,
Tamil Nadu pollution control Board,
77A, South Avenue Road,
Ambatture Industrial Estate,
Chennai - 600 058.

Respected Sir,

Sub: Hazardous waste (Management, Handling & Transboundary Movement) Rules
2016 Annual Return Form 4 - Reg.

We herewith submit our Hazardous waste Annual return in Form 4 for the period of
April 2019 to March 2020.

This is for your kind perusal.

Thanking you,

Yours truly,
For Ashok Leyland Ltd-Foundry Division


P. Venkatesan
Plant Head

Encl: 1. Form 4



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T: +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T: +91 44 3325 4500

Export and Corporate Office: No. 1, Sardar Patel Road, Guindy, Chennai - 600 032, India | T: +91 44 2220 5000 | F: +91 44 2220 5001

FORM - 4
[Rules 6(5), 13(8), 16(6) and 20 (2)]
FORM FOR ANNUAL RETURN

1.	Name and address of the of facility	Ashok Leyland Ltd-Foundry Division, Ennore Unit, Chennai-600 057.
2.	Authorization No. and Date of issue:	4099 Dated:08.02.2012(Online Authorization renewal is in progress)
3.	Name of the authorized person and full address with telephone and fax number	P.Venkatesan Plant Head, Ashok Leyland Ltd-Foundry Division, Ennore Unit, Chennai-600 057.Ph: 044-2575 2103.
4.	Production during the year (product wise), wherever applicable	Gross production of Ferrous (Grey iron castings) From April 2019 to March 2020 – 25,640 MT

Part A. To be filled by hazardous waste generators

1	Total quantity of waste generated category wise	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	10 KL
		5.2 Wastes/Residues Containing oil	0.1 MT
		22.1 Paint sludge (waste & residue)	65 MT
		33.1 Discarded containers/barrels/tins	160 MT
2	Quantity dispatched (ii) To recycler or co-processors or pre-processor	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	9.2 KL
		5.2 Wastes/Residues Containing oil	0.8 MT
		22.1 Paint sludge (waste & residue)	62 MT
		33.1 Discarded containers/barrels/tins	159 MT
35.3 ETP Sludge	-		
3.	Quantity utilized in-house, if any	NA	
4.	Quantity in storage at the end of the year	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	0.8 KL
		5.2 Wastes/Residues Containing oil	0.1 T
		22.1 Paint sludge (waste & residue)	3.0 T
		33.1 Discarded containers/barrels/tins	1 T
	35.3 ETP Sludge	3.5 MT	
Part B. To be filled by Treatment, storage and disposal facility operators			NA
Part C. To be filled by recyclers or co-processors or other users			NA

Place: Ennore

Date: 20/07/2020

Signature :

Designation : Plant Head

(Handwritten Signature)
20/7/20



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

27th May 2019

To
The District Environmental Engineer,
Tamil Nadu pollution control Board,
77A, South Avenue Road,
Ambatture Industrial Estate,
Chennai - 600 058.

Respected Sir,

Sub: Hazardous waste (Management, Handling & Transboundary Movement) Rules
2016 Annual Return Form 4 - Reg.

We herewith submit our Hazardous waste Annual return in Form 4 for the period of
April 2018 to March 2019.

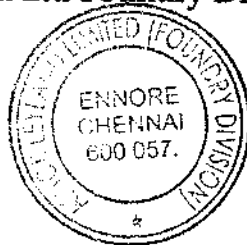
This is for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division

27/5/19
P.V.
P. Venkatesan
Plant Head



Encl: 1. Form 4



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500

FORM - 4
[Rules 6(5), 13(8), 16(6) and 20 (2)]
FORM FOR ANNUAL RETURN

1.	Name and address of the of facility	Ashok Leyland Ltd-Foundry Division, Ennore Unit, Chennai-600 057.
2.	Authorization No. and Date of issue:	4099 Dated:08.02.2012(Online Authorization renewal is in progress)
3.	Name of the authorized person and full address with telephone and fax number	P.Venkatesan Plant Head, Ashok Leyland Ltd-Foundry Division, Ennore Unit, Chennai-600 057.Ph: 044-2575 2103.
4.	Production during the year (product wise), wherever applicable	Gross production of Ferrous (Grey iron castings) From April 2018 to March 2019 - 30,882 MT

Part A. To be filled by hazardous waste generators

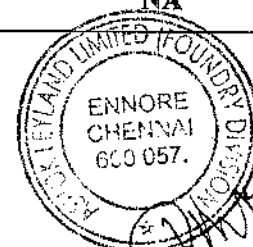
1	Total quantity of waste generated category wise	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	4.75 KL
	5.2 Wastes/Residues Containing oil	0.2 MT	
	22.1 Paint sludge (waste & residue)	50 MT	
	33.1 Discarded containers/barrels/tins	139.6 MT	
	35.3 ETP Sludge	1.3 MT	
2	Quantity dispatched (ii) To recycler or co-processors or pre-processor	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	4.75 KL
	5.2 Wastes/Residues Containing oil	0.2 MT	
	22.1 Paint sludge (waste & residue)	50 MT	
	33.1 Discarded containers/barrels/tins	139.6 MT	
	35.3 ETP Sludge	-	
3.	Quantity utilized in-house, if any	NA	
4.	Quantity in storage at the end of the year	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	0.6 KL
	5.2 Wastes/Residues Containing oil	0.01 MT	
	22.1 Paint sludge (waste & residue)	5.0 MT	
	33.1 Discarded containers/barrels/tins	3 MT	
	35.3 ETP Sludge	2.1 MT	
Part B.			NA
To be filled by Treatment, storage and disposal facility operators			NA
Part C.			NA
To be filled by recyclers or co-processors or other users			NA

Place: Ennore

Date: 27/05/2019

Signature :

Designation : Plant Head



Handwritten signature and date: 27/05/19



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

30th January 2018

To
The District Environmental Engineer,
Tamil Nadu pollution control Board,
77A, South Avenue Road,
Ambatture Industrial Estate,
Chennai - 600 058.

Respected Sir,

Sub: Hazardous waste (Management, Handling & Transboundary Movement) Rules
2016 Annual Return Form 4 - Reg.

We herewith submit our Hazardous waste Annual return in Form 4 for the period of
January 2017 to December 2017.

This is for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division


P. Venkatesan
Plant Head

Encl: 1. Form 4

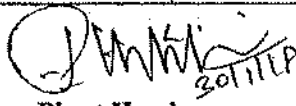

ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

FORM - 4
{Rules 6(5), 13(8), 16(6) and 20 (2)}
FORM FOR ANNUAL RETURN

1.	Name and address of the of facility	Ashok Leyland Ltd-Foundry Division, Ennore Unit, Chennai-600 057,	
2.	Authorization No. and Date of issue:	4099 Dated:08.02.2012	
3.	Name of the authorized person and full address with telephone and fax number	Plant Head, Ashok Leyland Ltd-Foundry Division, Ennore Unit, Chennai-600 057.Ph: 044-2575 2103.	
4.	Production during the year (product wise), wherever applicable	Gross production of Ferrous (Grey iron castings) From April 2016 to March 2017 - 30,725 MT	
Part A. To be filled by hazardous waste generators			
1	Total quantity of waste generated category wise	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	34 KL
		5.2 Wastes/Residues Containing oil	0.2 MT
		22.1 Paint sludge (waste & residue)	45.0 MT
		33.1 Discarded containers/barrels/tins	59000 Nos
2	Quantity dispatched (ii) To recycler or co-processors or pre-processor	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	33.6 KL
		5.2 Wastes/Residues Containing oil	0.2 MT
		22.1 Paint sludge (waste & residue)	44.0 MT
		33.1 Discarded containers/barrels/tins	58610 Nos
35.3 ETP Sludge	-		
3.	Quantity utilized in-house, if any	NA	
4.	Quantity in storage at the end of the year	Category of hazardous waste	Quantity (in MT/KL/Nos)
		5.1 Used/Waste oil	0.4 KL
		5.2 Wastes/Residues Containing oil	0.05MT
		22.1 Paint sludge (waste & residue)	1.0 MT
		33.1 Discarded containers/barrels/tins	390 Nos
35.3 ETP Sludge	1.2MT		
Part B.			
To be filled by Treatment, storage and disposal facility operators			NA
Part C.			
To be filled by recyclers or co-processors or other users			NA

Place: Ennore
Date: 30/01/2018

Signature : 
Designation : Plant Head



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

Ref: ALFD /EHS/F4/03/01/21

15th June'2021

To
The District Environmental Engineer,
Tamil Nadu pollution control Board,
77A, South Avenue Road,
Ambatture Industrial Estate,
Chennai - 600 058.

Respected Sir,

Sub: Hazardous waste (Management, Handling & Transboundary Movement) Rules
2016 Annual Return Form 4 - Reg.

We herewith submit our Hazardous waste Annual return in Form 4 for the period of
April 2020 to March 2021.

This is for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division


21/6/21
P. Venkatesan
Plant Head

Encl: 1. Form 4



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500

Registered & Corporate Office: No.1, Sardar Patel Road, Guindy, Chennai - 600 032, India | T : +91 44 2220 6000 | F : +91 44 2220 6001

CIN : L34101TN1948PLC000105 | www.hindujafoundries.com



HINDUJA GROUP

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ANNEXURE - XVII

FIVE YEARS PRODUCTION DETAILS

Additional details sought by TNPCB on 13.05.2019.



HINDUJA FOUNDRIES LIMITED
ENNORE, CHENNAI - 600 057

Production details for the Year 2015-2016

Gross production of Ferrous (Grey iron Castings) April 2015 to March 2016

Month/Year	Gross production of Ferrous (Grey iron Castings) in MT
Apr-15	2413
May-15	2812
Jun-15	2843
Jul-15	2791
Aug-15	2819
Sep-15	2706
Oct-15	2855
Nov-15	2342
Dec-15	2586
Jan-16	2760
Feb-16	2658
Mar-16	2812
Total Production (in MT)- 32397	



K. VARATHARAJAN
PLANT DIRECTOR
HINDUJA FOUNDRIES LTD,
KATHIVAKKAM HIGH ROAD,
ENNORE, CHENNAI-600 057.



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

PRODUCTION DETAILS FOR THE YEAR 2016-2017	
Gross production of Ferrous (Grey iron castings) April 2016 to March 2017	
Month/Year	Gross production of Ferrous (Grey iron castings) in MT
Apr-16	2506
May-16	2538
Jun-16	2710
Jul-16	2639
Aug-16	2782
Sep-16	2640
Oct-16	2601
Nov-16	2797
Dec-16	1718
Jan-17	2668
Feb-17	2461
Mar-17	2665
Total Production (in MT) - 30,725	

K. VARATHARAJAN
PLANT HEAD
ASHOK LEYLAND LTD.,
(FOUNDRY DIVISION)
KATHIVAKKAM HIGH ROAD,
ENMORE, CHENNAI-600 037.

ASHOK LEYLAND LIMITED (Foundry Division)

Enmore Unit | Kathivakkam High Road, Enmore, Chennai - 600 037 | T : +91 44 2575 2103
Superambudur Unit | Plot No. K-2, SIPCOT Ind. Estate, Arneri Village, Superambudur - 502 105 | T : +91 44 3325 4500
Registered & Corporate Office: No.1, Sardar Patel Road, Gummidu, Chennai - 600 082, India | T : +91 44 2220 6000 | F : +91 44 2220 6001
CIN : L34101TN1948PUC009105 | www.ashokleyland.com

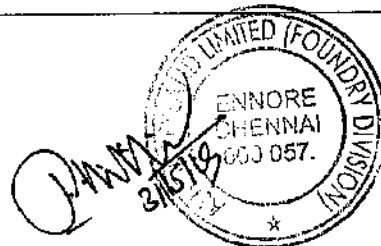


ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

Production details for the year 2017-18	
Gross production of Ferrous(Grey iron Castings) April 2017 to March 2018 <u>Consent order production capacity- 33500 MT/Annum</u>	
Month/Year	Gross actual production of Ferrous(Grey iron Castings) in MT
Apr-17	2656
May-17	2636
Jun-17	2684
Jul-17	2710
Aug-17	2729
Sep-17	2730
Oct-17	2705
Nov-17	2626
Dec-17	2590
Jan-18	2691
Feb-18	2650
Mar-18	2643
Total Actual Production in MT/Annum	32050

31/05/19



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103
Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500
Registered & Corporate Office: No.1, Sardar Patel Road, Guindy, Chennai - 600 032, India | T : +91 44 2220 6000 | F : +91 44 2220 6001
CIN : L34101TN1948PLC000105 | www.hindujafoundries.com

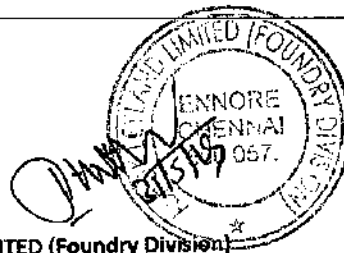


ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

Production details for the year 2018-19	
Gross production of Ferrous(Grey iron Castings) April 2018 to March 2019 <u>Consent order production capacity- 33500 MT/Annum</u>	
Month/Year	Gross actual production of Ferrous(Grey iron Castings) in MT
Apr-18	2551
May-18	2612
Jun-18	2756
Jul-18	2609
Aug-18	2540
Sep-18	2683
Oct-18	2494
Nov-18	2611
Dec-18	2557
Jan-19	2488
Feb-19	2345
Mar-19	2635
Total Actual Production in MT/Annum	30882

31/05/19



ASHOK LEYLAND LIMITED (Foundry Division)

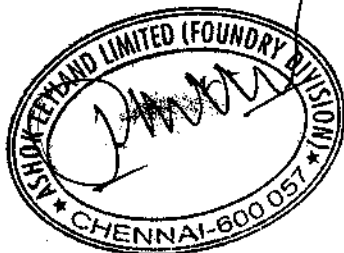
Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500

Registered & Corporate Office: No.1, Sardar Patel Road, Guindy, Chennai - 600 032, India | T : +91 44 2220 6000 | F : +91 44 2220 6001

CIN : L34101TN1948PLC000105 | www.hindujafoundries.com

PRODUCTION DETAILS FOR THE YEAR 2019-20	
Gross production of Ferrous and Non Ferrous castings April 2019 to March 2020	
Month /Year	Gross production of Ferrous (Grey iron castings) in MT
APRIL	2783.33
MAY	2869.01
JUNE	3092.17
JULY	2293.2
AUGUST	1574.27
SEPTEMBER	1326.58
OCTOBER	1747.66
NOVEMBER	1393.63
DECEMBER	1872.72
JANUARY	2015.66
FEBRUARY	2209
TOTAL	23177.23



PRODUCTION DETAILS FOR THE YEAR 2020-21

Gross production of Ferrous and Non Ferrous castings- April 2020 to March 2021

Month / Year	Gross production of Ferrous and Non Ferrous castings (Grey iron castings) in MT
APRIL	0
MAY	1486
JUNE	2485
JULY	2600
AUGUST	2625
SEPTEMBER	2575
OCTOBER	2675
NOVEMBER	2689
DECEMBER	2650
JANUARY	2525
FEBRUARY	2554
MARCH	2725
TOTAL	27589

PRODUCTION DETAILS FOR THE YEAR 2021-22

Gross production of Ferrous and Non Ferrous castings- April 2021 to March 2022

Month / Year	Gross production of Ferrous and Non Ferrous castings (Grey iron castings) in MT
APRIL	2785
MAY	1770
JUNE	2780
JULY	2670
AUGUST	1486
SEPTEMBER	2669
OCTOBER	2272
NOVEMBER	2268
DECEMBER	2721
JANUARY	2182
FEBRUARY	2652
MARCH	2785
TOTAL	29040

ANNEXURE - XVIII

ENVIRONMENTAL STATEMENT (FORM-V)



HINDUJA FOUNDRIES

01.09.16

To

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai - 600 058

Respected Sir,

Sub: Submission of Environmental Statement (Form - V) for the year ending 31st March 2016 of Hinduja Foundries Limited, Ennore.

We hereby furnish the Environmental Statement for the period of 01.04.15 to 31.03.16 and other required details are submitted for your kind perusal.

Thanking you,

Yours Truly,

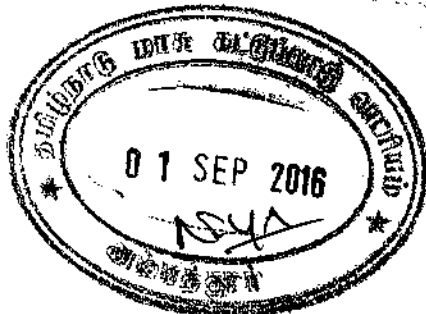
For Hinduja Foundries Limited,


11/9/16

F. Venkatesan
DGM- Projects & Maintenance



Encl: Form - V



HINDUJA FOUNDRIES LIMITED



FORM - V
[See Rule - 14]

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 201
FOR HINDUJA FOUNDRIES LIMITED, ENNORE - 600 057.

PART - A

(i)	Name & Address of the Owner/Occupier of the Industry operation or process:	Mr. D M Reddy HinduJa Foundries Limited Ennore, Chennai-600057
(ii)	Industry Category; Primary(STC Code) Secondary (SIC Code)	Red - Large
(iii)	Production Capacity (Units)	33,500 MT/Year
(iv)	Year of Establishment	1959 - Commissioned in 1961
(v)	Date of the last environmental statement submitted.	25.09.2015

PART - B

WATER & RAW MATERIAL CONSUMPTION

(i) Water Consumption (M³/day):

Process : 50
Cooling : 20
Domestic : 300

Name of Products	Process Water Consumption per unit of product output	
	During the previous financial year 2014-15	During the current financial year 2015-16
Ferrous & Non Ferrous Castings	2.11 KL/T	2.24 KL/T

(ii) Raw Material Consumption:

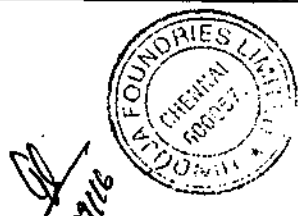
Sl.No	Name of Raw Material	Name of Products	Consumption of Raw Material per Ton	
			During the previous financial year 2014-15 (T)	During the current financial year 2015-16 (T)
Ferrous & Alloys				
1	Pig Iron	Ferrous & Non Ferrous Castings	0.10	0.11
2	Mild Steel		0.73	0.75
3	CI Scrap		0.22	0.21
4	Aluminum		-	-
5	Raw Silica Sand		0.80	0.84



PART - C

POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT
(Parameters as specified in the Consent Issued)

Sl.No	Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants in discharged (mass/volumes)			Percentage of variation from prescribed standards with reasons
			Parameters in mg/L.	Average Results (monthly)	Max. permissible Norms of SPC Board	
(a)	Effluent water	1.5 KL	pH(Number) TSS (mg/L) TDS (mg/L) Chlorides(mg/L) Sulphates(mg/L) Oils & Grease(mg/L) BOD (mg/L) COD(mg/L) Zinc(mg/L) Cyanide(mg/L) Total Chromium(mg/L) HexavalentChromium (mg/L) Copper(mg/L) Nickel(mg/L) Cadmium(mg/L) Lead(mg/L)	7.19 14.33 876.67 314.17 148.67 2.23 6.00 46.67 0.17 <0.001 <0.01 <0.01 <0.002 <0.048 <0.01 <0.48	5.5-9 100 2100 1000 1000 10 30 250 1 0.2 2 0.1 3 3 2 0.1	
(b)	Sewage water	240KL	Sewage is connected to the underground collection well to our sister concern M/s. Ashok Leyland and treatment done by them.			
(c)	AIR Induction Furnace (3.0 T) Induction Furnace (3.0 T) Induction Furnace (5.0 T) Induction Furnace (5.0 T) Induction Furnace (5.0 T)		SPM $\mu\text{g}/\text{m}^3$ SPM $\mu\text{g}/\text{m}^3$ SPM $\mu\text{g}/\text{m}^3$ SPM $\mu\text{g}/\text{m}^3$ SPM $\mu\text{g}/\text{m}^3$	41.6 40.8 56.3 51.2 48.7	150 150 150 150 150	



(d)	Ambient Air	PM 10 $\mu\text{g}/\text{m}^3$	65.8	100
		PM 2.5 $\mu\text{g}/\text{m}^3$	30.5	60
		SO ₂ $\mu\text{g}/\text{m}^3$	9.7	80
		NO ₂ $\mu\text{g}/\text{m}^3$	18.1	80
		Ozone(O ₃) $\mu\text{g}/\text{m}^3$	12.4	100
		Lead(Pb)($\mu\text{g}/\text{m}^3$)	0.1	1
		Carbon Monoxide(CO), (mg/m ³)	0.19	2
		Ammonia (NH ₃), ($\mu\text{g}/\text{m}^3$)	BDL (<5)	400
		Benzene(C ₆ H ₆)($\mu\text{g}/\text{m}^3$)	BDL (<0.01)	5
		BenzoPyrene(BaP),(ng/m ³)	BDL (<0.1)	1
		Arsenic (As) (ng/m ³)	BDL (<1)	6
Nickel(Ni), (ng/m ³)	BDL (<1)	20		

BDL-Below Detection Limit

PART - D

HAZARDOUS WASTES

(As specified under Hazardous Waste (Management & Handling Rules, 1989)

Hazardous Waste	Total Quantity (KL.)		
	During the previous financial year 2014 - 15	During the current financial year 2015- 16	
HAZARDOUS WASTE:			
01	Used Oil	1.025 KL	9.02 KL
02	Waste and Residues	2.05 T	1.2T
03	Discarded containers/liners use for Hazardous waste	34,376 NOS	47,063 NOS



PART - E
SOLID WASTES

Description	Total Quantity	
	During the previous financial year 2014 - 15 (T)	During the current financial year 2015- 16 (T)
(a) From Process		42439
i. Used Sand.	40628	1826
ii. Slag.	1738	60.5
iii. Grinding Dust.	120	NIL
(b) From Pollution control Facility	NIL	
(c) 1. Quantity recycled or reutilized	-	
2. Sold		
a) Used Sand	40628	42439
b) Slag	1738	1826
c) Grinding Dust	120	60.5

a) Grinding Dust and Slag are sold to outside vendor

PART - F

PLEASE SPECIFY THE CHARACTERIZATION (IN TERMS OF COMPOSITION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES

Sl.No	Name of the Waste	Quantity	Method of Disposal
SOLID WASTE:			
01	Used Sand	42439 T	Used for land filling
02	Slag	1826 T	Disposed to outside vendor
03	Grinding Dust	60.5T	Disposed to outside vendor
HAZARDOUS WASTE:			
01	Used Oil	9.02KL	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
02	Waste and residues	1.2T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
03	Discarded Containers/ Liners use for hazardous waste	47063 NOS	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.



PART - G

IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION

Major pollution abatement measures were:

- a) Plantation of 200 Trees and Survival rate was 75%.
- b) Maintaining the Rainwater harvesting system.
- c) Scrap disposal given due importance and scrap sold through e-auction.
- d) Hazardous waste disposal i.e. used oil & used batteries disposal is given due importance through TNPCB authorized recyclers.
- e) ETP treated water is used for recycling of water for process or gardening within our unit premises.

PART - H

ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION

- a) All stacks of Melting furnaces connected to Online Monitors - CARE AIR Center, TNPCB-Guindy.
- b) As an APC measures bag type dust collector unit installed for moulding line shakeout area.

PART - I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

- a) Reconditioning of pollution control equipments on regular basis.

AD
01/09/16





ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

11.09.17

To

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai - 600 058

Respected Sir,

Sub: Submission of Environmental Statement (Form - V) for the year ending 31st March 2017 of Ashok Leyland Ltd-Foundry Division.

We hereby furnish the Environmental Statement for the period of 01.04.16 to 31.03.17 and other required details are submitted for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division,


P. Venkatesan


DGM- Projects & Maintenance

Encl: Form - V





ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

11.09.17

To

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai - 600 058

Respected Sir,

Sub: Submission of Environmental Statement (Form - V) for the year ending 31st March 2017 of Ashok Leyland Ltd-Foundry Division.

We hereby furnish the Environmental Statement for the period of 01.04.16 to 31.03.17 and other required details are submitted for your kind perusal.

