Application Form For Environmental Clearance (Public Hearing)

January 2025

Application Form
(Draft EIA Report)

For

Proposed Expansion of Existing Steel Melting Plant

at

Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu

Sector No. 1(a) (Sector No. 1 as per NABET)

Category of the Project: B1 Metallurgical Industry

Baseline Period: June 2024 – August 2024

Environmental Consultant & Laboratory details:

Ecotech Labs Pvt Ltd,

No 48, 2nd Main road,
South extension Ram nagar,
Pallikaranai, Chennai -600100.

Proponent details:

M/s. ARS Steels and Alloy International Private Limited
D- 109, 2nd Floor LBR Complex
Chinthamani Anna Nagar East
Chennai-600 102

Declaration of Experts contributing to the EIA

Declaration by experts contributing to the EIA report for expansion of existing Steel Melting Shop at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi 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.

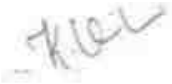
Project	Rolling Mill
Type & Category	3 (a) Metallurgical industries (ferrous & non-ferrous)
Project Proponent	M/s. ARS Steels and Alloy International Private Limited
Environment Consultant with their Accreditation Status	M/s. Eco Tech Labs Pvt. Ltd., QCI Accreditated
NABET Certificate No.	NABET/EIA/22-25/SA 0222
EIA Coordinator Name **Signature** **Period of Involvement**	Mr. R. Rajendran  June 2024 to August 2024
Contact Information	**M/s. Eco Tech Labs Pvt. Ltd.** No. 48, 2nd Main Road, Ram Nagar South Extension Pallikaranai, Chennai - 600 100 Mobile: +91 9789906200 E-mail: dhamo@ecotechlabs.in

Functional Area Experts

The basic fact division that environment and laboratory are accredited by NABL and Ministry of Environment and Forests, India and by other international bodies, stand testimony to its emphasis.

S. No.	Functional areas	Name of the experts	Involvement (period and task)	Signature and date
1	AP	Mrs. K. Vijayalakshmi	1. Selection of Baseline Monitoring stations based on the wind direction 2. Interpretation of Baseline data by comparing it with standards prescribed by CPCB against the type of area 3. Identification of sources of air pollution and suggesting mitigation measures to minimize impact ***Period: June 2024 – Till now***	
2	WP	Dr. A. Dhamodharan	1. Selection of baseline Monitoring Locations for Ground water analysis and also identifying nearest surface water to be studied. 2. Interpretation of baseline data collected 3. Identification of impacts based on the baseline study conducted and also to the ground water and nearby surface water due to the proposed project 4. Preparation of suitable and appropriate mitigation plan. ***Period: June 2024 – Till now***	
3	SHW	Dr. A. Dhamodharan	1. Identification of nature of solid waste generated 2. Categorization of the generated waste and estimating the quantity of waste to be generated based on the per capita basis. Identification of impacts of SHW on Environment 3. Suggesting suitable mitigation measures by recommending appropriate disposal method for each category of waste generated 4. Top soil and refuse management	

			Period: June 2024 – Till now	
4	SE	Mr. S. Pandian	1. Primary data collection through the census questionnaire 2. Obtaining Secondary data from authenticated sources and incorporating the same in EIA report. 3. Impact assessment & proposing suitable mitigation plan 4. CSR budget allocation by discussing with the local body and allotting the same for need based activity. ***Period: June 2024 – Till now*** ****INVOLVES PUBLIC HEARING***	
5	EB	Dr. A. Dhamodharan	1. Primary data collection through field survey and sheet observation for ecology and biodiversity 2. Secondary Collection through various authenticated sources 3. Prediction of anticipated impacts and suggesting appropriate mitigation measures. ***Period: June 2024 – Till now***	
6	HG	Dr. T. P. Natesan	1. Study of existing surface drainage arrangements in the core and buffer zone, impact due to mining on these drainage courses and suggestion of mitigative measures 2. Determination of groundwater use pattern, development of rainwater harvesting program. Storm water management through garland drainage system. ***Period: June 2024 – Till now***	
7	GEO	Dr. T. P. Natesan	1. Field survey for assessing regional and local geology, aquifer distribution, Determination of groundwater use pattern, development of rainwater harvesting program. ***Period: June 2024 – Till now***	