Thanking you,

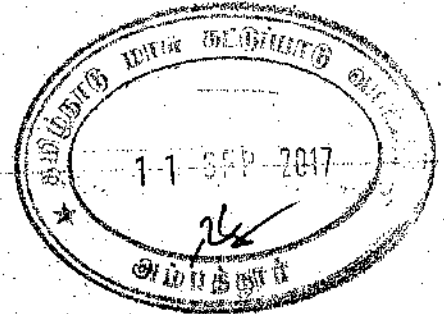
Yours truly,

For Ashok Leyland Ltd-Foundry Division,


P. Venkatesan


DGM- Projects & Maintenance

Encl: Form - V



FORM - V

[Rule - 14]

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2017
FOR ASHOK LEYLAND LIMITED-FOUNDRY DIVISION, ENNORE - 600 057.**

PART - A

(i)	Name & Address of the Owner/Occupier of the Industry operation or process:	Mr. Kamaal Basha Head - Foundry Ashok Leyland Ltd-Foundry Division Kathivakkam High Road Ennore, Chennai-600057
(ii)	<u>Industry Category;</u> Primary(STC Code) Secondary (SIC Code)	Red - Large
(iii)	Production Capacity (Units)	33,500 MT/Year
(iv)	Year of Establishment	1959 - Commissioned in 1961
(v)	Date of the last environmental statement submitted.	01.09.2016

PART - B

WATER & RAW MATERIAL CONSUMPTION

(i) Water Consumption (M³/day):

Process	: 50
Cooling	: 20
Domestic	: 300

Name of Products	Process Water Consumption per unit of product output	
	During the previous financial year 2015-16	During the current financial year 2016-17
Ferrous & Non Ferrous Castings	2.24 KL/T	2.18 KL/T

(ii) Raw Material Consumption:

Sl.No	Name of Raw Material	Name of Products	Consumption of Raw Material per Ton	
			During the previous financial year 2015-16 (T)	During the current financial year 2016-17 (T)
Ferrous & Alloys				
1	Pig Iron	Ferrous & Non Ferrous Castings	0.11	0.10
2	Mild Steel		0.75	0.73
3	CI Scrap		0.21	0.22
4	Aluminum		-	-

PART - C

POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT
(Parameters as specified in the Consent Issued)

Sl.No	Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants in discharged (mass/volumes)			Percentage of variation from prescribed standards with reasons
			Parameters in mg/L	Average Results (monthly)	Max. permissible Norms of SPC Board	
(a)	Effluent water	4.5 KL	pH(Number)	7.2	5.5-9	
			TSS (mg/L)	19.3	100	
			TDS (mg/L)	1101.1	2100	
			Chlorides(mg/L)	300	1000	
			Sulphates(mg/L)	287.6	1000	
			Oils & Grease(mg/L)	4.4	10	
			BOD (mg/L)	4.1	30	
			COD(mg/L)	24.0	250	
			Zinc(mg/L)	0.1	1	
			Cyanide(mg/L)	<0.005	0.2	
			Total Chromium(mg/L)	<0.003	2	
			HexavalentChromium (mg/L)	<0.01	0.1	
			Copper(mg/L)	<0.002	3	
			Nickel(mg/L)	<0.006	3	
Cadmium(mg/L)	<0.006	2				
Lead(mg/L)	<0.1	0.1				
(b)	Sewage water	Nil	Underground sewage is connected to the collection well M/s. Ashok Leyland and treatment done by them.			

G. S. K.
11/09/17

FORM - V

[Rule - 14]

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2017
FOR ASHOK LEYLAND LIMITED-FOUNDRY DIVISION, ENNORE - 600 057.**

PART - A

(i)	Name & Address of the Owner/Occupier of the Industry operation or process:	Mr. Kamaal Basha Head - Foundry Ashok Leyland Ltd-Foundry Division Kathivakkam High Road Ennore, Chennai-600057
(ii)	<u>Industry Category:</u> Primary(STC Code) Secondary (SIC Code)	Red - Large
(iii)	Production Capacity (Units)	33,500 MT/Year
(iv)	Year of Establishment	1959 - Commissioned in 1961
(v)	Date of the last environmental statement submitted.	01.09.2016

PART - B

WATER & RAW MATERIAL CONSUMPTION

(i) Water Consumption (M³/day):

Process : 50
Cooling : 20
Domestic : 300

Name of Products	Process Water Consumption per unit of product output	
	During the previous financial year 2015-16	During the current financial year 2016-17
Ferrous & Non Ferrous Castings	2.24 KL/T	2.18 KL/T

(ii) Raw Material Consumption:

Sl.No	Name of Raw Material	Name of Products	Consumption of Raw Material per Ton	
			During the previous financial year 2015-16 (T)	During the current financial year 2016-17 (T)
Ferrous & Alloys				
1	Pig Iron	Ferrous & Non Ferrous Castings	0.11	0.10
2	Mild Steel		0.75	0.73
3	CI Scrap		0.21	0.22
4	Aluminum		-	-

PART - C

POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT
(Parameters as specified in the Consent Issued)

Sl.No	Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants in discharged (mass/volumes)			Percentage of variation from prescribed standards with reasons
			Parameters in mg/L.	Average Results (monthly)	Max. permissible Norms of SPC Board	
(a)	Effluent water	4.5 KL	pH(Number) TSS (mg/L) TDS (mg/L) Chlorides(mg/L) Sulphates(mg/L) Oils & Grease(mg/L) BOD (mg/L) COD(mg/L) Zinc(mg/L) Cyanide(mg/L) Total Chromium(mg/L) HexavalentChromium (mg/L) Copper(mg/L) Nickel(mg/L) Cadmium(mg/L) Lead(mg/L)	7.2 19.3 1101.1 300 287.6 4.4 4.1 24.0 0.1 <0.005 <0.003 <0.01 <0.002 <0.006 <0.006 <0.1	5.5-9 100 2100 1000 1000 10 30 250 1 0.2 2 0.1 3 3 2 0.1	
(b)	Sewage water	Nil	Underground sewage is connected to the collection well M/s. Ashok Leyland and treatment done by them.			

GSK
11/09/17

PART - H

ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION

- a) Maintaining of Melting furnace stacks connected to Online Monitors - CARE AIR Center, TNPCB-Guindy.
- b) As a APC measures bag type dust collector unit under erected for moulding line shakeout area

PART - I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

- a) Reconditioning of pollution control equipments on regular basis.
- b) Sampling platform, port hole and ladder provisions given to the stacks as per the directions of TNPCB.

C. S. K.
11/09/17



ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

27.09.18

To

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai - 600 058

Respected Sir,

Sub: Submission of Environmental Statement (Form - V) for the year ending 31st March 2018 of Ashok Leyland Ltd-Foundry Division.

We hereby furnish the Environmental Statement for the period of 01.04.17 to 31.03.18 and other required details are submitted for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division,

P. Venkatesan
27/9/18
P. Venkatesan
Plant Head



Encl: Form - V

ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T: +91 44 3325 4500

Registered & Corporate Office: No. 1, Sankar Patel Road, Guindy, Chennai - 600 032 | T: +91 44 2610 2222

FORM - V

[Rule - 14]

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2018
FOR ASHOK LEYLAND LIMITED-FOUNDRY DIVISION, ENNORE - 600 057.****PART - A**

(i)	Name & Address of the Owner/Occupier of the Industry operation or process:	Mr. Vinod K Dasari Managing Director Ashok Leyland Ltd-Foundry Division Kathivakkam High Road Ennore, Chennai-600057.
(ii)	Industry Category: Primary(STC Code) Secondary (SIC Code)	Orange - Large
(iii)	Production Capacity (Units)	33,500 MT/Year
(iv)	Year of Establishment	1959 - Commissioned in 1961
(v)	Date of the last environmental statement submitted.	11.09.2017

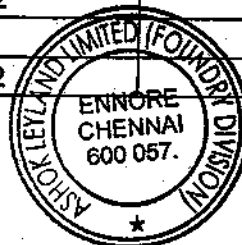
PART - B**WATER & RAW MATERIAL CONSUMPTION**(i) Water Consumption (M³/day):

Process : 60
Cooling : 28
Domestic : 350

Name of Products	Process Water Consumption per unit of product output	
	During the previous financial year 2016-17	During the current financial year 2017-18
Ferrous & Non Ferrous Castings	2.18 KL/T	2.20 KL/T

(ii) Raw Material Consumption:

Sl.No	Name of Raw Material	Name of Products	Consumption of Raw Material per Ton	
			During the previous financial year 2016-17 (T)	During the current financial year 2017-18 (T)
Ferrous & Alloys				
1	Pig Iron	Ferrous & Non Ferrous Castings	0.10	0.11
2	Mild Steel		0.73	0.74
3	CI Scrap		0.22	0.22
4	Aluminum		-	-
5	Raw Silica Sand		0.82	0.84



Handwritten signature and date:
27/09/18

PART - C

POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT
(Parameters as specified in the Consent Issued)

Sl.No	Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants in discharged (mass/volumes)			Percentage of variation from prescribed standards with reasons
			Parameters in mg/L.	Average Results (monthly)	Max. permissible Norms of SPC Board	
(a)	Effluent water	4.5 KL	pH(Number)	7.5	5.5-9	
			TSS (mg/L)	12	100	
			TDS (mg/L)	895.1	2100	
			Chlorides(mg/L)	34.4	1000	
			Sulphates(mg/L)	172.6	1000	
			Oils & Grease(mg/L)	0.9	10	
			BOD (mg/L)	3.8	30	
			COD(mg/L)	36.4	250	
			Zinc(mg/L)	0.1	1	
			Cyanide(mg/L)	<0.005	0.2	
			Total Chromium(mg/L)	<0.003	2	
			HexavalentChromium (mg/L)	<0.01	0.1	
			Copper(mg/L)	<0.002	3	
			Nickel(mg/L)	<0.006	3	
			Cadmium(mg/L)	<0.006	2	
Lead(mg/L)	<0.1	0.1				
(b)	Sewage water	350 KL	Underground sewage is connected to the collection well M/s. Ashok Leyland and treatment done by them.			

Handwritten signature
27/09/18



(c)	AIR				
	Induction Furnace III	PM mg/Nm ³	20	150	
	Induction Furnace IV	PM mg/Nm ³	16	150	
	Induction Furnace V	PM mg/ Nm ³	16	150	
	Fettl SB Dust collector 2-ML	PM mg/ Nm ³	69	150	
	Fettl SB Dust collector 1-ML	PM mg/ Nm ³	81	150	
	Sand Plant Dust Collector-ML	PM mg/ Nm ³	64	150	
	Captive power plant	PM mg/ Nm ³	18	150	
	Sand Plant MC Collector-EL	PM mg/ Nm ³	83	150	
	Fettl SB Dust collector 4-EL	PM mg/ Nm ³	95	150	
	Dhumbblast Dust Collector -EL	PM mg/ Nm ³	114	150	
Fettl SB Dust collector 5-EL	PM mg/ Nm ³	124	150		
(d)	Ambient Air	PM 10 µg/m ³	75.9	100	
		PM 2.5 µg/m ³	29.75	60	
		SO ₂ µg/m ³	14.2	80	
		NO ₂ µg/m ³	13.6	80	

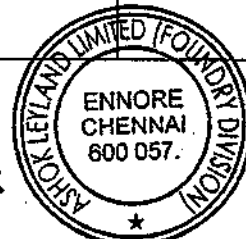
PART - D
HAZARDOUS WASTES

(As specified under Hazardous Waste (Management & Handling) Rules, 2016)

Hazardous Waste	Total Quantity (T/KL.)		
	During the previous financial year 2016-17	During the current financial year 2017-18	
HAZARDOUS WASTE			
01	5.1 Used Oil	5.13 KL	12 KL
02	5.2 Waste and Residues containing oil	0.2 T	2 T
03	21.1 Waste and Residues	36.8 T	48.5 T
04	33.1 Discarded containers/liners use for Hazardous waste	162 T	166T

PART - E
SOLID WASTES

Description	Total Quantity	
	During the previous financial year 2016-17 (T)	During the current financial year 2017-18 (T)
(a) From Process		
i. Used Sand.	51430	57468
ii. Slag.	1910	1945
iii. Grinding Dust.	64.2	69.5
(b) From Pollution control Facility	NIL	NIL
(c) 1. Quantity recycled or reutilized	-	-
2. Sold		
a) Used Sand	51430	57468
b) Slag	1910	1945
c) Grinding Dust	64.2	69.5



Handwritten signature and date: 22/10/18

a) Grinding Dust and Slag are sold to outside vendor

PART - F

PLEASE SPECIFY THE CHARACTERIZATION (IN TERMS OF COMPOSITION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES

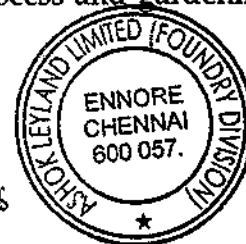
Sl.No	Name of the Waste	Quantity	Method of Disposal
SOLID WASTE:			
01	Used Sand	57468 T	Used for land filling
02	Slag	1945 T	Disposed to outside vendor
03	Grinding Dust	69.5 T	Disposed to outside vendor
HAZARDOUS WASTE:			
01	5.1 Used Oil	12 KL	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
02	5.2 Waste and Residues containing oil	2 T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
03	21.1 Waste and residues	48.5 T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
04	33.1 Discarded Containers/ Liners use for hazardous waste	166 T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.

PART - G

IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION

Major pollution abatement measures were:

- a) Plantation of 5385 Trees and Survival rate was 95%.
- b) Dense forest (Miyawaki method) developed within our unit premises in the area of 240 sq.m with 720 plants.
- c) Roof top rainwater harvesting system recharge well is maintained.
- d) Hazardous waste disposal i.e. used oil & used empty barrels, tins and buckets disposal is given due importance through TNPCB authorized recyclers.
- e) ETP treated water is used for recycling of water for process and gardening within our unit premises.



PART - H

**ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION
INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION**

- a) Maintaining of Melting furnace stacks connected to Online Monitors - CARE AIR Center, TNPCB-Guindy.
- b) As part of APC measures bag type dust collector units revamping has been done.

PART - I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

- a) Reconditioning of pollution control equipments on regular basis.
- b) Sampling platform, port hole and ladder provisions given to the stacks as per the norms.
- c) Natural turbo ventilators 25 Nos fitted on roof top of the shop floors.

AB
27/09/18





ASHOK LEYLAND

Aapki Jeet. Hamari Jeet.

27.05.19

To

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai - 600 058

Respected Sir,

Sub: Submission of Environmental Statement (Form - V) for the year ending 31st March 2019 of Ashok Leyland Ltd-Foundry Division.

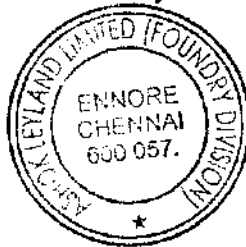
We hereby furnish the Environmental Statement for the period of 01.04.18 to 31.03.19 and other required details are submitted for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division,

Handwritten signature and date 27/5/19
P.Venkatesan
Plant Head



Encl: Form - V



ASHOK LEYLAND LIMITED (Foundry Division)

Ennore Unit | Kathivakkam High Road, Ennore, Chennai - 600 057 | T : +91 44 2575 2103

Sriperumbudur Unit | Plot No. K - 2, SIPCOT Indl. Estate, Arneri Village, Sriperumbudur - 602 105 | T : +91 44 3325 4500

600 057 | T : +91 44 3325 2000 | F : +91 44 3325 5001

FORM - V

[Rule - 14]

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2019
FOR ASHOK LEYLAND LIMITED-FOUNDRY DIVISION, ENNORE - 600 057.****PART - A**

(i)	Name & Address of the Owner/Occupier of the Industry operation or process:	Mr. P.Venkatesan Plant Head Ashok Leyland Ltd-Foundry Division Kathivakkam High Road Ennore, Chennai-600057.
(ii)	<u>Industry Category:</u> Primary(STC Code) Secondary (SIC Code)	Red - Large
(iii)	Production Capacity (Units)	33,500 MT/Year
(iv)	Year of Establishment	1959 - Commissioned in 1961
(v)	Date of the last environmental statement submitted.	27.09.2018

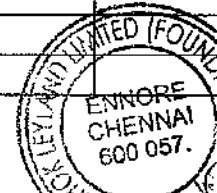
PART - B**WATER & RAW MATERIAL CONSUMPTION**(i) Water Consumption (M³/day):

Process : 60
Cooling : 28
Domestic : 350

Name of Products	Process Water Consumption per unit of product output	
	During the previous financial year 2017-18	During the current financial year 2018-19
Ferrous & Non Ferrous Castings	2.20 KL/T	2.15 KL/T

(ii) Raw Material Consumption:

Sl.No	Name of Raw Material	Name of Products	Consumption of Raw Material per Ton	
			During the previous financial year 2017-18 (T)	During the current financial year 2018-19 (T)
Ferrous & Alloys				
1	Pig Iron	Ferrous & Non Ferrous Castings	0.11	0.12
2	Mild Steel		0.74	0.75
3	CI Scrap		0.22	0.20
4	Aluminum		-	-
5	Raw Silica Sand		0.84	0.83



27/09/19

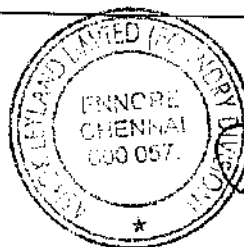
27/09/19

PART - C

POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT
(Parameters as specified in the Consent Issued)

Sl.No	Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants in discharged (mass/volumes)			Percentage of variation from prescribed standards with reasons
			Parameters in mg/L.	Average Results (monthly)	Max. permissible Norms of SPC Board	
(a)	Effluent water	4.5 KL	pH(Number)	7.3	5.5-9	-
			TSS (mg/L)	18.7	100	
			TDS (mg/L)	896	2100	
			Chlorides(mg/L)	323.7	1000	
			Sulphates(mg/L)	160.3	1000	
			Oils & Grease(mg/L)	<1	10	
			BOD (mg/L)	5.3	30	
			COD(mg/L)	24	250	
			Zinc(mg/L)	0.1	1	
			Cyanide(mg/L)	<0.005	0.2	
			Total Chromium(mg/L)	<0.003	2	
			HexavalentChromium (mg/L)	<0.01	0.1	
			Copper(mg/L)	<0.002	3	
			Nickel(mg/L)	<0.006	3	
Cadmium(mg/L)	<0.006	2				
Lead(mg/L)	<0.1	0.1				
(b)	Sewage water	300 KL	Underground sewage is connected to the collection well M/s. Ashok Leyland and treatment done by them.			

M
22/05/19



DANIEL
21/5/19

(c)	AIR				
	Induction Furnace III	PM mg/Nm ³	14	150	
	Induction Furnace IV	PM mg/Nm ³	15	150	
	Induction Furnace V	PM mg/ Nm ³	18	150	
	Fettl SB Dust collector 2-ML	PM mg/ Nm ³	86	150	
	Fettl SB Dust collector 1-ML	PM mg/ Nm ³	73	150	
	Sand Plant Dust Collector-ML	PM mg/ Nm ³	72	150	
	Captive power plant	PM mg/ Nm ³	16	150	
	Sand Plant MC Collector-EL	PM mg/ Nm ³	74	150	
	Fettl SB Dust collector 4-EL	PM mg/ Nm ³	124	150	
	Thumbblast Dust Collector -EL	PM mg/ Nm ³	98	150	
	Fettl SB Dust collector 5-EL	PM mg/ Nm ³	115	150	
(d)	Ambient Air	PM 10 µg/m ³	78.3	100	
		PM 2.5 µg/m ³	33.5	60	
		SO ₂ µg/m ³	12.8	80	
		NO ₂ µg/m ³	14.1	80	

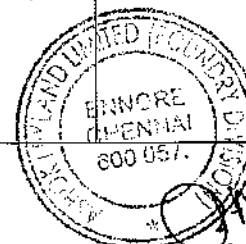
**PART - D
HAZARDOUS WASTES**

(As specified under Hazardous Waste (Management & Handling) Rules, 2016)

Hazardous Waste	Total Quantity (T/KL.)		
	During the previous financial year 2017-18	During the current financial year 2018-19	
HAZARDOUS WASTE			
01	5.1 Used Oil	12 KL	4.75 KL
02	5.2 Waste and Residues containing oil	2 T	0.2 T
03	21.1 Waste and Residues	48.5 T	50 T
04	33.1 Discarded containers/liners use for Hazardous waste	166T	139.6 T

**PART - E
SOLID WASTES**

Description	Total Quantity	
	During the previous financial year 2017-18 (T)	During the current financial year 2018-19 (T)
(a) From Process		
i. Used Sand.	57468	58424
ii. Slag.	1945	2769
iii. Grinding Dust.	69.5	120
(b) From Pollution control Facility	NIL	NIL
(c) 1. Quantity recycled or reutilized	-	-
2. Sold		
a) Used Sand	57468	58424
b) Slag	1945	2769
c) Grinding Dust(Grinding wheel)	69.5	120



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27/5/19

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a) Grinding Dust and Slag are sold to outside vendor

PART - F

PLEASE SPECIFY THE CHARACTERIZATION (IN TERMS OF COMPOSITION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES

Sl.No	Name of the Waste	Quantity	Method of Disposal
SOLID WASTE:			
01	Used Sand	58424 T	Used for land filling
02	Slag	2769 T	Disposed to outside vendor
03	Grinding Dust(Including used grinding wheel)	120 T	Disposed to outside vendor
HAZARDOUS WASTE:			
01	5.1 Used Oil	4.75 KL	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
02	5.2 Waste and Residues containing oil	0.2 T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
03	21.1 Waste and residues	50 T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.
04	33.1 Discarded Containers/ Liners use for hazardous waste	139.6 T	Sent to storage yard and then disposed to CPCB/TNPCB authorized recyclers.

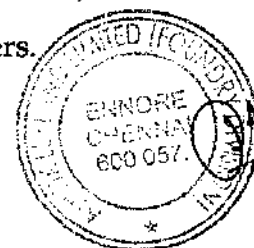
PART - G

IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION

Major pollution abatement measures were:

- a) Plantation of 2545 Trees and Survival rate was 95%.
- b) Dense forest (Miyawaki method) developed within our unit premises in the area of 120 sq.m with 360 plants.
- c) Roof top rainwater harvesting system recharge well is maintained.
- d) Hazardous waste disposal i.e. used oil & used empty barrels, tins and buckets disposal is given due importance through TNPCB authorized recyclers.

01/2/2019



25/5/19

- e) ETP treated water is used for recycling of water for process and gardening within our unit premises.

PART - H

ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION

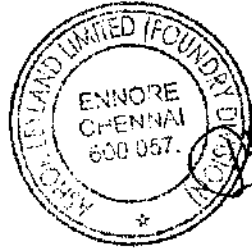
- a) Maintaining of Melting furnace stacks connected to Online Monitors - CARE AIR Center, TNPCB-Guindy.
- b) As part of APC measures bag type dust collector units revamping has been done.

PART - I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

- a) Reconditioning of pollution control equipment's on regular basis.
- b) Work is in progress to achieve the benchmarking level of indoor air quality

UB
27/05/19



27/5/19



ASHOK LEYLAND
Aapki Jeet. Hamari Jeet.

13.09.2021

To

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
77A, South Avenue Road,
Ambattur Industrial Estate,
Chennai - 600 058

Respected Sir,

Sub: Submission of Environmental Statement (Form - V) for the year ending 31st March 2021 of Ashok Leyland Ltd-Foundry Division.

We hereby furnish the Environmental Statement for the period of 01.04.20 to 31.03.21 and other required details are submitted for your kind perusal.

Thanking you,

Yours truly,

For Ashok Leyland Ltd-Foundry Division,


13/9/21

P.Venkatesan
Plant Head

Encl: Form - V



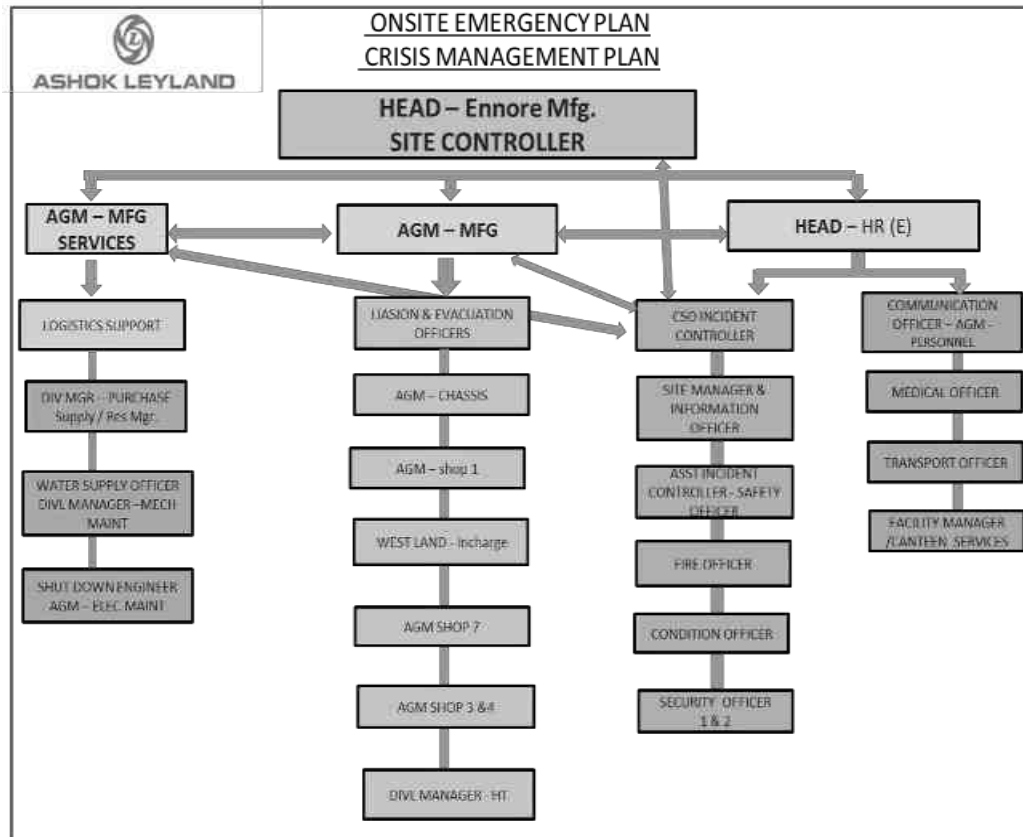
ANNEXURE - XIX

**EMERGENCY PREPARDNESS AND RESPONSE
PLAN**

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Emergency Response Preparation and Mitigation for Cyclone/Heavy Rains

Responsibility



Dept.wise check list is attached as annexure

Objective

This procedure is to prepare ER team for preparation and mitigation of Cyclone/Heavy Rains

Escalation

1. Based on the IMD forecast and severity of rainfall, Head - Ennore Mfg. Will decide to inform VP - Bus Operations.
2. VP - Bus Operations will decide to inform President - Operations.

Before Heavy Rain/Cyclone

- Listen radio, TV and Govt official broadcasting for weather reports
- Cover all electrical equipment's with plastic sheets
- Remove any materials hanging in the shop floors

- Board up glass windows
- Put storm shutters in place
- Clear rain water drain canal clear for free flow of water
- Keep a list of emergency phone no's
- Remove damaged power lines and tree branches
- Provide sufficient information to stakeholders regarding the weather condition
- Inform nearby industries for mutual support
- Check Gas and Diesel leak
- Prepare sufficient Emergency/Survival kits
- Brief ER team about the conditions and mitigation plan
- Brief the management regarding the condition and mitigation plan
- Ignore rumors, stay calm, don't panic

During Heavy Rain/Cyclone

- Stay Indoor
- Use concrete buildings for shelter
- Move away from low lying area
- Wait for official anticipate weather report
- Conserve all source of energy
- Keep your Torch, lantern and phones charged fully
- Use battery operated chargers
- Don't go outside until officially advised safe
- When running DG don't use more electricity power, use minimum requirement
- Use recommended route and don't rush
- Inform top management about the situation
- Always be in communication with team members

After Heavy Rain/Cyclone

- After rain/ cyclone assess the damage and allot responsibility to ER team
- Check all ER team members health condition before operation
- Use trained manpower in all activity
- Don't rush
- Check all electrical wires and supply before restoration
- Avoid jumping in to water
- Check all area for oil, diesel, paint and any other spillages and clear it as per SOP available
- Clear debris and unwanted materials from the roads
- Check all shops and buildings for easy accessibility and clear the area from obstruction
- Use minimal workforce for initial work and steadily increase the number
- Use diesel operated pumps for dewatering from low lying areas
- Inform all stake holders about the situation and seek their cooperation for their safety
- Don't deviate any safety protocols during restoration

Emergency Preparedness Plan based on Rain / Cyclone Forecast or any other Natural Calamity

S.No	Function	Nature of Emergency	Source of Information	Code Number	Severity 1 to 5	Critical Aspect / Activity / Check Point	Responsibility	Response time	Mi. Executive Manning/Shift	Remarks
1	Estate Maintenance	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-001	4-5	Subway Pumps Operation	N Sunderasan 9841694394	8 Hours	1	
						Main gate & Shop 5 Pump Operations				
						Check Storm Water Drain Exit Points				
						Open Storm Water Drain Shutters at WL				
						Close Rolling Shutters				
						Arrange adequate CCLs (Min 15/Shift)				
						Keep Adequate Sand Bags(Min 100 Nos)				
						Check Storm Water Drain slab pointing inside Shops, Stores & Assemblies				
						Check North light glasses/Roof sheets for stability				
						Keep ready Tarpaulins and Nylon Nets				
Communicate Forecast to HODs - Ennore										
2	Security	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-002	4-5	Fire Pumps Operation	Lt. Col SadaShakayam Peter 9841694394	8 Hours	2	
						Patrol Vehicles Readiness				
						Response to public queries at Gates				
						Rescue Team Readiness				
3	Canteen	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-003	4-5	Availability of Essential Items like: (Min 3 days)	Rex Peter 7299013234	8 Hours	1	
						LPG Cylinders				
						Milk				
						Water Bottles				
						Provisions				

						Vegetables				
						Adequate Staff				
4	Electrical	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-004	4-5	Inspect all areas thoroughly for any electrical damage Depending on water level rise/leakage /splashing switch off power to machines/equipment and put 'Do Not Switch On' Tag Check cable trenches, Generator Pits for water leakage Inspect all Substations, power distribution boards for water splashing and arrange suitable covering Inspect all wells/pump rooms and protect pumps and motors / switch off power depending on water level Keep ready Portable Mobile Gensets	Manish Ramakrishnan 9840755846	8 Hours	1	
5	Transportation	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-005	4-5	Availability of adequate & appropriate vehicles for transportation of Men, Machinery & Materials (All Shifts) Availability of Drivers (All shifts)	Satheesh 9841630650	2 Hours	1	
6	Diesel	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-006	4-5	Protection of Diesel Storage Sumps from contamination Ensure Availability of Diesel	Antony Peter 9840851374 RV Senthilkumar 9790908507	8 Hours	1	
7	HR/Personnel	Cyclone/Heavy to Very Heavy Rains	IMD - Forecast	AL-E-NC-007	4-5	Communication to Employees Handling of public related issues Creating Awareness to Employees/Interested parties	K Rameshkumar 9710926979	4 Hours	1	

Cyclone Safety Precautions - Self Check Sheet

S.No	CHECK POINTS	RESPONSIBILITY	YES/NO
1	Are the cars / vehicles / tankers are not parked close to trees	Security	
2	Are the hot work / Height work / Gardening work not carried out in the open areas	Safety	
3	Don't park chassis outside open area if required provide with wheel choke/stoppers	Chassis assembly / VTS	
4	Patrol in tank farms and other oil storage area	Security	
5	Check traffic sign boards and other name boards for loose sheets or hanging boards	Estate maintenance	
6	Open / Loose scrap transportation to be avoided	Estate maintenance	
7	Handling of mobile crane shall be avoided	Electrical Maintenance	
8	Shop Shutters to be closed depending upon the wind speed.Close the windows.	Estate maintenance	
9	Ensure stability in stacking or storage of parts / sub materials,pallets in the open areas.	Stores	
10	Alert the employees and contract CL's not to take shelter below the tree	Security	
11	Don't allow the persons in roof area and entry to be restricted.Ensure there is no loose parts.	Security	
12	Any temporary structure shall be secured/removed,spilled/sharp material on the floor shall be collected and disposed	Estate maintenance	
13	All bus drivers need to be cautioned for safe transportation of employees.	Transport	
14	Checking of all emergency lights,torch/DG sets,Dewatering pump and its working condition	Electrical Maintenance	
15	Ensure your area storm water trench free from blockage,damages..etc	Estate maintenance	
16	Ensure electrical panels area fully protected from water leakage and others	Electrical Maintenance	
17	Ensure the unused electrical equipments are isolated before leaving (Computer,water dispenser etc..)	Electrical Maintenance	
18	Ensure no loading and unloading activities (Chemicals and materials)	Stores	

Cyclone Safety Precautions - Security Check Sheet

S.No	CHECK POINTS	REMARKS
1	Listen radio, TV and Govt official broadcasting for weather reports	
2	Cover all electrical equipment's with plastic sheets	
3	Remove any materials hanging in the shop floors	
4	Board up glass windows	
5	Put storm shutters in place	
6	Clear rain water drain canal clear for free flow of water	
7	Keep a list of emergency phone nos	

8	Remove damaged power lines and tree branches	
9	Provide sufficient information to stakeholders regarding the weather condition	
10	Inform nearby industries for mutual support	
11	Check Gas and Diesel leak	
12	Brief the management regarding the condition and mitigation plan	
13	Brief ER team about the conditions and mitigation plan	
14	Nomination of Security Officers (24X7)	
15	Training of ERT	
16	ER vehicle checks	
17	Reserve SO for Mitigation	
18	Fire pump 1 & 2	
19	ER vehicle kit	
20	Walkie-Talkie provision to Head Mfg, AGM -Mfg services & Manager - Maintenance	

Estate Maintenance Checklist for Emergency Response Preparation and Mitigation for Cyclone/Heavy Rains

Flooding of subway during heavy monsoon:

1	Sand bags to be kept ready on either side of Subway entrance
2	All pumps situated on the eastern and western side of subway should be in operational condition
3	Inform security service for guarding on either side of subway to prevent movement of vehicles & Personal
4	All Storm water drain pumps situated at Admn. Building ML Canteen & Shop 5 should be in operation condition
5	All storm water drain outlet shutters in Eastland and Westland should be kept open only during rain
6	All Storm water drains should be checked for free flow of water.
7	All grills fixed in storm water drain outlets should be free of clutters
8	Road – Spout points should be free of clutters
9	Inform fire service for Mobile pump
10	Inform electrical department for availability of electricians for restoring power in case of electrical defaults in motors
11	Ensure availability of plumbers for attending breakdown in pumps if any.
12	After dewatering, clean the respective areas

Precautionary Measures to be taken in Shops during heavy Monsoon / Cyclone:

1	Sand bags to be kept ready on low lying shop entrance
2	Rolling shutters to be lowered to 8' 0" height only and all shop windows to be closed
3	All storm water drains inside shops should be checked for free flow of water
4	North light Glass & gutter conditions to be checked
5	RCC Building Roof & Sunshades spout holes to be checked
6	JCB, Tree cutting machines & Crane facilities should be kept ready in case of tree uprooting
7	Ensure availability of adequate contract casuals for cleaning the shop
8	Roof leak areas to be noted during rain and attended after rain over

ANNEXURE - XX

ADEQUACY REPORT BY ANNAMALAI UNIVERSITY

Adequacy Report

For

M/s. Ashok Leyland Limited , Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur
District, Tamil Nadu

Prepared By

Centre for Atmospheric Research & Climate Change

Annamalai University

and

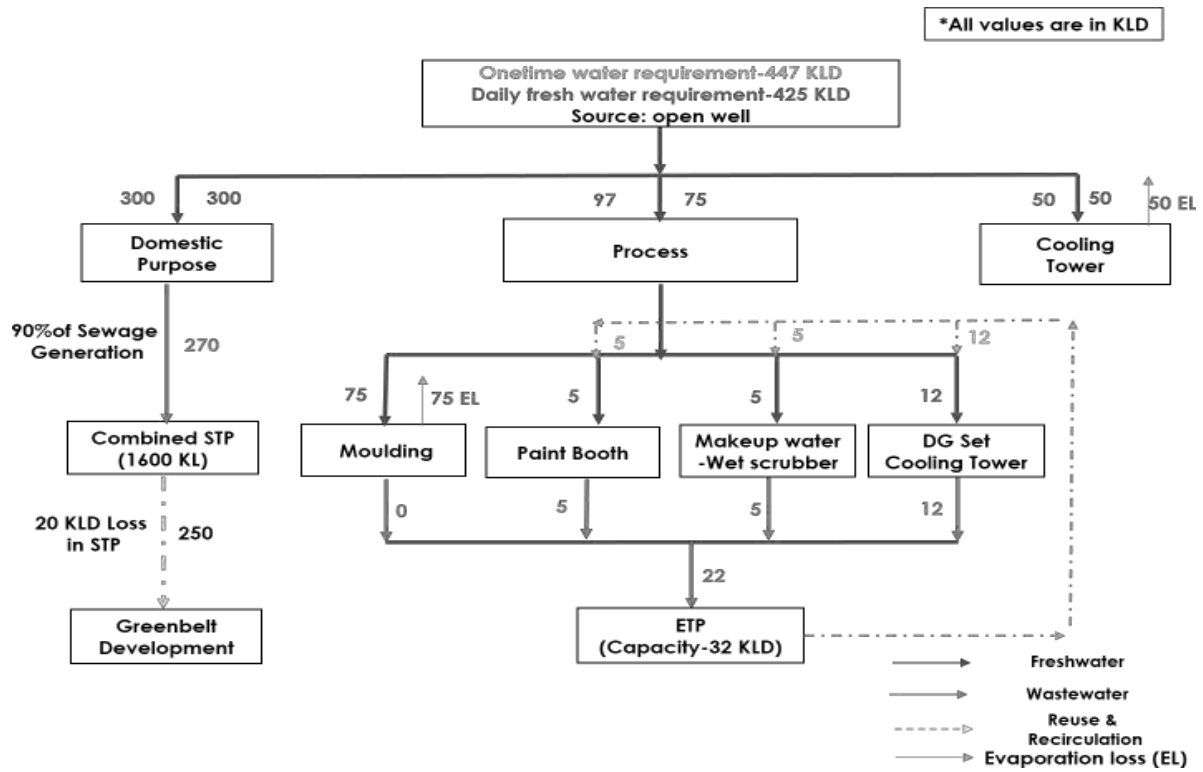
Linga Research and Consultancy services

65-A, Kasipillai Street

Chidambaram

CHAPTER 1 – DETAILS OF EXISTING / PROPOSED PROFILE

Sr.no.	DESCRIPTION	
A	Name of Unit	M/s. Ashok Leyland Limited
B	Factory Address	Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu
C	TNPCB ID	Consent Order No: 2008212173779
E	PRODUCT NAME & CAPACITY (MT/Month)	
	<p>Existing: Production of ferrous castings of 2790 TPM.</p> <p>Proposed: the expansion to increase the manufacturing capacity of ferrous castings from 2790 TPM to 6125 TPM.</p>	
F	WATER MANAGEMENT SYSTEM	
	<p>The total water requirement for plant activity will be 447.0 KLD after the proposed expansion activity. The daily freshwater demand will be 425.0 KLD which will be sourced from open wells located within the plant premises. The NOC for the water withdrawal has been obtained from Chennai Metropolitan Development Authority. After expansion, the generated sewage (270.0 KLD) will be treated in common STP of capacity 1600 KLD. The effluent generated in the process will be treated in 32.0 KLD ETP. Hence No wastewater will be discharged outside the plant premises. Hence, there is no impact on the water regime due to the wastewater generation from the plant operation.</p>	
	Water Source	Ground Water
	WATER CONSUMPTION	
	Cooling Tower makeup	50 KLD
	process	97 KLD
	Domestic	300 KLD
	Total	447 KLD



WASTE WATER GENERATION			
Sewage		270 KLD	Treated in proposed STP of 1600 KLD
Blow down		22 KLD	Treated in ETP of 32 KLD
Grand Total		292 KLD	
EFFLUENT CHARACTERISTICS			
Characteristics	Untreated	Treated	TNPCB
BOD	300	<10	10
COD	550	<100	50
TSS	120	<10	20
pH	6.5-7.5	7.0-7.5	5.5-9.0

SOLID WASTE MANAGEMENT

S. No	Solid waste	HWM 2016 Categ.	Quantity (TPM)		Treatment or Disposal
			Existing	After Expansion	
1	Used Sand	-	3250	3675.0	Send out through authorized Contractors
2	Furnace Slag	-	166.6	330.0	Send out through authorized Contractors
3	Grinding Dust	-	8.33	12.0	Send out through authorized Contractors
4	Municipal solid waste	-	7.35	3.10	Will be collected and given to civic bodies

Waste

S.No	Description	Existing(TPA)	After Expn.(TPA)	Mode of Disposal
1	Used/Spent Oil	100.0	150.0	Sold to CPCB authorized recyclers
2	Waste/Residues containing oil	2.0	2.5	Sold to CPCB authorized recyclers
3	Paint Waste/Residues	1.2	2.0	Sold to CPCB authorized recyclers
4	Discarded containers	60.0	190	Disposed to SPCB authorized disposer
5	ETP Sludge	2.0	3.0	Disposed to CTSDF

Air Pollution Control Measures

Stack No.	Point Emission Source	Air pollution Control measures	Stack height from Ground Level in m
1	Induction Furnace 1 - 3 T	Wet scrubber with stack	16
2	Induction Furnace 2 - 3 T	Wet scrubber with stack	16
3	Induction Furnace 3 - 5 T	Wet scrubber with stack	16
4	Sand Recycling Plant	Bag Filters with stack	17
5	Sand Multi Cooler	Bag Filters with stack	8.5
6	IMF No bake Moulding Line Shack Out	Bag Filters with stack	14.6
7	Air Blowing Booth 1	Bag Filters with stack	8.5
8	Paint Booth - 1	Water curtain with stack	7.5
9	Paint Booth - 2	Water curtain with stack	7.5
10	Shot Blasting Machine - 1	Bag Filters with stack	12.5
11	Shot Blasting Machine - 2	Bag Filters with stack	12.5
12	Tum blasting Machine - 1	Bag Filters with stack	12.5
13	Tum blasting Machine - 2	Bag Filters with stack	11
14	Thermic Oven Senior	Stack	12.5
15	Thermic Oven Junior - 1	Stack	12.5
16	Thermic Oven Old (Hyundai)	Stack	12.5
17	Thermic Oven New (Hyundai)	Stack	12.5
18	Thermic Oven Leg Core	Stack	12.5
19	Thermic Oven Saddle Core	Stack	12.5
20	Thermic Oven IMF Core	Stack	12.5
21	Sand Batch Type Oven	Stack	12.5
22	SNAG Grinder - 1	Cyclone separator with stack	11.5
23	SNAG Grinder - 2	Cyclone separator with stack	8.8
24	SNAG Grinder - 3	Cyclone separator with stack	8.8

25	SNAG Grinder – 4	Cyclone separator with stack	11.8
26	SNAG Grinder – 5	Cyclone separator with stack	11.8
27	SNAG Grinder – 6	Cyclone separator with stack	11.8
28	Swing Frame Grinders - 1 & 2	Common cyclone separator with stack	12.5
29	Swing Frame Grinder – 3	Cyclone separator with stack	12.5
30	Swing Frame Grinder – 4	Cyclone separator with stack	12.5
31	Head Shake Out & Blowing	Cyclone separator with stack	11.5
32	Beaver Sand Mill	Vent filter with stack	12.5
33	New Sand Hopper (Hyundai)	Vent filter with stack	12
34	Induction Furnace 4 - 5 T	Wet scrubber with stack	17.5
35	Induction Furnace 5 - 5 T	Wet scrubber with stack	17.5
36	Sand Recycling Plant 2	Bag Filters with stack	17.5
37	Sand Multi Cooler – 2	Bag Filters with stack	12.5
38	GZ Moulding Line Shake Out	Bag Filters with stack	11.5
39	Air Blowing Booth 2	Cyclone separator with stack	6
40	Paint Booth – 3	Water curtain with stack	6
41	Shot Blasting Machine - 3	Bag Filters with stack	11.8
42	Shot Blasting Machine - 4	Bag Filters with stack	11.8
43	Shot Blasting Machine - 5	Bag Filters with stack	11.8
44	Tum blasting Machine - 3	Bag Filters with stack	10.8
45	Thermic Oven Leg – 1	Stack	13
46	Thermic Oven Leg – 2	Stack	13
47	Thermic Oven Escorts	Stack	12.5
48	Thermic Oven M/C 32	Stack	11.4
49	Thermic Oven M/C 33	Stack	12.5
50	Thermic Oven Jr. Jacket	Stack	11.4
51	Pre heating Welding Oven	Stack	9.5

52	Post heating Welding Oven	Stack	9.5
53	SNAG Grinder - 7	Cyclone separator with stack	8.6
54	SNAG Grinder - 8	Cyclone separator with stack	8.6
55	Swing Frame Grinders - 5 & 6	Common cyclone separator with stack	9.4
56	Swing Frame Grinders - 7 & 8	Common cyclone separator with stack	9.3
57	Swing Frame Grinder - 9	Cyclone separator with stack	9.5
58	Swing Frame Grinders - 10 & 11	Common cyclone separator with stack	11.8
59	Sand Mill - 1	Vent filter with stack	11.7
60	Sand Mill - 2	Vent filter with stack	11.7
61	WESMAN Stress Relieving Furnace - 1	Stack	9.5
62	WESMAN Stress Relieving Furnace - 2	Stack	11.7
63	GZ Line Pouring Exhaust 1	Stack	11.5
64	GZ Line Pouring Exhaust 2	Stack	11.5

The dispersion pattern of PM, SO₂ and NO₂ is attempted for the major Stacks -8, Stack-5, Stack-4, Stack-3, Stack-2 and Stack-1 with Induction furnace by considering all possible wind speed and its corresponding stability classes. The maximum concentration of PM occur at a downwind distance of 200m under stability class A-B as 1.123 µg/m³ . Also, the stacks- 5 contribute the GLCs of SO₂ as 0.376 µg/m³ . The GLC of PM, SO₂ and NO₂ contributed from the major stacks under critical case are shown from the Figure-1 to Figure-16. It is evidence from the resultant GLCs of all the pollutant under this study are within the prescribed limit of the TNPCB.

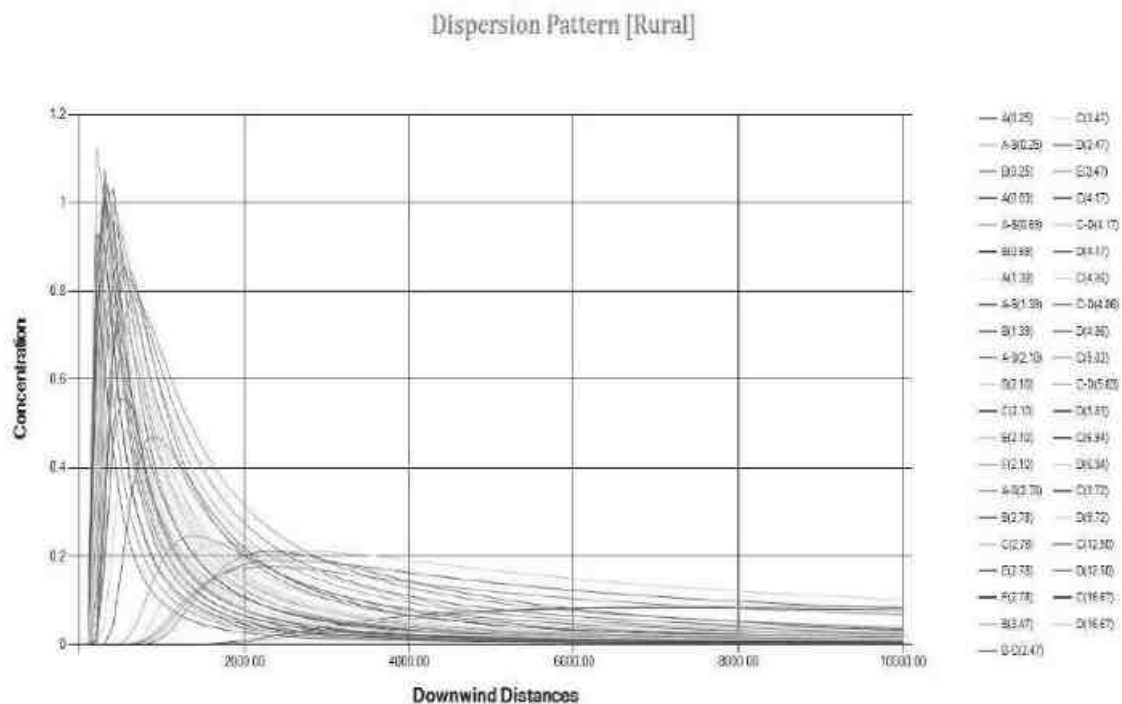


Figure-1 : Dispersion pattern of Particulate Matter for the Stack-8

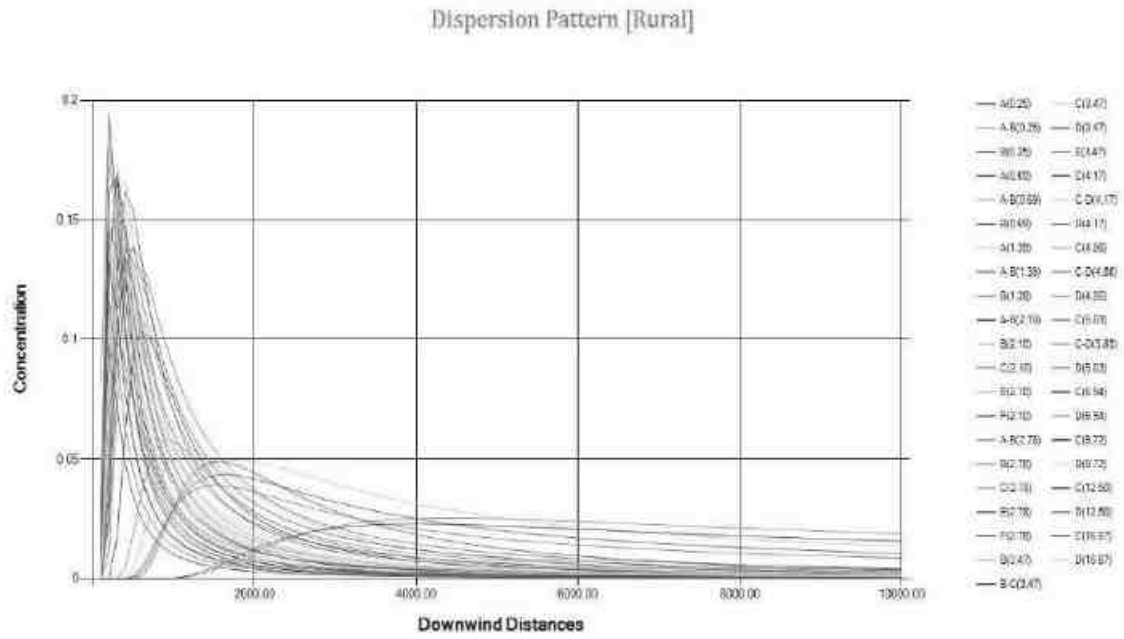


Figure-2: Dispersion pattern of Particulate Matter for the Stack-5

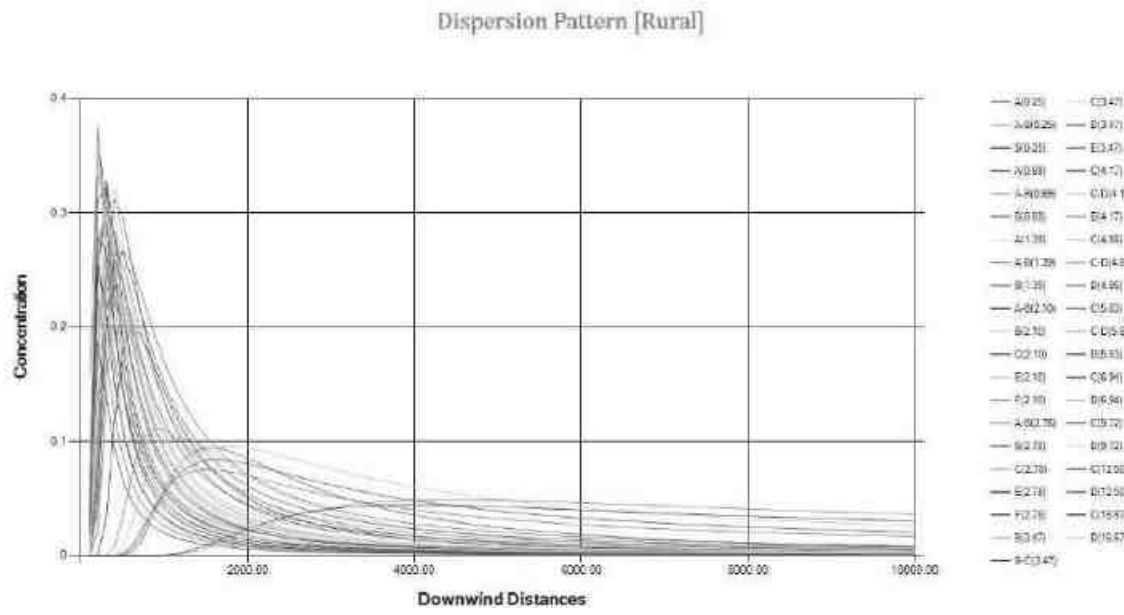


Figure-3: Dispersion pattern of SO2 for the Stack-5

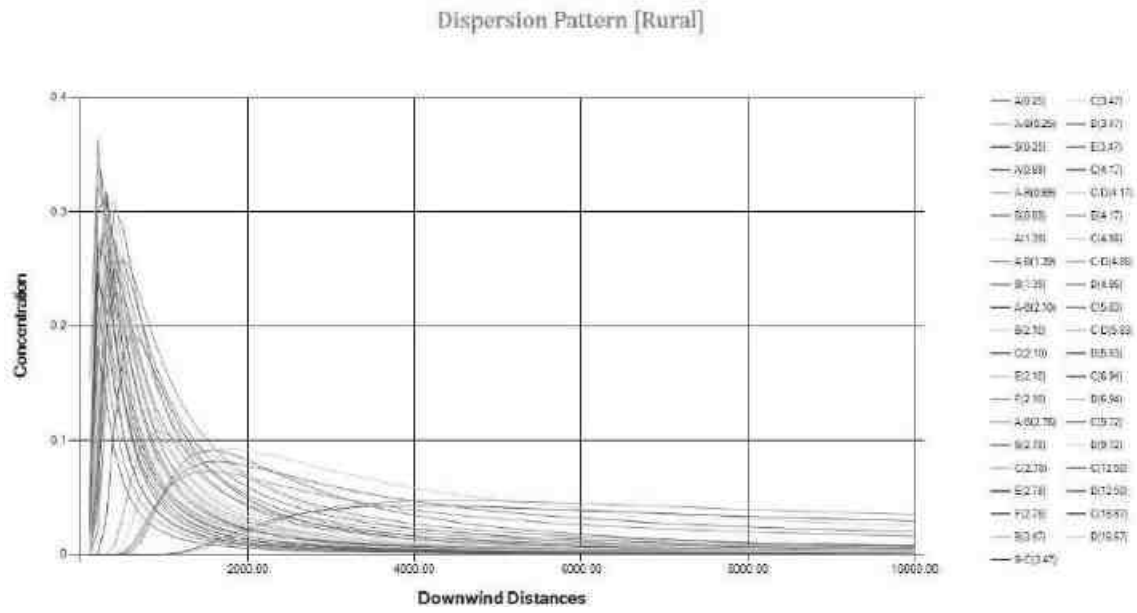


Figure-4: Dispersion pattern of NO2 for the Stack-5

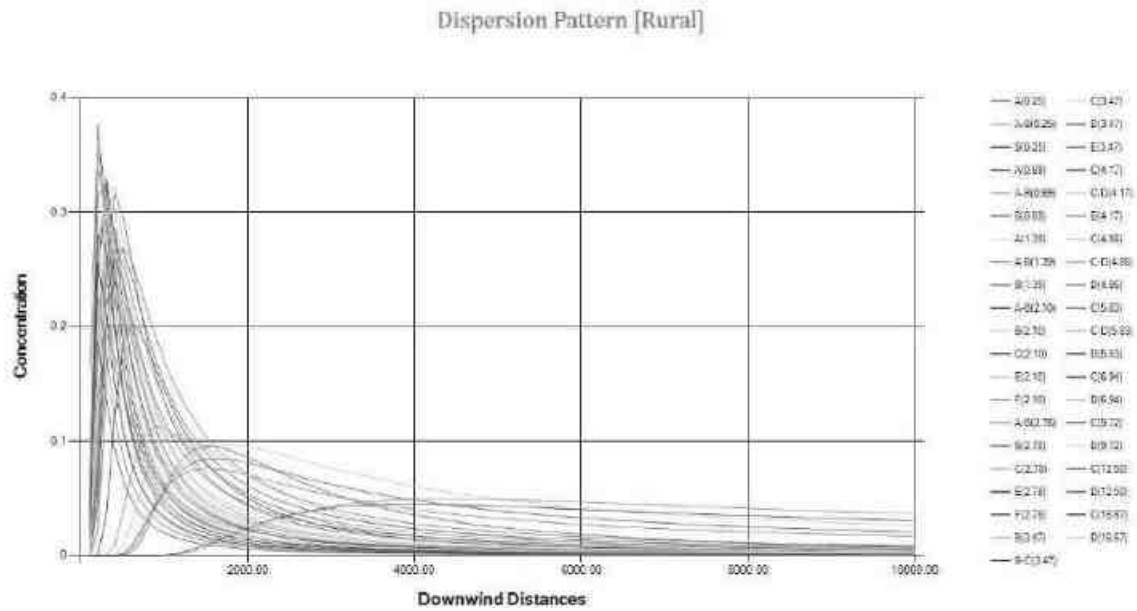


Figure-5: Dispersion pattern of Particulate Matter for the Stack-4

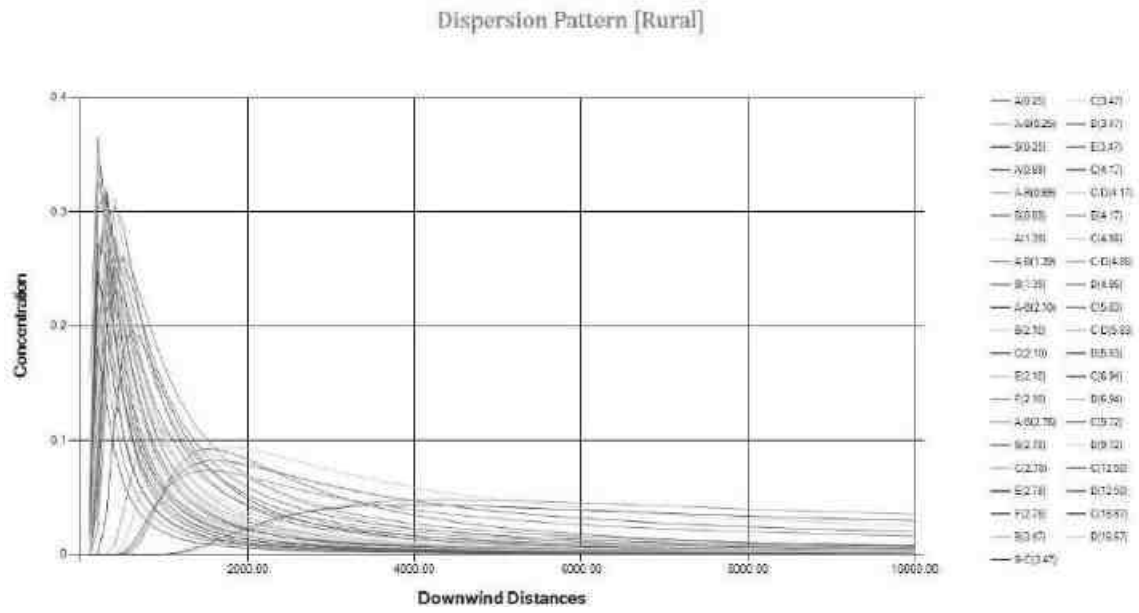


Figure-6: Dispersion pattern of SO2 for the Stack-4

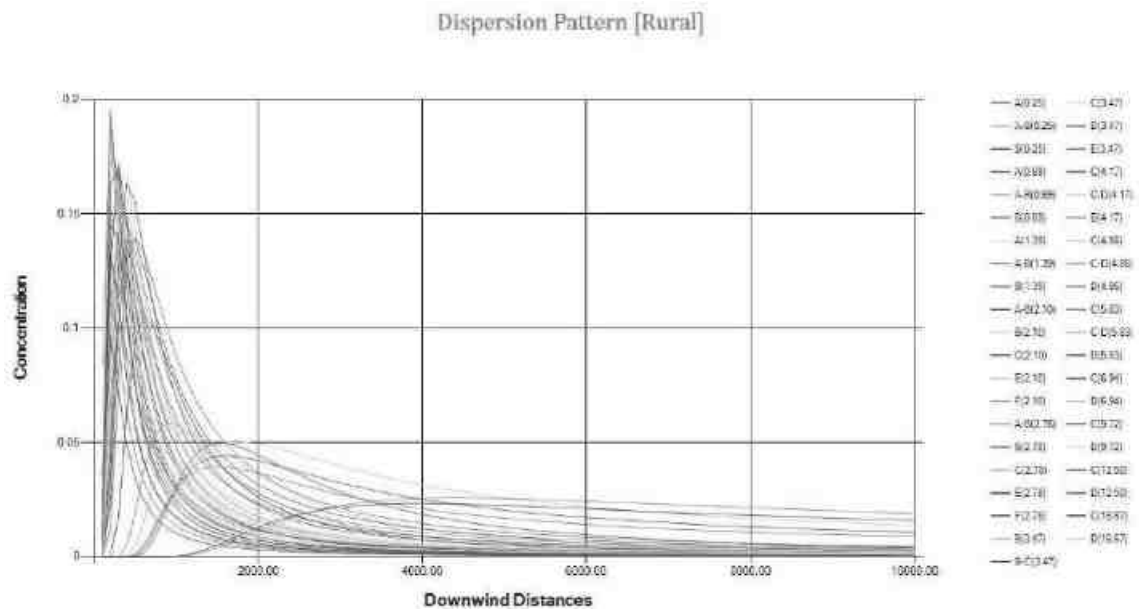


Figure-7: Dispersion pattern of NO2 for the Stack-4

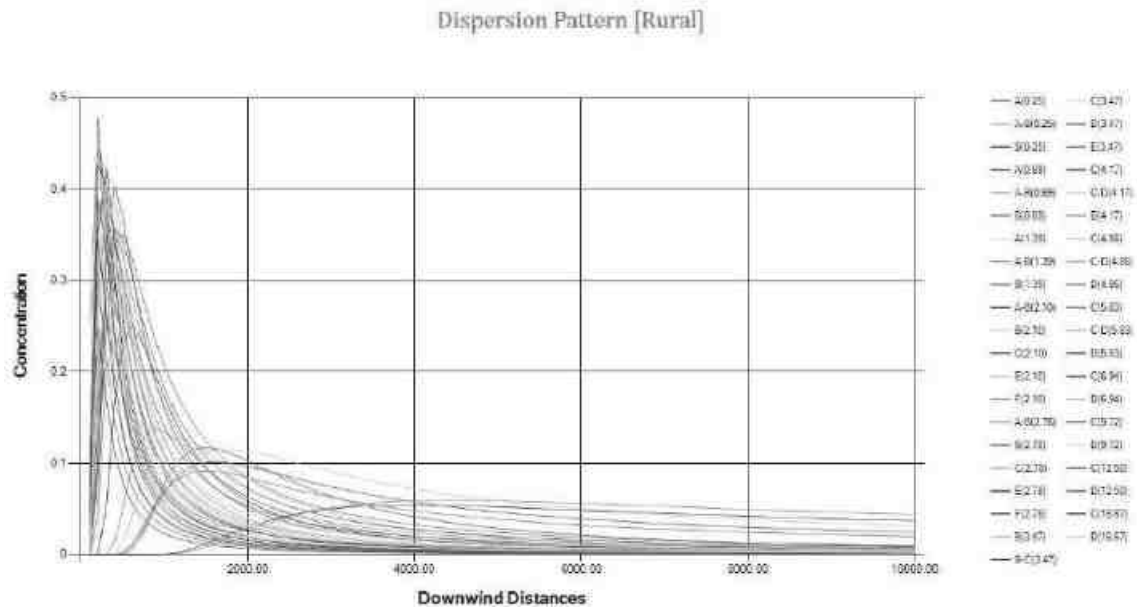


Figure-8: Dispersion pattern of Particulate Matter for the Stack-3

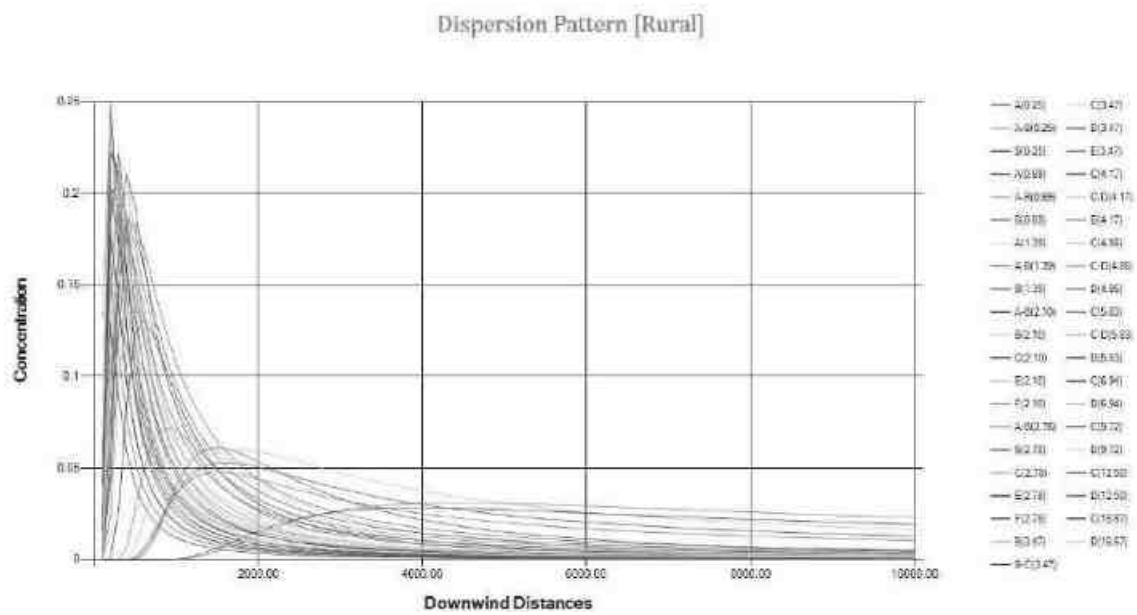


Figure-9: Dispersion pattern of SO2 for the Stack-3

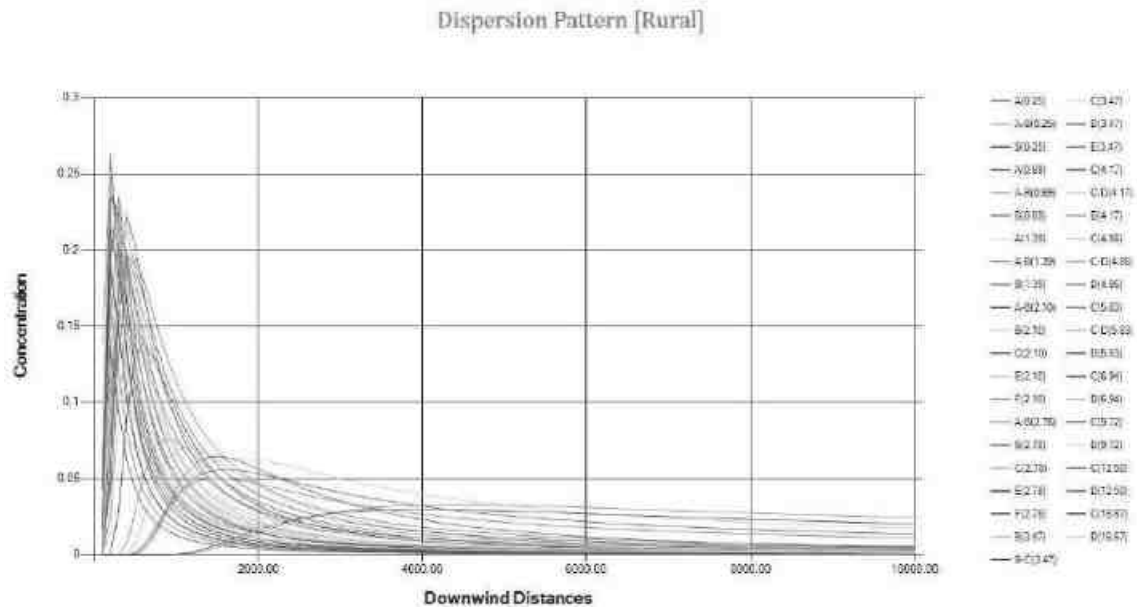


Figure-10: Dispersion pattern of NO2 for the Stack-3

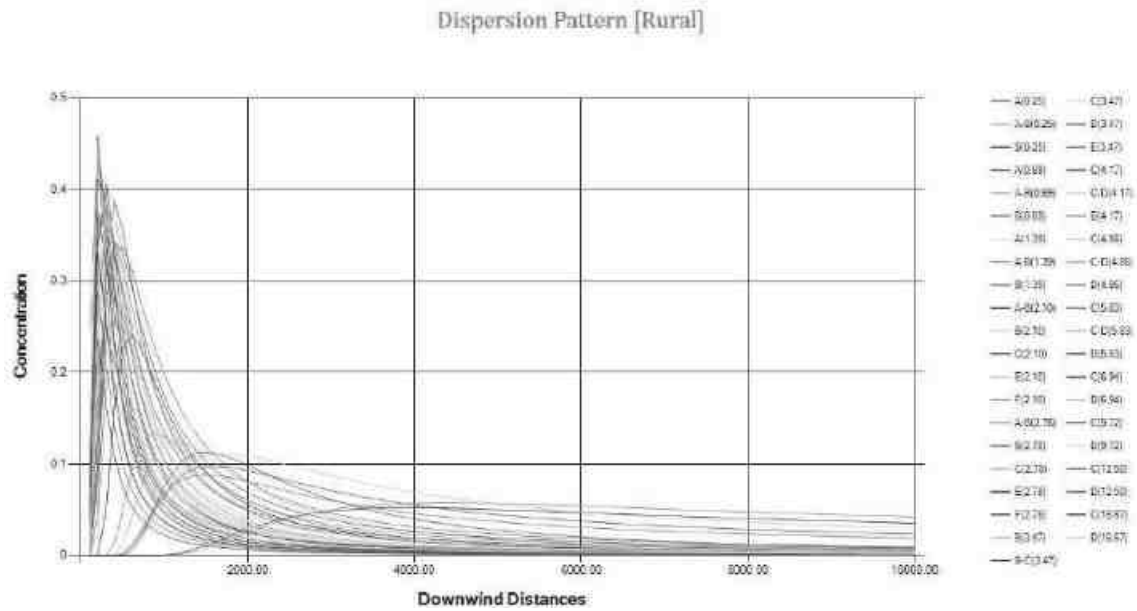


Figure-11: Dispersion pattern of Particulate Matter for the Stack-2

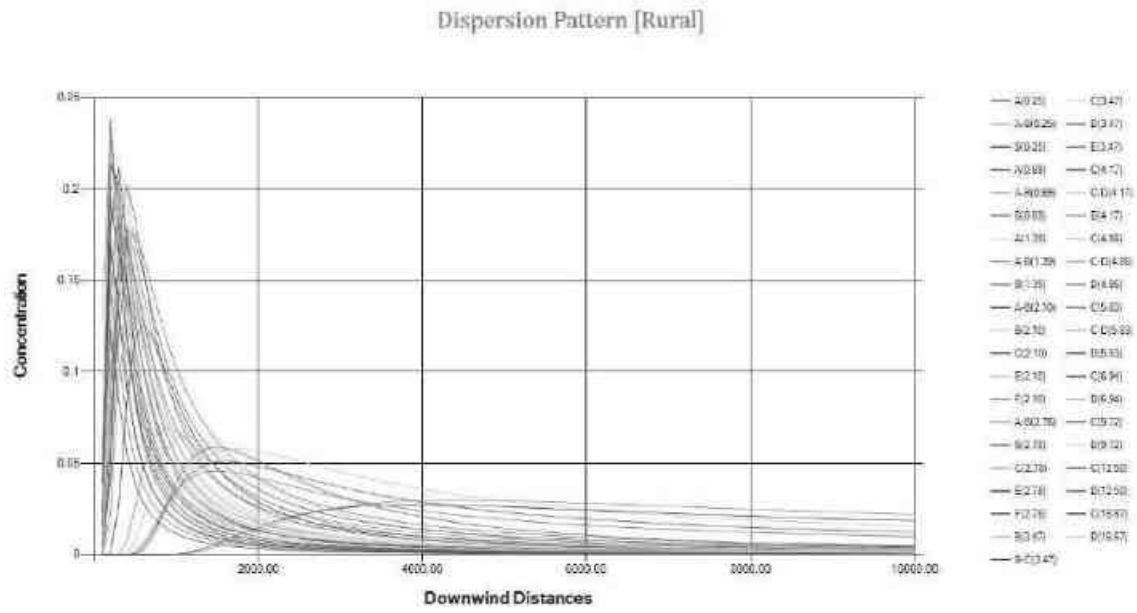


Figure-12: Dispersion pattern of SO2 for the Stack-2

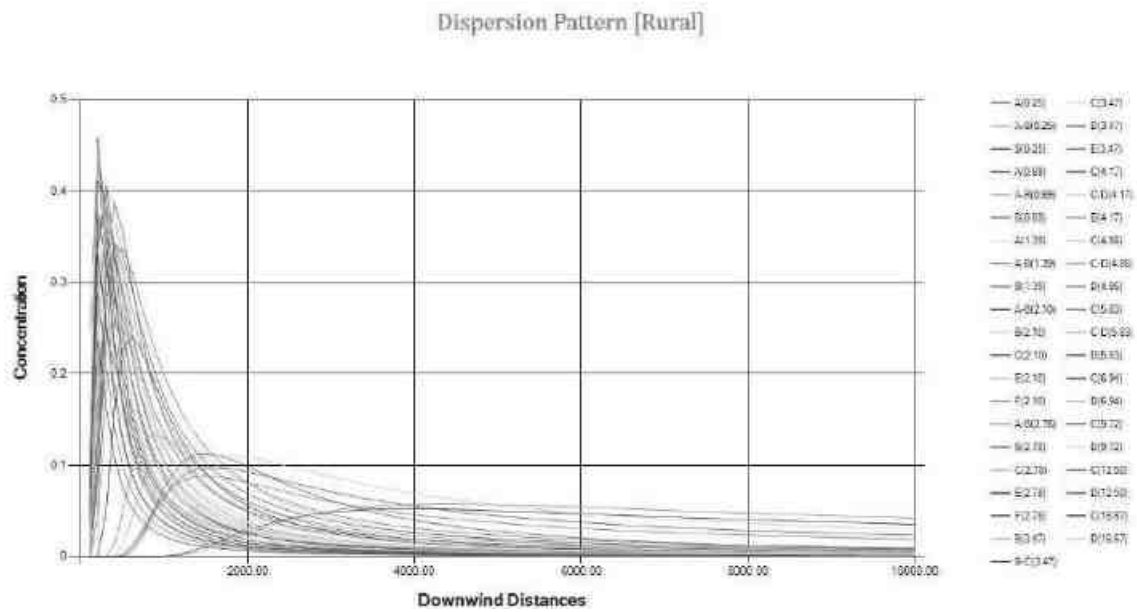


Figure-13: Dispersion pattern of NO2 for the Stack-2

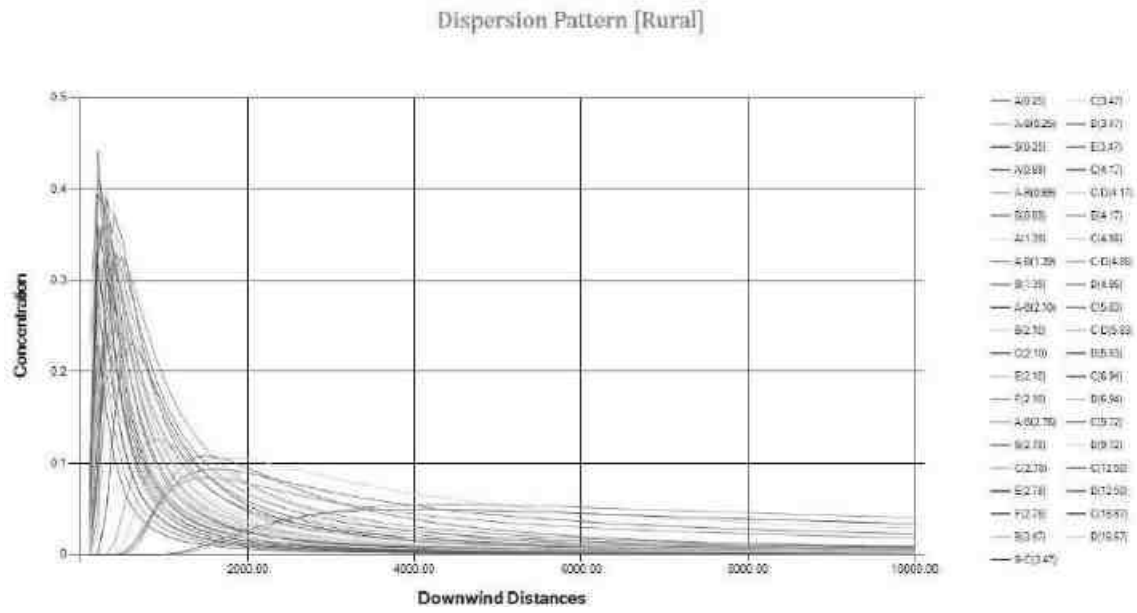


Figure-14: Dispersion pattern of Particulate Matter for the Stack-1

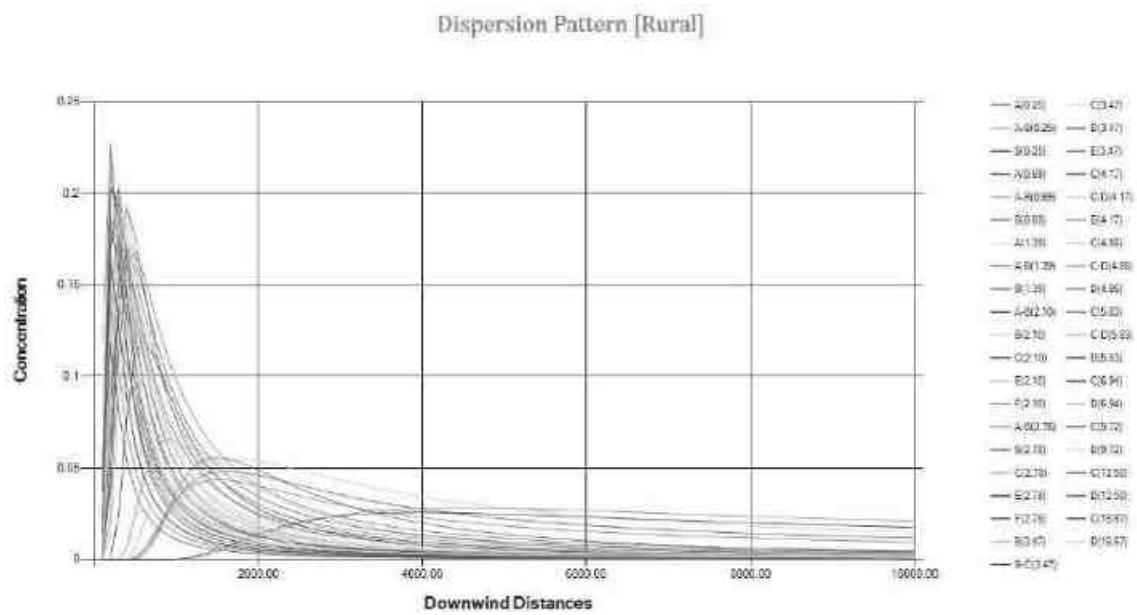


Figure-15: Dispersion pattern of SO2 for the Stack-1

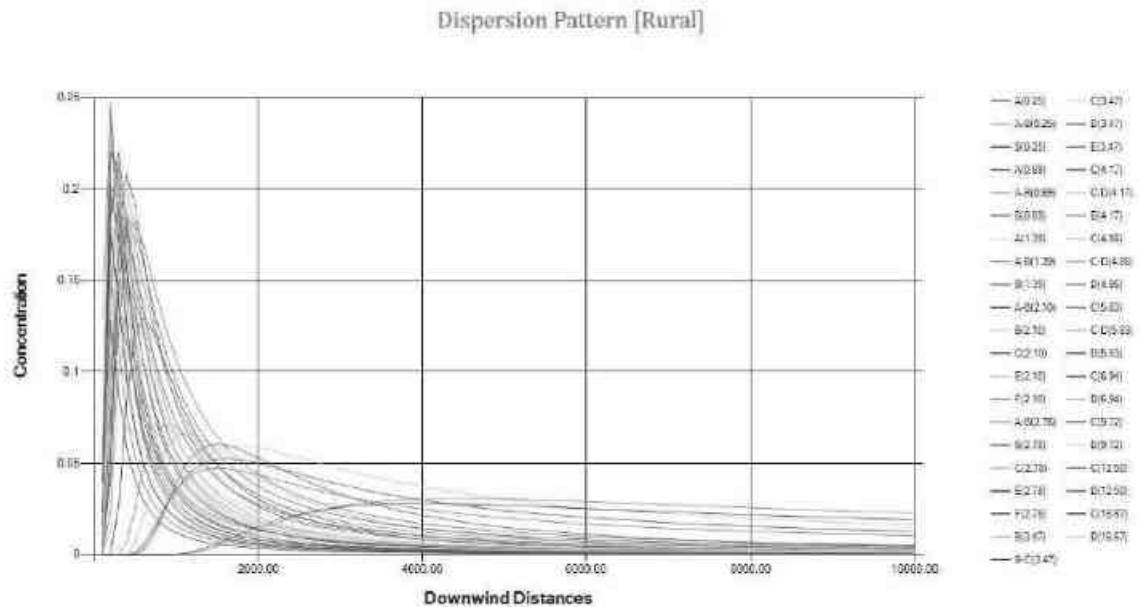
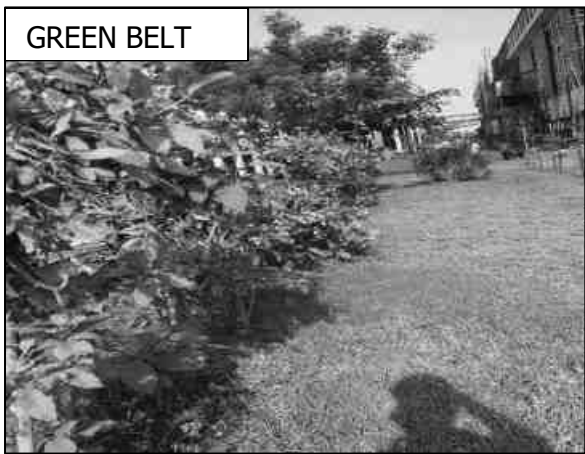


Figure-16: Dispersion pattern of NO2 for the Stack-1





Prof S.Palanivelraja, M.E., (Env.Engg.), Ph.D., (Air.Polln)

Professor & Director

Centre for Atmospheric Research & Climate Change

Annamali University

Annamalainagar

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9865047612

**ADEQUACY CERTIFICATE FOR EMS
(ENVIRONMENTAL MANAGEMENT SYSTEM)**

This certificate is valid subject to the implementation of the specifications mentioned in the enclosed Adequacy Report on Environmental Management System. However, it is subject to automatic cancellation, in case of any change in the product profile/capacity, quality and quantity of effluents (Air + Water + Solid/Hazardous) and efficiency of EMS equipment from Adequacy Report on Environmental Management System.

DATE: 26/03/2021



Prof. S.PALANIVELRAJA,

M.E.,(Env.Engg.),Ph.D.(Air Polln).

Professor and Director

Centre for Atmospheric Research & Climate Change

Annamalai University

Annamalai Nagar - 608 002.

ANNEXURE - XXI

REPORT OF ANALYSIS-TNPCB



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali

From

To

P.K.Raguraman, M.Sc., Dip. (Ind. Safety)
Chief Scientific Officer,
District Environmental Laboratory, Manali
Tamil Nadu Pollution Control Board,
950/1, Poonamallee High Road,
Arumbakkam,
Chennai-106

M/s. Ashok Leyland Ltd.,
Foundries Division,
Ennore,
Chennai - 600 057.

Lr.No.TNPC Bd/DEL-MNL/Air Survey/F. No. 22/21-22, Dt. 08.03.2022

Sir,

Sub: Furnishing of Report of Analysis of Ambient Air Quality /
Stack Monitoring / Ambient Noise Level Survey - Reg.

- Ref: 1. This office Lr.No. TNPCB/DEL/MNL/AAQS/SM/NLS/F.No.22/2021-22 dt. 04.08.2021
2. This office Lr.No. TNPCB/DEL/MNL/AAQS/SM/NLS/F.No.22/2021-22 dt. 20.10.2021
3. Your Lr.No.Nil dt. 19.10.2021
4. Your Lr.No.Nil dt. 16.12.2021
5. Cash Receipt No. 81266 dt.20.10.2021 Rs.1,00,900/-
6. Cash Receipt No. 147171 dt.22.12.2021 Rs.1,49,720/-

I am herewith sending the Report of Analysis of Ambient Air Quality / Stack Monitoring / Ambient Noise Level Survey conducted in the vicinity of your industry **M/s. Ashok Leyland Ltd., Foundries Division, Ennore, Chennai-57** on **25.11.2021 & 26.11.2021** with invoice for Rs.2,50,620/- (Rupees Two Lakh Fifty Thousand and Six Hundred and Twenty only) towards the above survey / analytical charges, and the same has been adjusted vide reference (3) cited.

Kindly acknowledge the receipt of the above without fail.

for Karitha Leonard
Chief Scientific Officer,
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali 8/3/22

Encl.: As above.

Copy submitted to:

1. The District Environmental Engineer, TNPC Bd, Ambattur for favour of kind information please.
2. Copy to file.



TAMILNADU POLLUTION CONTROL BOARD

District Environmental Laboratory, Manali

AMBIENT AIR QUALITY SURVEY – Report of Analysis

Report No. 46/ AAQS/2021-22

Date: 08.03.2022

1. Name of the Industry : **M/s. Ashok Leyland Ltd., Foundries Division, (Main Land)**
 2. Address of the Industry : **Ennore, Chennai -57.**
 3. Date of Survey : **25.11.2021**
 4. Duration of Survey : **8 Hours / 24 hours**
 5. Category : **Red / Orange / Green – Large / Medium / Small**
 6. Land use classification : **Industrial / Commercial / Residential / Sensitive**

Meteorological Conditions

Ambient Temperature (°C)	Min	Max	Relative Humidity (%)	Min	Max
	25	30		74	100
Weather Condition	Partially Cloudy		Rain Fall (mm)	Nil	
Predominant Wind Direction	NE – SW		Mean Wind Speed (km/hr)	13	

Ambient Air Quality Survey Results

Sl. No.	Location	Direction *	Distance (m) *	Height Form GL (m)	Pollutants Concentration (microgram / m ³)			
					PM 2.5	PM 10	SO ₂	NO ₂
1	On top of platform near Subway	N	100	3.0	24	83	15	13
2	On top of platform near North Gate (Time Office)	NW	100	3.0	--	75	10	15
3	On top of platform near Canteen	WNW	100	3.0	--	78	13	16
4	On top of platform near Main Gate	W	150	3.0	--	80	11	18
5	On top of platform Adjacent RO plant	SW	100	3.0	28	87	14	22

Note: * With respect to major emission sources. The analytical results are restricted to the sampling period of 8 hrs/24hrs

AW 8/3/22
DCSO/ES

for Karitha Leonard 8/3/22
Chief Scientific Officer,
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali

Test Performed	Test Method
PM10	IS 5182 : (Part 23) – 2006
SO2	Modified West – Gaeke / IS 5182 : (Part 2) – 2001 RA: 2012
NO2	Jacobs – Hochheiser / IS 5182 : (Part 6) – 2006 RA:2012



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali

AMBIENT AIR QUALITY SURVEY

Schematic Diagram Showing Location of Sampling

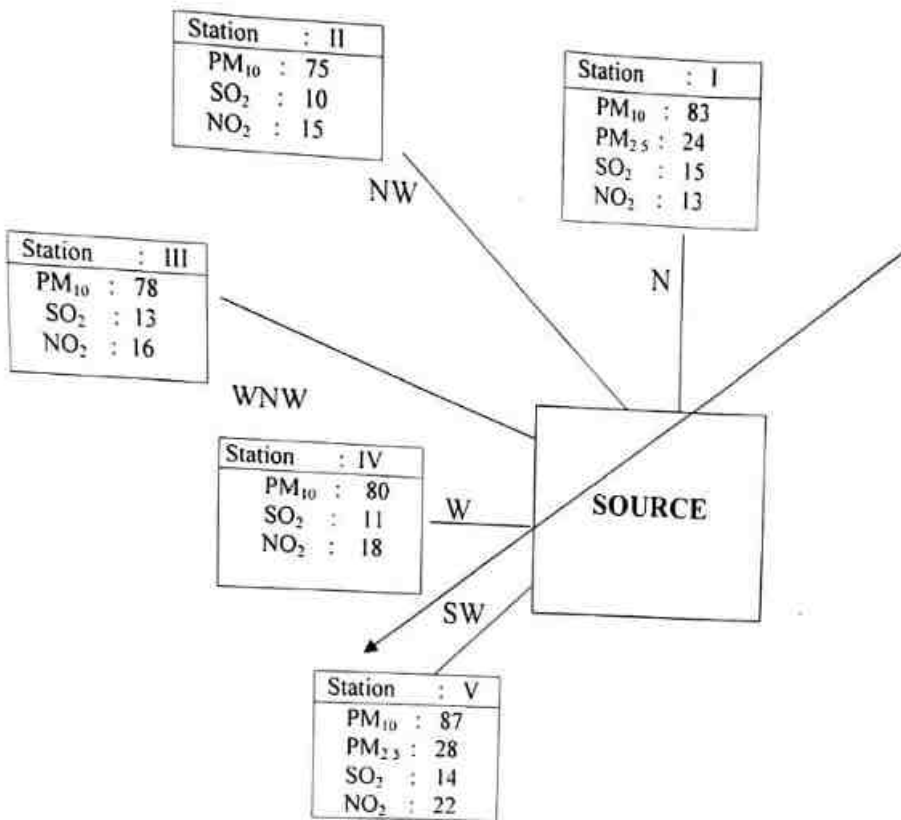
Report No. 46 /AAQ/SM/2021-22

Name and Address of the Industry

: M/s. Ashok Leyland Ltd., Foundries Division,
(Main Land)

Date of Survey

: 25.11.2021



Note: All the values are expressed in $\mu\text{g}/\text{m}^3$ and restricted to sampling period of 8 hrs/24hrs

Meteorological Conditions:	
Predominant Wind Direction	NE - SW
Wind Speed (Km/hr)	13
Weather Condition	Partially Cloudy
Rainfall	Nil

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for Kavitha Learend
Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD

District Environmental Laboratory, Manali
AMBIENT AIR QUALITY SURVEY – Report of Analysis

Report No. 46/ AAQS/2021-22

Date: 17.12.2020

1. Name of the Industry : M/s. Ashok Leyland Ltd., Foundries Division, (East Land)
 2. Address of the Industry : Ennore, Chennai -57.
 3. Date of Survey : 26.11.2021
 4. Duration of Survey : **8 Hours** / 24 hours
 5. Category : **Red** / Orange / Green – **Large** / Medium / Small
 6. Land use classification : **Industrial** / Commercial / Residential / Sensitive

Meteorological Conditions

Ambient Temperature (°C)	Min	Max	Relative Humidity (%)	Min	Max
	26	27		94	100
Weather Condition	Partially Cloudy		Rain Fall (mm)	Nil	
Predominant Wind Direction	NE – SW		Mean Wind Speed (km/hr)	13	

Ambient Air Quality Survey Results

Sl. No.	Location	Direction *	Distance (m) *	Height Form GL (m)	Pollutants Concentration (microgram / m ³)			
					PM 2.5	PM 10	SO ₂	NO ₂
1	On top of platform near Scrap Yard	NE	100	3.0	20	73	11	14
2	On top of platform near 33KVA SS	E	100	3.0	--	68	10	12
3	On top of platform near East Gate	SE	150	3.0	--	65	8	10
4	On top of platform near Adjacent Well	S	100	3.0	25	80	12	16
5	On top of platform Stores	SSW	100	3.0	--	91	15	19

Note: * With respect to major emission sources. The analytical results are restricted to the sampling period of 8 hrs/24hrs

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for Karitha Leonard
Chief Scientific Officer,
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali
8/3/22

Test Performed	Test Method
PM10	IS 5182 : (Part 23) – 2006
SO2	Modified West - Gaeke / IS 5182 : (Part 2) – 2001 RA: 2012
NO2	Jacobs – Hochheiser / IS 5182 : (Part 6) – 2006 RA:2012



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali

AMBIENT AIR QUALITY SURVEY

Schematic Diagram Showing Location of Sampling

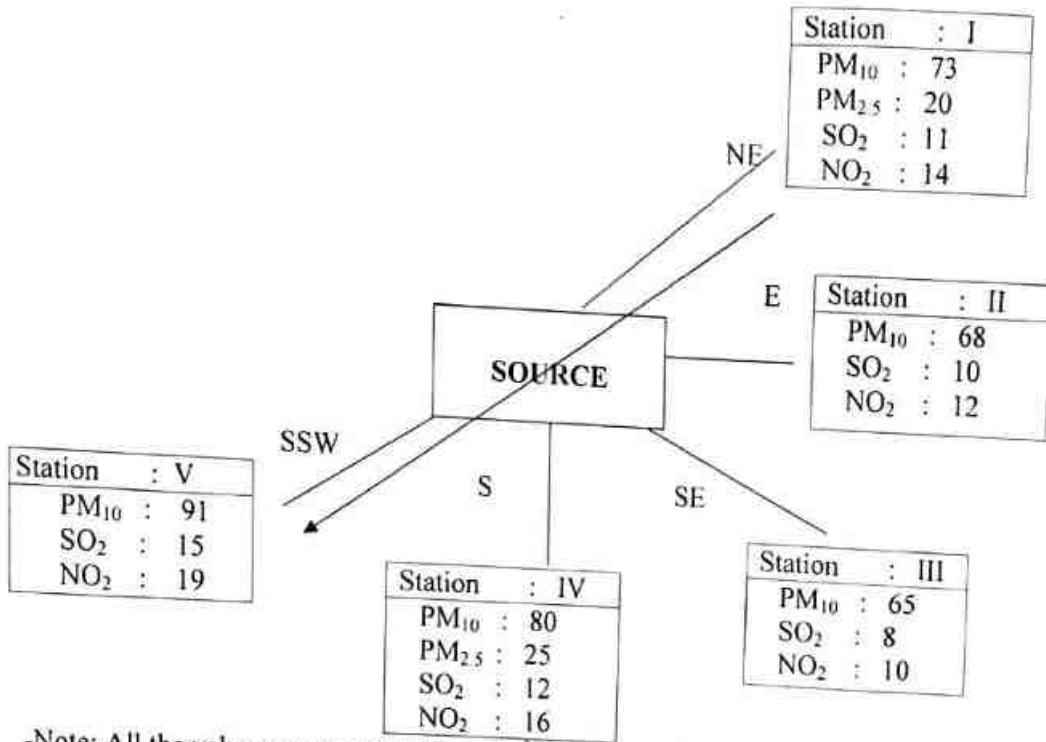
Report No. 46/AAQ/SM/2021-22

Name and Address of the Industry

: M/s. Ashok Leyland Ltd., Foundries Division,
(East Land)

Date of Survey

: 26.11.2021



-Note: All the values are expressed in $\mu\text{g}/\text{m}^3$ and restricted to sampling period of 8 hrs/24hrs

Meteorological Conditions:	
Predominant Wind Direction	NE - SW
Wind Speed (Km/hr)	13
Weather Condition	Partially Cloudy
Rainfall	Nil

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for Karitha Leonard
Chief Scientific Officer,
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali
8/3/22



TAMILNADU POLLUTION CONTROL BOARD

District Environmental Laboratory, Manali

STACK MONITORING SURVEY – Report of Analysis

Report No. 46/ SM/2021-22

Date: 08.03.2022

1. Name of the Industry : **M/s. Ashok Leyland Ltd., Foundries Division,**
2. Address of the Industry : Ennore, Chennai – 57
3. Date of Survey : **25.11.2021 & 26.11.2021**
4. Type of Industry : Coal/Chemical/Sugar/Paper & Pulp/
Power plant / Textile Processing/**Foundries**

Stack Monitoring Survey Results

Sl. No.	Stack attached to	Fuel used	Stack Temp °K	Velocity in (m/ sec)	Discharge rate In Nm ³ /hr	Pollutants (mg / Nm ³)		
						PM	SO ₂	NO _x
1	IT – Furnace – II APC – Wet Scrubber IT – Furnace – IV & V Combined	Electrical Energy	323	19.56	12750	35	18	134
2	Sand Plant Dust Collector APC-Pulse jet Bag filter	--	333	27.17	68712	63	--	--
4	DG 500 KVA	HSD	443	30.91	58760	19	BDL	632
5	Thumb Blasting – Dust Collector APC-Pulse jet Bag filter	--	323	21.92	14288	91	--	--
6	Fettling Shot Blasting – Dust Collector – 4 & 5 APC-Pulse jet Bag filter	--	318	21.31	14109	119	--	--

Test Performed	Test Method
PM10	IS 5182 : (Part 23) – 2006
SO ₂	Modified West – Gaeke / IS 5182 : (Part 2) – 2001 RA: 2012
NO _x	Jacobs – Hochheiser / IS 5182 : (Part 6) – 2006 RA:2012

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Kaitha Leonard
for Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD

District Environmental Laboratory, Manali

Stack Details

Report No.46/AAQ/SM/2021-22

1. Name and Address of the Industry : M/s. Ashok Leyland Ltd., Ennore, Chennai -57

2. Date of Survey : 25.11.2021 & 26.11.2021

Sl. No.	Particulars	1	2	
1.	Stack attached to	IT - Furnace-II, IV & V	Sand Plant dust collector	
2.	Details of process stack	--	--	
3.	Height from G Level in (m)	16	16	
4.	Diameter in (m)	0.5	1.0	
5.	Port hole height from Ground Level or bends or ducts in (m)	10	10	
6.	Fuel Used (with % Sulphur content)	--	--	
7.	Fuel Consumption rate per day (mention units)	--	--	
8.	Type of Stack and capacity	Round	Round	
9.	Production on the date of Survey	Not Furnished		
10.	APC Measures provided	Wet Scrubber	Filter Bag	
11.	APC functional status	Functional	Functional	
12.	Composition of flue gas mg/m ³	CO %	0	--
		CO ₂ %	0.25	--
		O ₂ %	19.7	--
13.	Moisture content in %	--	--	
14.	Ambient temp in °K	302	302	
15.	Temp of flue gas in °K	323	333	
16.	Velocity of flue gas in m/sec	19.56	27.17	
17.	Volume of flue gas sampled in m ³	0.9855	0.9855	
18.	Gaseous Discharge rate per day in Nm ³ /hr	12750	68712	
19.	Combustion efficiency %	--	--	

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for Karitha Leonard
Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD

District Environmental Laboratory, Manali

Stack Details

Report No.46/AAQ/SM/2021-22

1. Name and Address of the Industry : **M/s. Ashok Leyland Ltd., Ennore, Chennai -57**

2. Date of Survey : **25.11.2021 & 26.11.2021**

Sl. No.	Particulars	3	4	5	
1.	Stack attached to	DG-500 KVA	Thumb Blasting Dust Collector	Fettling Shot Blasting Dust Collector - 4 & 5	
2.	Details of process stack	--	--	--	
3.	Height from G Level in (m)	16	16	16	
4.	Diameter in (m)	1.0	0.5	0.5	
5.	Port hole height from Ground Level or bends or ducts in (m)	10	10	10	
6.	Fuel Used (with % Sulphur content)	--	--	--	
7.	Fuel Consumption rate per day (mention units)	--	--	--	
8.	Type of Stack and capacity	Round	Round	Round	
9.	Production on the date of Survey	Not Furnished			
10.	APC Measures provided	Filter Bag	Filter Bag	Filter Bag	
11.	APC functional status	Functional	Functional	Functional	
12.	Composition of flue gas mg/m ³	CO %	194	--	--
		CO ₂ %	5.31	--	--
		O ₂ %	14.2	--	--
13.	Moisture content in %	--	--	--	
14.	Ambient temp in °K	303	300	302	
15.	Temp of flue gas in °K	443	323	318	
16.	Velocity of flue gas in m/sec	30.91	21.92	21.31	
17.	Volume of flue gas sampled in m ³	0.9822	0.9921	0.9855	
18.	Gaseous Discharge rate per day in Nm ³ /hr	58760	14288	14109	
19.	Combustion efficiency %	--	--	--	

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Kavitha Leonard
Chief Scientific Officer,
District Environmental Laboratory, 8/3/22
Tamil Nadu Pollution Control Board
Manali



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District Environmental Laboratory, Manali

STACK MONITORING SURVEY – Additional details

Report No. 46/ SM/2021-22

Date: 08.03.2022

1. Name of the Industry : M/s. Ashok Leyland Ltd., Foundries Division
2. Address of the Industry : Ennore, Chennai – 57
3. Date of Survey : 25.11.2021 & 26.11.2021
4. Type of Industry : Coal/Chemical/Sugar/Paper & Pulp/
Power plant / Textile Processing/ Foundries

Stack Monitoring Additional details

Sl. No.	Details of stack mentioned in the Air Consent order	Details of stack available and in working condition	Details of stack for which stack Emission sampling have been done	Justification for the left out of stack Emission Sampling
1	IT – Furnace – II, IV & V APC – Wet Scrubber	Working	Sampling Done	--
2	Sand Plant Dust Collector APC-Pulse jet Bag filter	Working	Sampling Done	--
3	DG 500 KVA	Working	Sampling Done	--
4	Thumb Blasting – Dust Collector APC-Pulse jet Bag filter	Working	Sampling Done	--
5	Fettling Shot Blasting – Dust Collector – 4 & 5 APC-Pulse jet Bag filter	Working	Sampling Done	--

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for Kavitha Leonard
for Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali
AMBIENT/SOURCE NOISE LEVEL SURVEY - Report of Analysis

Report No. 46/NLS/2021-22

Date: 08.03.2022

1.	Name of the Industry	M/s. Ashok Leyland Ltd., Foundries Division, (Main Land)		
2.	Address of the Industry	Ennore, Chennai - 57.		
3.	Date of Survey	25.11.2021 & 26.11.2021		
Category		RL	Land use Classification	Industrial
Type of Survey		Ambient/Source	Time of Survey	Day
Meteorological conditions			Calm/Windy/Rainy	Windy

Logging Parameters

Instrument Used	CESVA Model SC310	Serial No	T243103		
Logging Interval	10 Minutes each point	Measuring Range	50-110 dB(A)		
Weighting	"A"	Peak Weighting	"C"	Time Weighting	FAST
Sound Incidence	RANDOM		Time in hrs	14.00 - 15.00	

Report of Noise Level Monitoring

Sl No	Location	Duration (min)	Distance (M)	Direction	Sound Level - dB (A)		
					L _{eq}	Min	Max
1	Near Time Office	10	100	NW	60.4	55.6	71.2
2	Near Fork lift Shed	10	100	WNW	63.4	60.1	70.9
3	Near Main Gate	10	100	W	70.1	63.9	73.0
4	Near Admin	10	75	WSW	65.4	55.5	76.2
5	Near RO Plant	10	100	SW	67.1	62.5	71.3

Note: L_{eq} value is the average energy for the measured period.

aw
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fa *Kaitha Leonard*
Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali
AMBIENT/SOURCE NOISE LEVEL SURVEY - Report of Analysis

Report No.46/ NLS/2021-22

Date: 08.03.2022

1.	Name of the Industry	M/s. Ashok Leyland Ltd., Foundries Division, (East Land)		
2.	Address of the Industry	Ennore, Chennai - 57.		
3.	Date of Survey	26.11.2021		
Category		RL	Land use Classification	Industrial
Type of Survey		Ambient/Source	Time of Survey	Day
Meteorological conditions		Calm/Windy/Rainy		Windy

Logging Parameters

Instrument Used	CESVA Model SC310	Serial No	T243103		
Logging Interval	10 Minutes each point	Measuring Range	50-110 dB(A)		
Weighting	"A"	Peak Weighting	"C"	Time Weighting	FAST
Sound Incidence	RANDOM		Time in hrs	14.00 - 15.00	

Report of Noise Level Monitoring

Sl No	Location	Duration (min)	Distance (M)	Direction	Sound Level - dB (A)		
					Leq	Min	Max
1	Near Subway	10	75	N	72.3	67.1	77.0
2	Near Scrap Yard	10	100	NE	71.1	66.7	74.5
3	Near 33 KVA Substation	10	75	E	74.3	70.1	76.7
4	Near East Gate	10	150	SE	60.9	56.4	67.5
5	Near Pump House	10	100	S	65.6	61.1	73.3

Note: Leq value is the average energy for the measured period.

ah
8/3/22
DCSO/ES

Kartha Leonard
for Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali

INFERENCE REPORT ON A.A.Q.S./ S.M.

1. Name of Industry : M/s. Ashok Leyland Ltd., Foundries Division
2. Pollution Category : Red Large
3. Date of A.A.Q. Survey : 25.11.2021 & 26.11.2021
4. Predominant Wind Direction : NE - SW & NE - SW
5. Weather condition : Partially Cloudy

STATUS OF POLLUTANTS LEVEL

I. AMBIENT AIR QUALITY :-

1. Total No. of A.A.Q. stations monitored : 10
2. No. of A.A.Q. stations in which Pollutants Level exceeded the Boards standards : Nil

Maximum and Minimum values of Pollutants Level observed:

Sl. No.	POLLUTANT	Values in microgram/m ³		BOARD'S STANDARD (As per consent order)
		Maximum	Minimum	
1.	PM ₁₀	91	65	100
	PM _{2.5}	28	20	60
2.	<u>GASEOUS POLLUTANTS:-</u>			
	(i) SO ₂	15	8	80
	(ii) NO ₂	22	10	80

II. STACK MONITORING:-

1. Total No. of Stacks Monitored : 5
2. No. of Stacks in which Pollutants level Exceeded the Boards standards : Nil

DCSO/ES

8/3/22

for Karitha Leonard
Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali



TAMILNADU POLLUTION CONTROL BOARD
District Environmental Laboratory, Manali

BILL

Report No. 46/AAQ/SM/2021-22

Bill No.	46/2021-22
Date	08.03.2022

To
M/s. Ashok Leyland Ltd., Foundries Division, Ennore, Chennai -57

Ref: 1. B.PMs.No.6 Dt.31.03.2009.

2. This office Lr.No. TNPCB/DEL/MNL/AAQS/SM/NLS/F.No.22/2021-22 dt. 04.08.2021

3. This office Lr.No. TNPCB/DEL/MNL/AAQS/SM/NLS/F.No.22/2021-22 dt. 20.10.2021

4. Your Lr.No.Nil dt. 19.10.2021

5. Your Lr.No.Nil dt. 16.12.2021

6. Cash Receipt No. 81266 dt.20.10.2021 Rs.1,00,900/-

7. Cash Receipt No. 147171 dt.22.12.2021 Rs.1,49,720/-

Sl. No.	Description	Rate (Rs.)	No. of Stations/ Stacks	Amount (Rs.)
1.	SAMPLING CHARGES: (i) Ambient Air Quality monitoring PM ₁₀ (ii) Source Emission Monitoring (PM, SO ₂ , NO _x , etc.,) (iii) Ambient Air Quality monitoring PM _{2.5}	3500 13125 3500	10 5 4	35,000 65,625 14,000
2.	ANALYTICAL CHARGES: (i) Ambient Air Samples PM ₁₀ , SO ₂ , NO ₂ (each Rs. 1050/-) (ii) Ambient Air Samples PM _{2.5} (iii) Source Emission Samples PM, SO ₂ , NO _x (each R.1050/-)	3150 1800 1050	10 4 9	31,500 7,200 9,450
3.	AMBIENT NOISE MONITORING CHARGES:	1400	10	14,000
Transportation Charges				870
Total				1,77,645
Received Vide HDFC Bank DD No.030210 dated 06.10.2021 Our CR.No. 81266 dated 20.10.2021				1,00,900
Received Vide HDFC Bank DD No.030388 dated 03.12.2021 Our CR.No. 147171 dated 22.12.2021				1,49,720
Amount Received				2,50,620
Excess amount will be adjusted in future air survey				72,925

DCSO/ES 8/3/22

for *Kaitha Leonard*
Chief Scientific Officer, 8/3/22
District Environmental Laboratory
Tamil Nadu Pollution Control Board
Manali

TAMIL NADU POLLUTION CONTROL BOARD



OFFICE OF :

DOC TYPE :

OFFICE CODE :

CODE :

CASH RECEIPT NO. **81266**

ACCOUNTS				S.L.			

Date: 20/10/2021

Received from Mrs. Asbok Selyandee Ltd, (Foundry Division)
Ennore, Chennai - 67

the sum of Rupees One lakh nine hundred only

in cash / by D.D. / Banker's Cheque No 03020 dated 06/10/2021

drawn on HDFC Payable at Chennai

towards Cess / EMD / SD / Consent Fee to Air / Water / Analysis fees / AAQS /

VEM Test Fees / ETI / Other -

Rs. 100900/-

[Signature]
Signature
For District Environmental Engineer
Tamilnadu Pollution Control Board
Chennai District.



TAMIL NADU POLLUTION CONTROL BOARD

OFFICE OF :

DOC TYPE:

OFFICE CODE:

CODE :

CASH RECEIPT NO.

147171

Date: 22/12/2021

ACCOUNTS				S.L.			

Received from M/s. Ashok Heyland Ltd. (Foundries Division)

the sum of Rupees One lakh forty nine thousand Seven

thousand and twenty only

in cash / by D.D. / Banker's Cheque No 030388 dated 03/12/2021

drawn on HDFC Payable at Chennai

towards Cess / EMD / SD / Consent Fee to Air / Water / Analysis fees / AAQS /

VEM Test Fees / ETI / Other

Rs. 149720/-

Signature of District Environmental Engineer
Tamilnadu Pollution Control Board
Chennai District.

ANNEXURE - XXII

LIST OF MACHINERIES

LIST OF MAJOR MACHINERIES IN ALL PROCESS FACILITIES

SHOP/AREA	EQUIPMENT NAME	PLANT-1 LOAD in KW	PLANT-2 LOAD in KW
GENERATOR	WARTSILA D.G set		4000
MELTING	Induction Melting Furnace 3000 Kgs X 2	4000	0
	Induction Melting Furnace 5000 Kgs X 3	3000	6000
	Holding Furnace 10 MT X 2	600	0
	Holding Furnace 20MT X 2	0	600
	Water Cooling system	90	75
	Exhaust system	82	65
	Hyd. Pumps	40	30
	Lightings	20	20
	Crane Load	90	110
	Total Load	7922	6900
MOULDING	K/O Exhaust	35	30
	P/O Exhaust	27	27
	K/O Vibrator	15	15
	Hyd. Pumps	335	396
	Cooling Pumps	27	27
	Positions	30	34
	Lightings	23	28
	Total Load	492	557
SANDPLANT	Ret Sand Sys	105	100
	Prep. Sand Sys	40	40
	KW & DISA Sand Mill	285	410
	Sand Multicooler	260	265
	Lightings	12	12
	AC	3	3
	Total Load	705	830
FETTLING	Snag M/c	280	148
	Jigging M/c	54	40
	SBM M/c	165	240
	Tumblast	95	76
	Painting	67	54
	Blowing	27	40
	Lightings	67	54
	Total Load	755	652

CORESHOP	Cold Box M/c	210	245
	Shell M/c	520	480
	Ovens	49	42
	Sand Mills	27	33
	Lightings	42	35
	Amine Scrubbers	38	42
	Total Load	886	877
COMPRESSOR	Kaesar-1	250	250
	Kaesar-2	250	250
	Kaesar-3	250	250
	Kaesar-4	250	0
	Atlas Comp-1	75	75
	Atlas Comp-2	160	160
	Kirloskar-1	200	200
	Kirloskar-2	0	200
	Kirloskar-3	0	200
	Kirloskar-4	0	200
	Cooling Pump Load	15	21
	Total Load	1450	1806

ANNEXURE - XXIII

**DEMOGRAPHY AND LANDUSE OF THE STUDY
AREA**

DEMOGRAPHY IN THE STUDY AREA

Name	TRU	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT	M_LIT	F_LIT	P_ILL	TOT_WORK_P	MAINWORK_P	MARGWORK_P	NON_WORK_P
0-3 km															
Kattivakkam (M)	Urban	9354	36617	18466	18151	5718	136	27279	14692	12587	9338	13273	10880	2393	23344
Edayanchavadi (CT)	Urban	3142	12119	6042	6077	1402	5	9340	4969	4371	2779	4219	3495	724	7900
3-7 km															
Athipattu (CT)	Urban	2762	11034	5623	5411	4505	299	8205	4454	3751	2829	4072	3397	675	6962
Vallur	Rural	2993	11935	6089	5846	7803	29	9101	5040	4061	2834	4617	3662	955	7318
Manali (M)	Urban	9331	35248	17911	17337	8224	32	26268	14133	12135	8980	12745	11494	1251	22503
Vellivoyal	Rural	820	3511	1758	1753	2466	5	2399	1292	1107	1112	1340	1299	41	2171
Vichoor	Rural	1437	5765	2868	2897	2925	9	4107	2211	1896	1658	2391	1781	610	3374
Kadapakkam	Rural	787	2941	1436	1505	825	0	2196	1194	1002	745	1318	1164	154	1623
Sadayankuppam	Rural	1355	5348	2704	2644	1406	165	4021	2126	1895	1327	1942	1708	234	3406
Tiruvottiyur (M)	Urban	63862	249446	125300	124146	35332	502	197146	103034	94112	52300	94000	81050	12950	155446
Chinnasekkadu (TP)	Urban	3238	12396	6365	6031	3665	13	9509	5152	4357	2887	4490	3757	733	7906
Elandancheri	Rural	201	685	356	329	69	0	466	272	194	219	309	236	73	376
Nandiambakkam	Rural	1511	6268	3156	3112	2048	549	4817	2542	2275	1451	2362	1899	463	3906
Minjur (TP)	Urban	7048	28337	14168	14169	9374	58	22301	11813	10488	6036	11392	8624	2768	16945
Kosapur	Rural	190	780	358	422	713	8	541	277	264	239	291	149	142	489
7-10 km															
Mathur (CT)	Urban	6886	27674	14081	13593	4585	37	22254	11815	10439	5420	10160	8111	2049	17514
Periyamullaivoyal	Rural	275	977	495	482	403	0	585	332	253	392	443	161	282	534
Chinnamullaivoyal	Rural	20	70	35	35	70	0	40	21	19	30	33	6	27	37
Aranvoyal	Rural	1202	4821	2373	2448	2192	72	3264	1781	1483	1557	1818	1140	678	3003

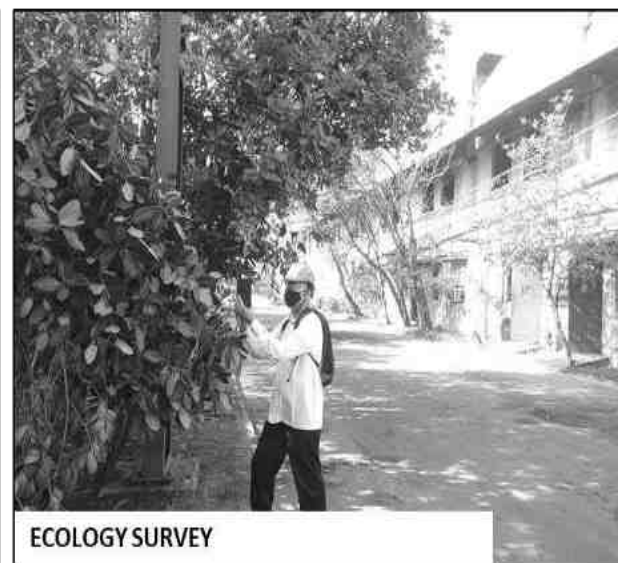
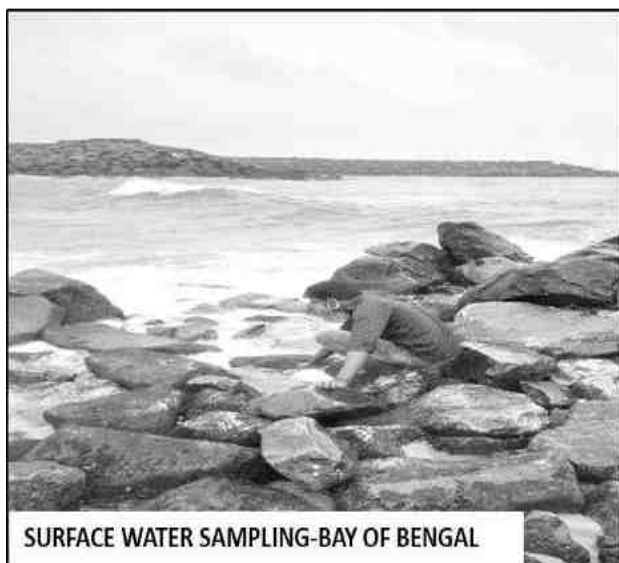
LANDUSE PATTERN IN THE STUDY AREA

LANDUSE PATTERN OF THE STUDY AREA ACCORDING TO DISTRICT CENSUS HANDBOOK 2011							
S. No.	Village	Forest (ha)	Irrigated land (ha)	Un- irrigated land (ha)	Cultivable waste land (ha)	Area not available for cultivation (ha)	Total (ha)
0 -3 km radius							
1	Periyakuppam	0	47.5	0	4.6	47.62	99.72
2	Kattupakkam	0	4.6	0	0	60.75	65.35
3	Kuruvimalai	0	43.65	0	29.92	3.9	77.47
4	Ennore	0	0	0	0	423.84	423.84
	Sub Total	0.0	95.75	0	34.52	536.11	666.38
3 -7 km radius							
5	Vallur	0	125.05	86.64	0	1124.45	1336.14
6	Seemapuram	0	200.79	41.33	0.25	67.43	309.8
7	Vellivoyal	0	51.14	42.74	72.15	330.47	496.5
8	Vichoor	0	72.77	16.03	3.17	59.19	151.16
9	Kadapakkam	0	133.35	0	12.72	130.6	276.67
10	Andarkuppam	0	116.69	0	0	31.99	148.68
11	Seppakkam	0	29.74	192.62	23.1	9.76	255.22
12	Manali	0	54.75	138.45	6.04	98.86	298.1
13	Athipattu	0	121.52	63.1	36.3	125.9	346.82
14	Tiruvotriyur	0	129.89	48.07	0	43.57	221.53
15	Eladancheri	0	0	0	0	25.22	25.22
16	Sadayankuppam	0	33.94	0	132.16	143.01	309.11
	Sub total	0.0	1069.63	628.98	285.89	2190.45	4174.95
7 -10 km radius							
17	Mathavaram	0	0	0	0.58	56.23	56.81
18	Kosapur	0	0	9.21	32.96	115.7	157.87
19	Minjur	0	43.76	9.07	0	16.38	69.21
20	Mathur	0	172.84	4.02	1.66	84.23	262.75
	Sub Total	0	216.6	22.3	35.2	272.54	546.64
	Grand total	0.0	1381.98	651.28	355.63	2999.1	5387.99

ANNEXURE - XXIV

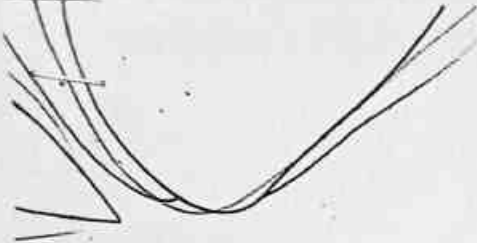
BASELINE PHOTOGRAPHS

BASELINE PHOTOGRAPHS



ANNEXURE – XXV

OCCUPATIONAL HEALTH & SAFETY



THE NEW-AGE FAMILY HOSPITAL

VISION SCREENING



kauvery
hospital

vision test

Emp no: 4511

Name : Mr G Vengatesan

PID No : 2101010531

Age/ Sex: 51/M

Date: 25/01/2021

Company: Hinduja Foundries

WITHOUT CORRECTION		RIGHT EYE	LEFT EYE
	Distance Vision	6/6	6/6
Near Vision	N6	N6	
COVER TEST	Ortho		
COLOUR VISION	Normal	Normal	
FINDINGS	Both Eyes – Normal		
ADVICE	Nil		

Optometrist: Ms Krithika K

Sign

Lung rest

EmpNo: 4511

Name : MR.VENGATESAN.G

AGE /SEX: 51 / M

Reg. No : 062

DATE : 25/01/2021

X-RAY CHEST PA VIEW

Trachea and mediastinum in midline.

cardiothoracic ratio is within normal limits.

Both domes of diaphragm are normally placed.

Both lungs fields show normal bronchovascular markings.

Both cardiophrenic and costophrenic angles are free.

Bony ribcage and soft tissue structures appear normal.

IMPRESSION :

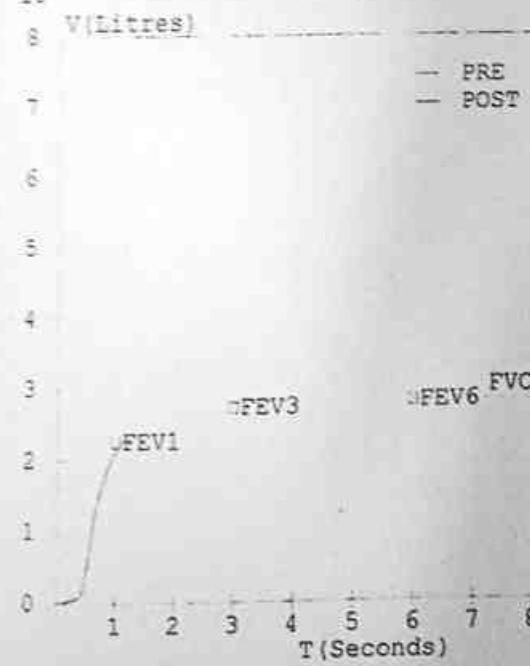
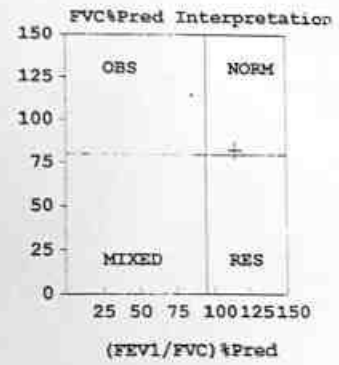
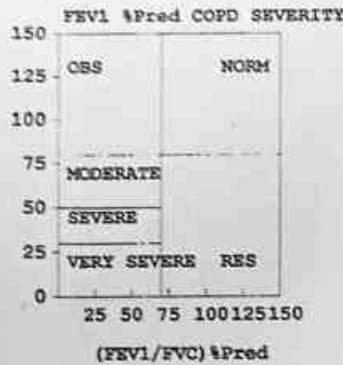
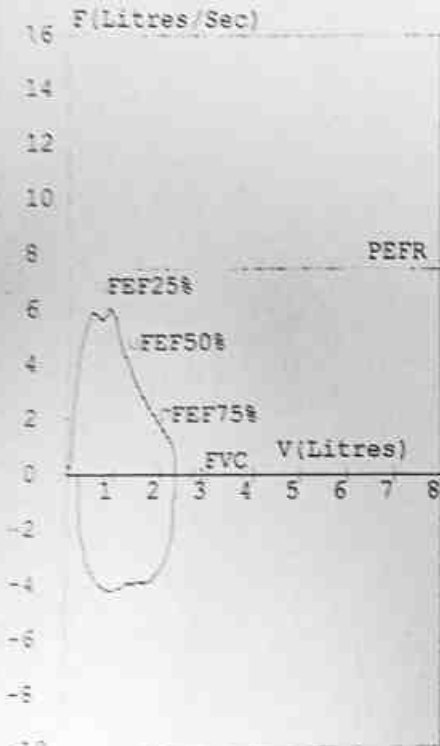
NORMAL STUDY

RADIOLOGIST

Dr. S. SELVAKUMAR, M.D.
Professor of Radiology
Consultant of General
Diagnostic Radiology
Reg. No. 6021

• India • UAE • South Africa • USA
Patient: RAMESHBABU K MR
Refd. By:
Pred. Eqns: RECORDERS
Date : 09-Jun-2022 05:05 PM

TEST REPORT
Age : 46 Yrs
Height : 165 Cms
Weight : 70 Kgs
ID : 4499
Gender : Male
Smoker : No
Eth. Corr: 90
Temp :



FVC Results

Parameter	Pred	M. Pre	%Pred	M. Post	%Pred	%Imp
FVC (L)	02.80	02.32	083	-----	---	---
FEV1 (L)	02.25	02.15	096	-----	---	---
FEV1/FVC (%)	80.36	92.67	115	-----	---	---
FEF25-75 (L/s)	03.22	04.09	127	-----	---	---
PEFR (L/s)	07.46	05.94	080	-----	---	---
FIVC (L)	-----	02.09	---	-----	---	---
FEV.5 (L)	-----	00.60	---	-----	---	---
FEV3 (L)	02.72	02.32	085	-----	---	---
PIFR (L/s)	-----	04.25	---	-----	---	---
FEF75-85 (L/s)	-----	02.06	---	-----	---	---
FEF.2-1.2 (L/s)	05.60	05.22	093	-----	---	---
FEF 25% (L/s)	06.83	05.75	084	-----	---	---
FEF 50% (L/s)	04.78	04.66	097	-----	---	---
FEF 75% (L/s)	02.16	02.42	112	-----	---	---
FEV.5/FVC (%)	-----	25.86	---	-----	---	---
FEV3/FVC (%)	97.14	100.00	103	-----	---	---
FET (Sec)	-----	01.16	---	-----	---	---
ExplTime (Sec)	-----	00.21	---	-----	---	---
Lung Age (Yrs)	046	048	104	-----	---	---
FEV6 (L)	02.80	-----	---	-----	---	---
FIF25% (L/s)	-----	03.31	---	-----	---	---
FIF50% (L/s)	-----	03.90	---	-----	---	---
FIF75% (L/s)	-----	04.24	---	-----	---	---

Pre Test COPD Severity
Test within normal limits

Dr. R. SUBBARAMAN, MD.DTCM
Consultant Pulmonologist
No. 19127

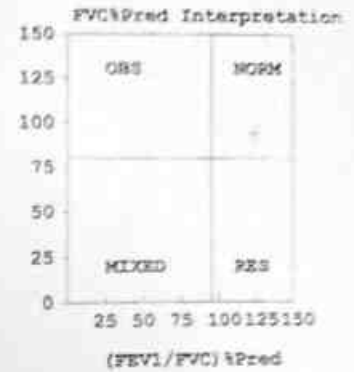
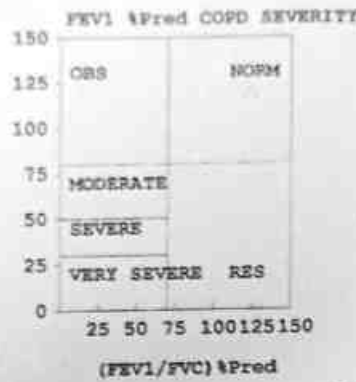
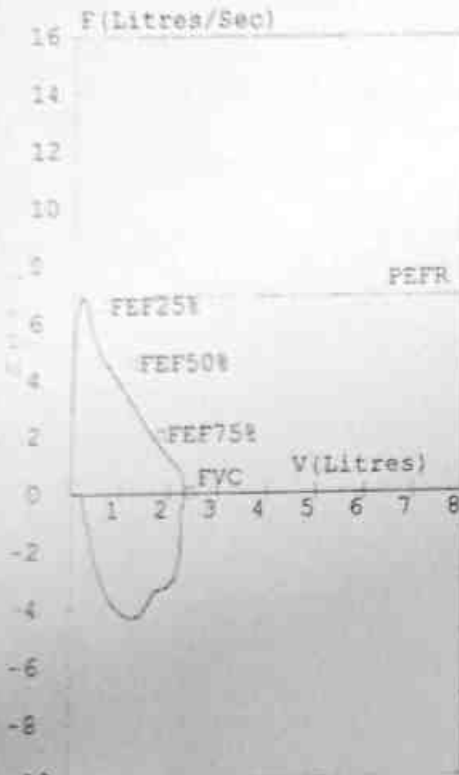
Pre Medication Report Indicates
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

சென்னை மலையாள எடுக்காதினம்

India • UAE • South Africa • USA
Patient: YUVARAJ A MR
Refd. By:
Pred. Eqns: RECORDERS
Date : 09-Jun-2022 05:41 PM

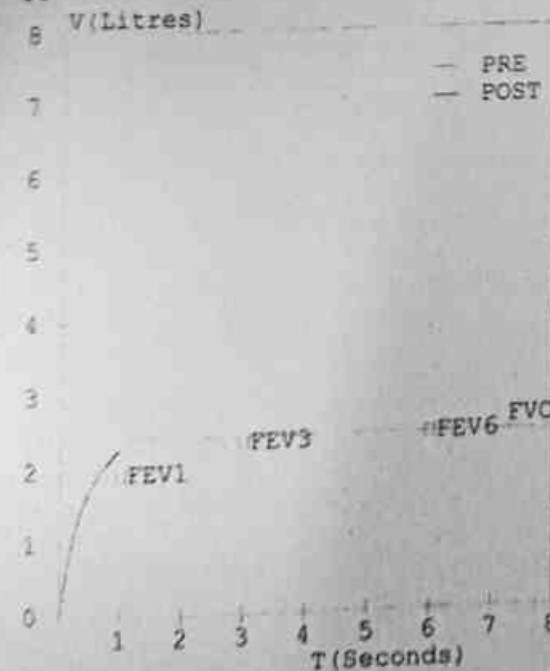
TEST REPORT

Age : 47 Yrs
Height : 157 Cms
Weight : 60 Kgs
ID : 4101
Gender : Male
Smoker : No
Eth. Corr: 90
Temp :



FVC Results

Parameter	Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L) 02.43	02.29	094	----	---	---
FEV1	(L) 01.95	02.28	117	----	---	---
FEV1/FVC	(%) 80.25	99.56	124	----	---	---
FEF25-75	(L/s) 03.04	03.05	100	----	---	---
PEFR	(L/s) 06.91	06.79	098	----	---	---
FIVC	(L) -----	02.08	---	----	---	---
FEV.5	(L) -----	01.77	---	----	---	---
FEV3	(L) 02.36	02.29	097	----	---	---
PIFR	(L/s) -----	04.35	---	----	---	---
FEF75-85	(L/s) -----	01.48	---	----	---	---
FEF.2-1.2	(L/s) 05.18	04.44	086	----	---	---
FEF 25%	(L/s) 06.56	04.87	074	----	---	---
FEF 50%	(L/s) 04.56	03.34	073	----	---	---
FEF 75%	(L/s) 02.03	01.78	088	----	---	---
FEV.5/FVC	(%) -----	77.29	---	----	---	---
FEV3/FVC	(%) 97.12	100.00	103	----	---	---
FET	(Sec) -----	01.02	---	----	---	---
ExptTime	(Sec) -----	00.02	---	----	---	---
Lung Age	(Yrs) 047	039	083	----	---	---
FEV6	(L) 02.43	-----	---	----	---	---
FIF25%	(L/s) -----	03.26	---	----	---	---
FIF50%	(L/s) -----	04.13	---	----	---	---
FIF75%	(L/s) -----	04.07	---	----	---	---



Pre Test COPD Severity
Test within normal limits

[Signature]
Dr. R. SUBBARAMAN, MD
Consultant Pulmonologist
No. 19177

Pre Medication Report Indicates
Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

சென்னை நலவியல் அலுவலகம்

ANNEXURE - XXVI

EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. Ashok Leyland Limited (Formerly known as Hinduja Foundries Ltd) proposes to increase their manufacturing capacity of ferrous castings in their existing premise. The industry is situated at 39A & 39B at Kathivakkam village, Tiruvottiyur taluk, Tiruvallur District, Tamil Nadu.

M/s. Ashok Leyland Limited, Foundry Division (herein after referred to as ALL) established at Ennore in 1961 is a part of Ashok Leyland, India's largest foundry group. The erstwhile Hinduja Foundries Limited was amalgamated with Ashok Leyland Limited pursuant to the Order of the National Company Law Tribunal (NCLT) vide Order dated April 24, 2017. The NCLT order was filed with the Registrar of Companies, Chennai on April 28, 2017 and the scheme became effective on April 28, 2017. The amalgamation is effective from the appointed date of October 1, 2016.

The existing plant has been operating in a company owned land area of 13.86 ha (34.25 acres) which features furnace, sand preparation and mould making divisions. The furnace division comprises 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace to produce castings of 2790 TPM. The company has obtained Consent to Operate granted under Air & Water Act from TNPCB for the existing unit which is valid up to March 2023.

Presently, the industry has proposed to increase the manufacturing capacity of ferrous castings from 2790 TPM to 6125 TPM. The projected production will be achieved by the existing 2 nos. of 3 MT and 3 nos. of 5 MT induction furnace and other supporting equipment's. The enhancement in the production doesn't require an additional area hence, the existing land would be sufficient to carry out the expansion and modernization activity. The estimated total cost for the proposed expansion and modernization is Rs. 15.0 Crores.

Project Scoping Category

In order to obtain Environmental Clearance from State Level Environment Impact Assessment Authority (SEIAA) and Consent for Establishment (CFE) from the Tamil Nadu Pollution Control Board (TNPCB), Environmental Impact Assessment (EIA) report with detailed Environmental Management Plan (EMP) is essential as per the EIA Notification 2006 and its subsequent amendments.

As per the Environmental Impact Assessment Notification dated 14th September 2006, the proposed expansion and modernization project falls under the **Schedule No. 3(a) [Metallurgical Industries-Ferrous and Non-ferrous]**.

Considering the project activity, nature the project proposal falls under the **Category 'B1'**. The project was considered in the 153rd SEAC meeting held on 04.06.2020 and subsequently in the 382nd SEIAA meeting held on 23.06.2020 received TOR vide letter No. **SEIAA-TN/F.No.7465/2020/3(a)/ALL/TOR-726/2020** dated **23.06.2020**

1.1 Location of the Project

The Plant site is situated at Kathivakkam Village, Tiruvottiyur Taluk, Tiruvallur District, Tamil Nadu. The plant site is about 15.5 km (SSW) from Chennai and 46.5 km from Tiruvallur district (West). Nearest habitation Ennore and Kathivakkam is about 0.02 km (NNE) and 0.35 km (NNW) from the plant site. The site is about adjacent to the SH-114 Connecting Chennai and Ennore. The nearest Railway station is Ennore R.S at a distance of 0.38 km in NNE. The Nearest Airport is Chennai International Airport at a distance of 29.0 Km in SW. The proposed expansion and modernization activities will be carried out within the existing

industrial premises itself. Therefore, no additional land will be acquired for the proposed expansion and modernization. The Index map and the study area map of 10 km radius is shown in **Figure - 1.1** and **Figure - 1.2** respectively. Google map of 10 km radius of the existing plant site is shown in **Figure - 1.3**. The details of environmental setting are given in **Table - 1.1**.

TABLE - 1.1
ENVIRONMENTAL SETTING OF THE PLANT SITE (10 KM RADIUS)

Sr.No	Particulars	Details		
		Point	Latitude	Longitude
1.	Latitude & Longitude	A	13°12'52.52"N	80°19'12.98"E
		B	13°12'46.78"N	80°19'23.73"E
		C	13°12'36.20"N	80°19'20.17"E
		D	13°12'42.57"N	80°19'03.55"E
2.	Elevation above MSL	4 – 9 m		
3.	Land use at the project site	Industrial Land use as per DTCP		
4.	Nearest Habitation	Ennore- 0.02 km, NNE Kathivakkam – 0.35 km, NNW		
5.	Nearest Highway	SH-114 Connecting Chennai to Ennore-Adjacent, W		
6.	Nearest Railway station	Ennore Railway Station – 0.38 km, NNE		
7.	Nearest Air Port	Chennai International Airport – 27.17 km, SSW		
8.	Nearest Harbor	Ennore Port - 5.31 Km, NNE		
9.	Nearest Town	Ennore – 0.02 km, W		
10.	Reserve Forest within 10-km radius	Nil in 10 km radius		
11.	Nearest water bodies	Bay of Bengal - 0.12 km, E Kosasthalayar River – 0.37 Km, WNW Kadapakkam Panchayat Lake – 7.1 Km, W Vichoor Lake – 8.27 Km, W		
12.	Ecologically sensitive zones like Wild Life Sanctuaries, National Parks and biospheres	None within 10-km radius		
13.	Defense Installation / Archaeological / Ports	Nil in 10 km radius		
14.	CRZ identification	CRZ-II as per CZMP/study by IRS, Anna University		
15.	Historical places	Nil		
16.	Socio-economic factors	No resettlement and rehabilitation involved		
17.	Nearest Hospitals	Ernavur Government Hospital (2.86 Km, SW) Urban Primary Healthcare center (4.02 Km, SW)		
18.	Religious places	CSI St. Peter church (0.01 Km, WNW) Masjid-e-Mammor (0.15 Km, SW) Sri Batherakali Amman Temple (0.43 Km, N)		
19.	Nearby Industries	Ashok Leyland Defence Unit – Adjacent, S Coromandel International Limited – 0.15 Km, N Ennore Thermal Power Station-1.0 Km, SW NTPC thermal Power plant- 2.5 Km, N		

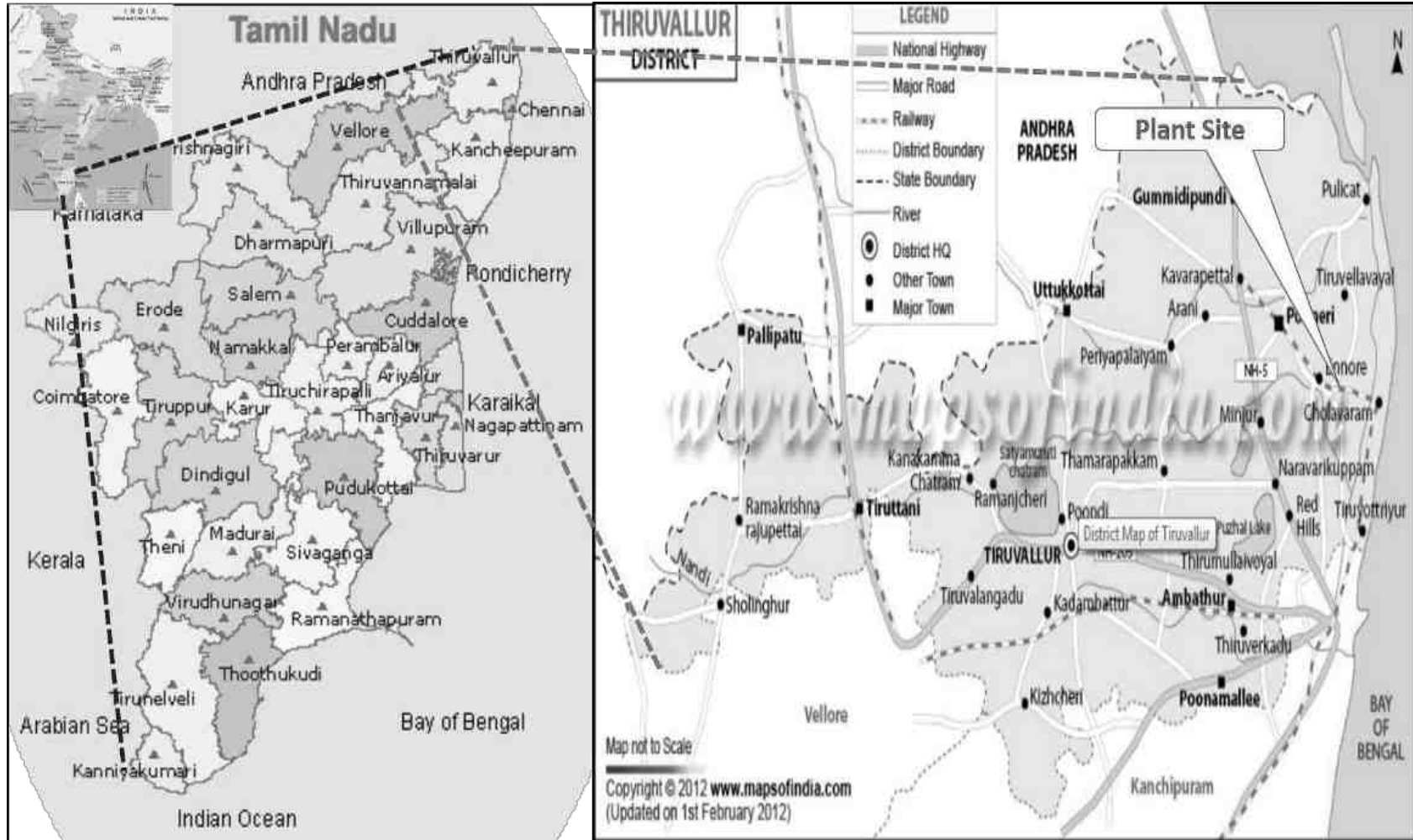
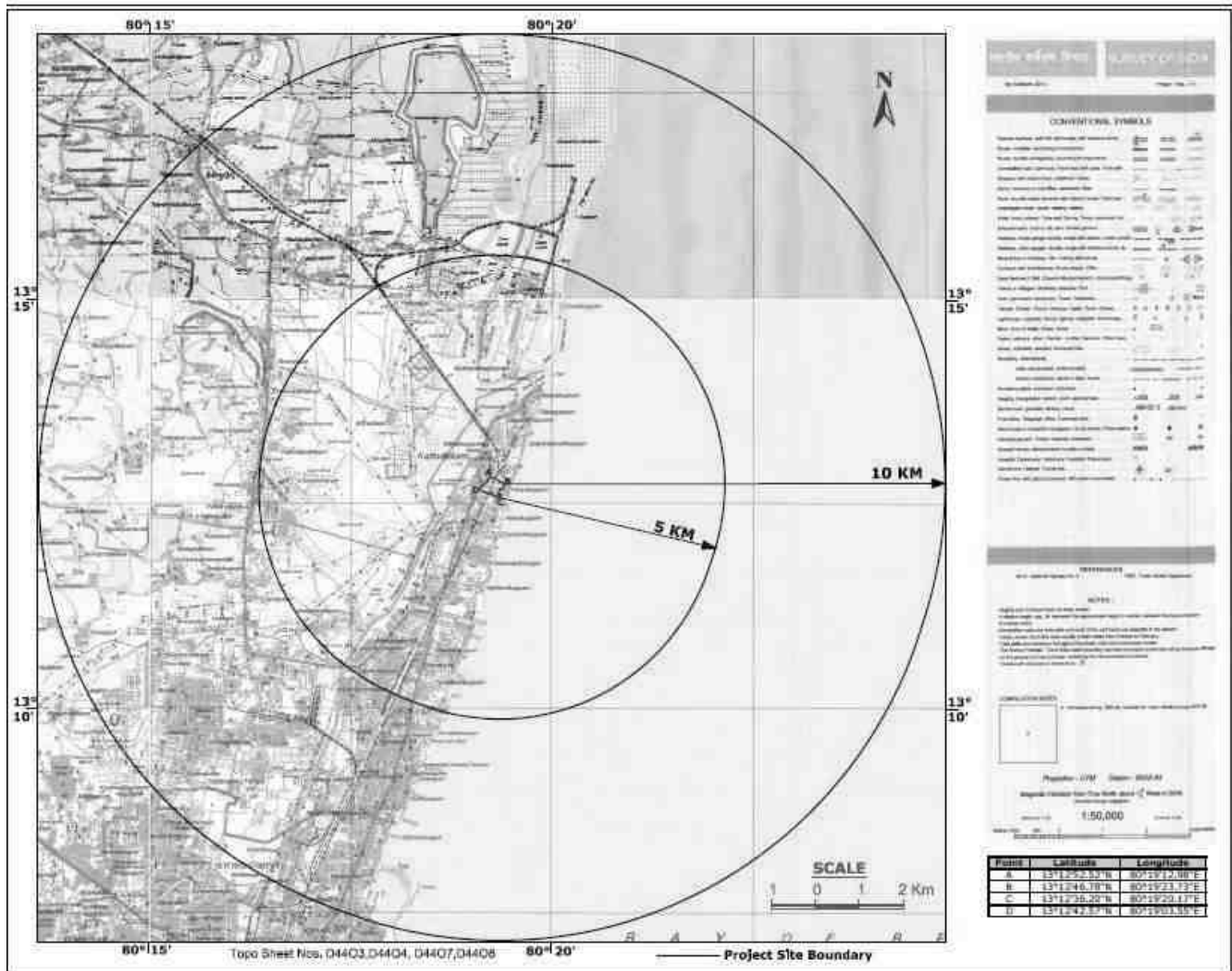


FIGURE - 1.1
INDEX MAP



**FIGURE - 1.2
STUDY AREA MAP**



FIGURE - 1.3
GOOGLE MAP OF 10 KM RADIUS

1.2 Project Details

1.2.1 Manufacturing Details

The facility is proposed to enhance the production quantity of ferrous castings from 2790 TPM to 6125 TPM.

1.2.2 Land Requirement

The total land available under the ownership of the Ashok Leyland Limited is 13.86 ha (34.25 acres). The existing plant site is classified as Industrial Land use Zone. The proposed expansion and modernization will be carried out within the existing premises itself. The details of land-use breakup of the existing plant and after the proposed expansion and modernization are given in **Table - 1.2**

TABLE - 1.2
DETAILS OF LANDUSE BREAK-UP

S. No.	Break up	Area		Percentage
		Ha	Acres	
1	Process building area	4.79	11.83	34.55
2	Non-process building area	0.68	1.66	4.84
3	Storage area	0.34	0.84	2.45
4	Parking Area	0.06	0.17	0.50
5	Driveway & pathway area	2.16	5.36	15.65
7	Green belt area	4.90	12.1	35.32
8	Open area	0.93	2.29	6.69
	Total	13.86	34.25	100

Source: Ashok Leyland Limited

1.2.3 Raw Material Requirement

The major raw materials required for the proposed expansion and modernization project are Scraps, Mild steel, CI borings, Pig iron and Silica sand. The details of various raw materials, sources and their mode of transport are given in **Table-1.3**

TABLE - 1.3
DETAILS OF RAW MATERIAL REQUIREMENT FOR FOUNDRY UNIT

S. No.	Raw Material	Existing (TPM)	After Expansion (TPM)	Source
1	Pig Iron	203.0	565.0	Goa, Karnataka
2	Mild Steel	1522.0	3300.0	Tamil Nadu
3	CI Borings, CI Scrap & Foundry Returns	1268.0	2825.0	Tamil Nadu
4	Product scrap	320.0	0	-
5	Washed Silica Sand	2635.6	3675.0	Andhra Pradesh
6	Sodium Silicate	8.36	1.5	Tamil Nadu
7	Resin & Binders	41.0	59.0	Maharashtra
8	Core Paints	50.0	66.0	Maharashtra

S. No.	Raw Material	Existing (TPM)	After Expansion (TPM)	Source
9	Casting Paints	8.36	13.8	Maharashtra
10	Thinner (3:1 ratio)	3.825	4.600	Maharashtra
11	Di methyl Formaldehyde	0.396	0.594	Tamil Nadu
12	S M Release Oil (Silicone oil)	0.253	0.380	Tamil Nadu

1.2.4 Power and Fuel Requirement

The peak power demand for the entire unit is 19100 KVA while the average power demand will be about 17000 KW. In order to meet the desired quantity additional power supply of 700 KVA will be required. Therefore, the peak power demand for the entire unit after expansion and modernization will be 19900 KVA while the average power demand will be about 17910KW. The entire power requirement will be sourced through TANGEDCO. The Induction furnaces are installed in the existing activity as per Central Electricity Authority's directions to minimize the power surge and harmonic distortion in the incoming feeders. To meet the emergency power requirement during power cuts and grid failures 2 Nos of 1250 KVA DG Sets will be installed and the existing DG set of 5000 KVA will be decommissioned. The Power & fuel requirement details are given in **Table – 1.4 and Table 1.5**

**TABLE-1.4
POWER REQUIREMENT**

Particulars	Existing	After Expansion
Power Requirement Source: 1. TANGEDCO	19100 KVA	19900 KVA
Backup facility DG-Set	1x5000 KVA	2x1250 KVA

Note: After the Proposed expansion DG set of capacity 5000 KVA will be decommissioned.
Source: Ashok Leyland Limited

**TABLE-1.5
FUEL REQUIREMENT**

S. No	Description	Existing TPD	After Expansion TPD
1	HSD	3.0	4.0
2	HFO	0.1	0

Existing DG set of 5000 KVA will be decommissioned, hence HFO will not be used

1.2.5 Water Requirement

The total water requirement for plant activity will be 447.0 KLD after the proposed expansion and modernization activity. The daily freshwater demand will be 425.0 KLD which will be sourced from open wells located within the plant premises. The NOC for the water withdrawal has been obtained from Chennai Metropolitan Development Authority. The water requirement of the existing and after expansion and modernization is shown in **Table-1.6**

TABLE - 1.6
DETAILS OF WATER REQUIREMENT

S No	Category	Requirement in KLD	
		Existing	After Expansion
1.	Cooling tower makeup	28.0	50.0
2.	Process	72.0	97.0
3.	Domestic requirement	350.0	300.0
Total		450.0	447.0

Source: Ashok Leyland Limited

1.2.6 Manpower Requirement

The total manpower available in the existing plant is about 1950 nos. After expansion and modernization activity additional man power of 250 Nos will be equipped from the nearby communities for various plant operations. The unit is operated round the clock in three shifts. The total manpower after the proposed expansion and modernization will be 2200 nos.

1.2.7 Process Description

The conversion of MS scrap in to castings does not require any sophisticated technology. Various grades of scraps, borings and ferro alloys are melted in furnaces and pour into the moulds. The moulds of required size and shape prepared by using sand and bentonite (clay) which act as a binding material. Then the castings separated from sand moulds and cleaned. The manufacturing process of Iron castings involves the following steps in sequence.

- Sand preparation and Mould Making/Core making;
- Making cores and sand moulds;
- Melting in induction furnace and Pouring;
- Shot blasting and fettling; and
- Quality testing and Dispatch.

1.3 **Baseline Environmental Status**

The 10 km radial distance from the existing plant boundary has been considered as study area for Environmental Impact Assessment (EIA) baseline studies. Environmental monitoring for various attributes like meteorology, ambient air quality, surface and ground water quality, soil characteristics, noise levels and flora & fauna have been conducted at specified locations and the secondary data collected from various Government and Semi-Government organizations. Baseline Environmental monitoring studies for the various environmental attributes were carried out during 1st July 2020 to 30th September 2020. The details of the baseline study are presented as follows:

1.3.1 Meteorology

Meteorological data at the site was monitored during 1st July 2020 to 30th September 2020. It was observed that during study period temperature ranged from 23°C to 38°C. During the same period of observations, the relative humidity recorded was ranged from 36% to 96%. Predominant wind directions are mostly from the WSW followed by SW.

1.3.2 Ambient Air Quality

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at eight (8) locations. The summary of the ambient air quality monitoring results is given in **Table - 1.7**.

TABLE - 1.7
SUMMARY OF AMBIENT AIR QUALITY IN THE STUDY AREA

Sr. No	Parameters	Concentration ($\mu\text{g}/\text{m}^3$)		NAAQS Limits, 2009 ($\mu\text{g}/\text{m}^3$)
		Maximum	Minimum	
1	Particulate matter PM _{2.5}	32.8	15.1	60
2	Particulate matter PM ₁₀	88.6	59.7	100
3	Sulphur dioxide (SO ₂)	33.4	7.1	80
4	Oxides of Nitrogen (NO _x)	33.5	8.5	80
5	Carbon monoxide, CO	330	193.0	2000

1.3.3 Water Quality

Eight (8) ground water samples and four (4) surface water samples within the study area were considered for assessment. The water samples are compared with the standards of drinking water IS 10500:2012

Ground water quality

The results of the ground water samples are compared with the standards for drinking water as per IS: 10500:2012. The analysis results indicate that the pH ranges in between 7.02-8.05, which is well within the specified standard of 6.5 to 8.5. The maximum pH of 8.05 was observed at Kattukuppam (GW3) and the minimum pH of 7.02 was observed at Thulsikuppam (GW6). Total hardness was observed to be ranging from 188.1-559.9 mg/l. The maximum hardness was recorded at Edayanchavadi (GW4) and the minimum hardness was recorded at Kattukuppam (GW3). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 616-2698 mg/l. The maximum TDS was recorded at Edayanchavadi (GW4) and the minimum TDS was recorded at Kattukuppam (GW3).

Chlorides at all the locations were within the permissible limit, ranging in between 158.4-724.6 mg/l. Fluorides are ranging in between 0.6-0.9 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 2.9-9.5 mg/l. The heavy metal content is below detectable limits.

Surface water quality

During the baseline period season, most of the surface water bodies in the study area were dry hence 6 samples were taken for analysis. The analysis results indicate that the pH ranges in between 7.86-8.03, which is well within the specified standard of 6.5-8.5. The maximum pH of 8.03 was observed at sea (SW4) and the minimum pH of 7.86 was observed at Kosathalayar River (SW1).

Total hardness was observed to be ranging from 1122.3-2010.8 mg/l. The maximum hardness was recorded at Sea (SW4) and the minimum hardness was recorded at Kosathalayar River (SW1). The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 1072-31225 mg/l. The maximum TDS was recorded at Ennore Creek (SW3) and the minimum TDS was recorded at Kosathalayar River (SW1).

Chlorides at all the locations were within the permissible limit, ranging in between 284-15365 mg/l. Fluorides are ranging in between 0.7-1.3 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 4.5-19.7 mg/l. The heavy metal content is below detectable limits

1.3.4 Soil Characteristics

Six (6) soil samples were collected in and around the plant site to assess the present soil quality of the region. It has been observed that the texture of the soil is mostly "clay soil" in the study area. The common color of the soil is pale brown. The pH of the soil ranged from 7.47 to 7.95, indicating that the soil is alkaline in nature. The bulk density of soil ranges from 1.2 to 1.3 gm/cc

1.3.5 Noise Levels

The noise monitoring has been conducted for determination of ambient noise levels at Eight (8) locations in the study area. The daytime (L_{day}) noise levels were found to be in the range of 47.8 dB (A) to 63.2 dB (A). The night time (L_{night}) noise levels were observed to be in the range of 43.2 dB(A) to 59.4 dB(A). Hence, the noise levels were found to be well within the range specified by CPCB norms.

1.3.6 Ecological Environment

From the field observations there are no reserve forests in the 10km radius of the study area. As per MoEF and Forest Department of Tamil Nadu state, there are no National Parks, Wildlife Sanctuaries, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridors or IBAs within 10 km of the project site. As per the records of the Botanical Survey of India, there are no plants of conservation importance in the study area.

No rare or endangered or threatened (RET) or Schedule I species in the study area as per the Wildlife Protection Act, 1972.

10.3.7 Socio Environment

The study area (10-km radius) has a total population of 4,55,972 persons according to 2011 Census. The male and female constitute 50.3 % and 49.6 % of the total population respectively. As per census, the study area comprises 20.6% population belonging to Scheduled Castes (SC) and 0.44% belonging to Scheduled Tribes (ST).

The literacy rate is found to be 77%. As per census 2011 records, the main workers were found to be 31% of the total population. The marginal workers and non-workers constituted to 5% and 62% of the total population.

1.4 **Anticipated Environmental Impacts and Mitigation Measures**

Impacts during Operational Phase

1.4.1 Impact on Soil

The soil quality remains the same as the proposed expansion and modernization does not involve a change in land use pattern. The probable sources of degradation of soil quality will be due to generation and disposal of ash and fugitive dust emission. The airborne fugitive dust from the plant is likely to be deposited on the topsoil in the immediate vicinity of the

plant boundary. However, the fugitive emissions are likely to be controlled to a great extent through pollution control measures like water sprinkling and the greenbelt development. Hence, no impact is envisaged on soil quality of the project site

1.4.2 Impact on Air Quality

Particulate Matter (PM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x) will be the major pollutants from the proposed expansion and modernization. In order to control the emissions of particulates, the pollution control equipments are proposed. Adequate stack height has been provided to disperse gaseous emissions over a wider area.

Gaseous Emission Control Measures:

Melting of metals and alloys in the induction furnaces generates dust and metal oxide fumes. These dust and fumes are extracted from the furnace and they are passed through an air pollution control system consisting of spark arrestor, dilution damper followed by wet scrubber etc. and then it would be released into the atmosphere through stacks. These dust and fumes are extracted from the furnace and they are passed through wet scrubber for treating. After treatment, it will be released onto the atmosphere through the individual stacks of above 30 m. The pollutants generated from the Induction furnace is controlled by the wet scrubber followed with stack of suitable height. In the billet division, the pollution generated from the induction furnace is controlled by cyclone separator, mist eliminator, wet scrubber followed by common stack with rolling mill. The Regular monitoring and maintenance of the pollution control equipment's enhances the complete process of the plant site.

1.4.3 Impact on Water Quality & Management

As the manufacturing process will be operated only on the dry process, water is mainly used at certain stages in the process like machinery cooling, scrubber make up and domestic needs. The entire water demand for the existing operation and proposed expansion and modernization will be met from existing bore well located within the industrial premises.

The total water requirement for plant activity will be 447.0 KLD after the proposed expansion and modernization activity. The daily freshwater demand will be 425.0 KLD which will be sourced from open wells located within the plant premises. After expansion and modernization, the generated sewage (270.0 KLD) will be treated in common STP of capacity 1600 KLD. No wastewater will be discharged outside the plant premises. Hence, there is no impact on the water regime due to the wastewater generation from the plant operation.

1.4.4 Impact due to Solid Waste Generation

In order to avoid problems associated with solid waste disposal, an effective solid waste management system will be followed. Hence, the impact due to solid waste generation during the plant operation is not envisaged. The sources, quantity of the solid waste generated and waste management measures for existing and after the proposed expansion and modernization are presented in **Table - 1.8**

TABLE - 1.8
DETAILS OF SOLID WASTE GENERATION AND MANAGEMENT

S. No.	Waste Generation	Quantity (TPM)		Mode of Disposal
		Existing	Expansion	
Non-Hazardous Waste				
1	Used Sand	3250	3675.0	Send out through authorized Contractors
2	Furnace Slag	166.6	330.0	Send out through authorized Contractors
3	Grinding Dust	8.33	12.0	Send out through authorized Contractors
4	Municipal solid waste	7.35	3.10	Will be collected and given to civic bodies
Hazardous Waste				
1	Used/Spent Oil	100	150	Sold to CPCB authorized recyclers
2	Waste/Residues containing oil	2	2.5	Sold to CPCB authorized recyclers
3	Paint Waste/Residues	1.2	2.0	Sold to CPCB authorized recyclers
4	Discarded containers	60	190	Disposed to SPCB authorized disposer
5	ETP Sludge	2.0	3.0	Disposed to CTSDf

1.4.5 Impact on Noise levels

The major noise generating sources are from cooling tower, air compressors, shack out vibrators, transformer, sand plant, moulding section, DG sets, loading & unloading operation. The predicted noise level through mathematic modeling at the boundary due to various plant activities will be ranging in between 48-50 dB (A). It is seen from the modelling results that the incremental noise levels are within the CPCB standards.

Noise Attenuation Measures

The following control measures will be implemented for the proposed expansion and modernization project:

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures;
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, DG sets, shack out vibrator will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units; and
- Adequate greenbelt development is also being developed in the plant boundary of the plant.

1.4.6 Impact on Ecology

The incremental concentrations of the air quality modelling show that the resultant levels of PM, SO₂ and NO_x are well within the permissible limits as per National Ambient Air Quality Standards, 2009. The impacts on aquatic ecology due to the proposed expansion and modernization activity would be negligible as the treated water will be properly reused and no waste water is discharged outside the plant premises. The proposed expansion and modernization do not create any significant impact on aquatic bodies.

1.4.7 Impact on Public Health

The discharge of waste materials (stack emission, wastewater and solid wastes) from process operations can have some adverse impact on public safety and health in the surrounding area, if appropriate treatment procedures are not followed. As the plant pollution control equipments will be designed as per the modern available technology for controlling the impacts, no adverse impacts on public health in the area are anticipated.

1.5 Environmental Management Plan

Environmental Management Plan during the Erection Phase

1.5.1 Soil Environment Management

Preparation of site will involve excavations and fillings. The earthen material generated during excavations and site grading periods, shall be properly dumped and slope stabilisation shall be taken. The topsoil generated during erections shall be preserved and reused for plantations.

The additional greenbelt area shall be delineated before start-up of earthwork and tree plantation shall be taken up during erection stage itself.

1.5.2 Air Quality Management

The activities like site development, grading and vehicular traffic contribute to increase in PM and NO_x concentrations. The mitigation measures recommended to minimize the impacts are:

- Water Sprinkling in construction area;
- Asphaltting the main approach road;
- Proper maintenance of vehicles and construction equipment; and
- Tree plantation in the area earmarked for greenbelt development.

1.5.3 Water Quality Management

- The earthwork (cutting and filling) will be avoided during the rainy season and will be completed during the summer season.
- Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken.
- Soil binding and fast-growing vegetation will be grown to arrest the soil erosion.

1.5.4 Noise Level Management

Operation of construction equipment and vehicular traffic contribute to the increased noise level. Recommended mitigation measures are:

- Enclosures for noise making units like pumps, compressors, shack out vibrators etc.,
- Good maintenance of vehicles and construction equipment;
- Plantation of trees around the plant boundary to attenuate the noise; and
- Provision of earplugs and earmuffs to workers.

1.5.5 Ecological Management

Clearing of vegetation will not be required as the land is already under possession of the project proponent. Thus, there will not be any ecological impact due to the project expansion and modernization in its erection stage.

Environment Management Plan during the Operation Phase

During operation phase, the impacts on the various environmental attributes should be mitigated using appropriate pollution control equipment. The Environment Management Plan prepared for the proposed expansion and modernization project aims at minimizing the pollution at the source itself.

1.5.6 Air pollution Management

Fugitive and Stack emission from the foundry unit will contribute to increase in concentrations of PM, SO₂ and NO_x. The mitigation measures recommended are as follows:

- Raw material handling sections are major source for fugitive emissions;
- Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission; and
- The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions.

1.5.7 Water pollution management

The recommended measures to minimise the impacts are as follows;

- Recycling of wastewater for greenbelt areas;
- Adequate treatment of wastewater prior to recycling/reuse to maximum extent;
- Utilization of treated domestic wastewater in greenbelt development and plant operation;
- Lining of effluent dyke suitably to prevent any seepage into ground to avoid any groundwater contamination;
- Provision of storm water system to collect and store run-off water during rainy season and utilization of the same in the process to reduce the fresh water requirement; and
- Suitable rainwater harvesting structures to be constructed.

1.5.8 Noise pollution Management

The major noise generating sources are the cooling tower, air compressors, shack out vibrators, furnace section, DG sets, loading & unloading operation. Some recommendations are;

- Adequate protective measures in the form of ear muffs/ear plugs have been provided to the workers working in high noise areas;

- In addition, reduction in noise levels in the high noise machinery areas could be achieved by adoption of suitable preventive measures such as suitable building layout in which the equipment is to be located; and
- Adequate greenbelt development is also being developed in the plant boundary.

1.5.9 Solid Waste Management

- The Non-hazardous wastes such as used sand, furnace slag, grinding dust and municipal solid wastes will be Send out through authorized Contractors.
- The Hazardous wastes such as Used/Spent Oil, Waste/Residues containing oil, Paint Waste/Residues, discarded containers will be collected and given to CPCB authorized recyclers and ETP Sludge will be Disposed to CTSDf.

1.6 Traffic Study

The project site is located to from SH-114 which is Chennai-Ennore highway. The engine driven vehicles were classified into various levels like two wheelers, Auto Rickshaw, Car/Utility, Buses and Trucks. The proposed expansion and modernization involves the transport of raw material and finished goods near to and from the plant site. The present level of traffic on the existing road is found to be 417.2 PCUs/hr. The total traffic generated from the proposed expansion and modernization is 429.2 PCUs/hr (417.2+12=429.2). The transportation in the proposed expansion and modernization not create any significant impacts to the environment. The traffic scenario is presented in **Table-1.9**.

TABLE-1.9
TRAFFIC SCENARIO

Road	V	C*	V/C Ratio	LOS
Chennai – Ennore Hwy (SH-114)	Existing			
	417.2	1500	0.28	B
	After Expansion and modernization			
	429.2 (417.2+12)	1500	0.29	B

*V= Volume in PCUs/hr & C= Capacity in PCUs/ hr
* Note: Capacity as per IRC Guidelines*

The existing level of service (LOS) of the Chennai – Ennore Hwy (SH-114) is '**B**' which is very good. After considering the transportation of trucks due to the proposed project expansion and modernization, meagre impact was envisaged. The level of service predicted to be '**B**' (**very Good**) even after the proposed expansion and modernization.

There will be a frequent movement of trucks in the plant premise for the transportation of raw material and products but the proposed expansion and modernization involves only a small increase in truck numbers which may never cause a significant impact. The vehicular movements can discharge SO₂, NO_x and particulate emissions due to combustion engines. The emission from the vehicular movements can be controlled by good management practices of the vehicles.

- Vehicles used for transportation will be equipped with novel engine for reducing emissions.
- Low sulphur-High Speed Diesel will be used for fuelling vehicles.
- Periodical maintenance of vehicles with emission testing will be carried out.

1.7 Environmental Monitoring Program

The environmental monitoring program is important in terms of evaluating the performance of pollution control equipment installed in the plant. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/TNCPB. The frequency of air, noise, surface water and ground water sampling and location of sampling will be as per the directives of Tamil Nadu Pollution Control Board.

1.7.1 Budgetary Allocation for Environmental Protection

The capital cost of the project is around 1200 crores and the total project cost for the proposed expansion and modernization project is about Rs. 15.0 Crores. Out of this, Rs. 26.20 lakhs have been spent on environment protection, management, pollution control, treatment and monitoring systems, appropriate budgetary provision would be made and provision for recurring expenditure for environment management of the project would be made **Table - 1.10**

TABLE - 1.10
COST PROVISION FOR ENVIRONMENTAL MEASURES

Sr. No.	Description of Item	Environment Capital Cost (Rs. in Lakhs)	Environment Recurring Cost (Rs. in Lakhs/annum)
1	Air pollution control systems	2500.0	500.0
2	Water pollution control system	25.0	10.0
3	Solid Waste Management	10.0	2.5
4	Noise pollution control	10.0	2.5
5	Environment Monitoring	25.0	6.5
6	Occupational Health & Safety (OHS)	20.0	25.0
7	Green belt Development	30.0	20.0
Total		2620.0	566.5

1.7.2 Greenbelt Development

Greenbelt will be developed along with the existing greenbelt area. Greenbelt/landscaping are already being maintained at 35.32% which covers a land area of 4.90 ha for the existing plant. Additionally, plantation developed within existing greenbelt area.

1.8 Disaster Management Plan

To tackle the consequences of a major emergency inside the plant premises or its immediate vicinity, a Disaster Management Plan has been formulated. The objective of the Disaster Management Plan is to make use of the combined resources of the foundry unit and the outside services, to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;

- Provide authoritative information to the media;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

1.8.1 Occupational Health & Safety Measures

Large projects where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance, the men, materials and machines are the basic inputs. Along with the benefits, the industrialization generally brings several problems like occupational health and safety.

The industrial planner therefore has to take steps to minimize the impacts and to ensure appropriate occupational health and safety in the foundry unit. The following measures are proposed:

- Conducting awareness programs at regular intervals to the employees;
- Providing safety kits and prevention kits; and
- Provision of Clinic at the plant site to handle emergency situations that may arise.

1.9 Corporate Environment Responsibility

The existing CSR policy lays down the guidelines and mechanism to carry out CSR projects/programs by Ashok Leyland Limited and to report their CSR work in the format provided by the rules under the Companies Act, 2013.

Ashok Leyland have developed the policy in consonance with section 135, Companies Act, 2013 on CSR and in accordance with the CSR rules notified thereof by the ministry of Corporate Affairs, Government of India in 2014.

M/s. Ashok Leyland Limited. CSR policy is formed by the guiding principles that form part of the CSR rules. CSR policy is applied to all CSR projects/program undertaken by Ashok Leyland Limited as per Schedule VII of the Companies Act 2013, within the geographical limits of India only, for the benefits of marginalized, disadvantaged, poor or deprived sections of the community and the environment.

M/s. Ashok Leyland Limited proposes to take part in various CER activities like water supply, tree plantation, bus shelters, medical camp, road facilities and development of the villages. 2.0% of the project cost will be allocated for CER activity. The CER activity action plan for the existing and proposed expansion and modernization is shown in **Table - 1.11(a)** and **Table-1.11(b)**.

TABLE - 1.11(a)
EXISTING CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES

Sr. No.	CSR Activity
1	Child development activities from underprivileged rural communities
2	Road to school program has been initiated in 3 districts (Chennai, Namakkal, Hosur)
3	Water ATMs has been installed in various schools
4	Health care for students has also been carried out

TABLE – 1.11(b)
CORPORATE ENVIRONMENT RESPONSIBILITY ACTION PLAN

Sr. No	Activity	Capital cost (Lakhs)	Recurring cost (Lakhs/ annum)
1.	Water supply facility to nearby villages	5.0	2.0
2.	Funding for the education, distribution of free books, uniforms for students	2.5	5.0
3.	Improvement of nearby water bodies	20.0	15.0
4.	Free periodical health camps for the nearby habitation people	2.5	5.0
Total		30.0	27.0

1.10 Project Benefits

The basic requirement of the community needs will be strengthened by extending health care, educational facilities to the community, providing drinking water to the villages, building/strengthening of existing roads in the area.

Implementation of the power project will result in the following benefits

- Temporary employment for people from the neighboring villages during construction phase;
- Community development activities such as training of local unemployed youth in various construction skills, English speaking, personality development, development of self-help groups for women, providing drinking water facility, strengthening of rural roads, deepening of ponds etc.,
- State will get revenue from payment towards taxes and water cess etc.,
- Providing dispensary with a medicine bank to cater to the health care needs of the surrounding villages;
- Providing vocational training to women in areas for their self-employment.
- Utilizing the services of ex-servicemen for providing training to youth in areas of personality development, security etc.,

1.11 Conclusion

The proposed Expansion and modernization of foundry unit has certain level of marginal impacts on the local environment. Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed expansion and modernization project would be beneficial to the society as well as to reduce the demand-supply gap of ferrous castings products which contributes to the economic development of the region in particular and country in general.