8	SC	Dr. A. Dhamodharan	1. Interpretation of baseline report 2. Identification of possible impacts on soil, prediction of soil conservation and suggesting suitable mitigation measures. ***Period: June 2024 – Till now***	
9	AQ	Mrs. K. Vijayalakshmi	1. Collection of Meteorological data for the baseline study period 2. Plotting wind rose plot and thereby selecting the monitoring locations based on the wind pattern 3. Estimation of sources of air emissions and air quality modeling is done 4. Interpretation of the results obtained 5. Identification of the impacts and suggesting suitable mitigation measures. ***Period: June 2024 – Till now***	
10	NV	Mrs. K. Vijayalakshmi	1. Selection of monitoring locations 2. Interpretation of baseline data 3. Prediction of impacts due to noise pollution and suggestion of appropriate mitigation measures ***Period: May 2022 – Till now***	
11	LU	Dr. T. P. Natesan	1. Collection of Remote sensing satellite data to study the land use pattern. 2. Primary field survey and limited field verification for land categorization in the study area 3. Preparation of Land use map using Satellite data for 10km radius around the project site. ***Period: June 2024 – Till now***	
12	RH	Mrs. K. Vijayalakshmi	1. Identification of the risk 2. Interpreting consequence contours 3. Suggesting risk mitigation measures ***Period: June 2024 – Till now***	

Declaration by the Head of the accredited consultant organization/ authorized person

I, Mr. R. Rajendran, hereby confirm that the above-mentioned experts prepared the EIA report for existing Steel Melting Shop at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.

I also confirm that the consultant organization shall be fully accountable for any misleading information mentioned in this statement.

Signature: 

Name: Mr. R. Rajendran

Name of the EIA consultant organization: M/s. Eco Tech Labs Private Limited

NABET Certificate No: NABET/EIA/22-25/SA 0222

UNDERTAKING

We, M/s. ARS Steels and Alloy International Private Limited, undertaking that the Draft Environmental Impact Assessment (EIA) Report for expansion of existing Steel Melting Shop at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu under project category B1 and Schedule S.No.3(a).

TOR issued by the State Expert Appraisal Committee, TN vide Identification No. TO24B1010TN5601831N dated: 04/07/2024.

I, hereby assure that all the information and data provided in the EIA report is accurate, true and correct and owns responsibility for the same.

Place: Tiruvallur

Yours faithfully

Date:

M/s. Viki Industries Private Limited

Plot No.48A, 2nd Main Road,
Ram Nagar, South Extension,
Pallikkaranai, Chennai - 600 100
GST NO. 33AADCE6103A2ZH
PAN NO. AADCE6103A

Eco Tech Labs Pvt Ltd

Cell No. 98400 87542
Email : info@ecotechlabs.in
Website : www.ecotechlabs.in
CIN : U74900TN2014PTC094895

UNDERTAKING

I, Dr. A. Dhamodharan, Managing Director confirms that this Draft EIA Report for expansion of existing Steel Melting Shop at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu has been prepared at M/s. Ecotech Labs Pvt. Ltd., Chennai.

I also confirm that I shall be fully accountable for any miss-leading information mentioned in this Report.

Signature:

Name: Dr. A. Dhamodharan

Designation: Managing Director

Name of the EIA Consultant Organization: M/s. Ecotech Labs Pvt Ltd., Chennai.

NABET Certificate No: NABET/EIA/22-25/SA 0222

Date: 21.12.2024 Place: Chennai

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1 INTRODUCTION

The existing steel rolling mill of M/s. ARS Steels & Alloy International Private Limited is located at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.

1.1 Purpose of the Report

As per the EIA Notification dated 14th September 2006 and its further amendments, the proposed expansion project activity comes under Metallurgical Industry and falls under Category 'B'. Hence it requires Environment Clearance from State Level Environment Impact Assessment Authority (SEIAA), Tamilnadu under item 3(a) of the Schedule of EIA Notification, 2006. In order to assess the environment impacts due to the proposed expansion, EIA report has been prepared.

As a part of above process, the application (Form-1 & PFR) submitted to State Level Environment Impact Assessment Authority (SEIAA) for the proposed expansion & it was considered by the State Expert Appraisal Committee (SEAC) in its meeting held on 13th June 2024 for issuing Terms of Reference (ToR). The Committee and Authority has suggested specific Terms of Reference (ToR) for preparation of the EIA report and it was communicated vide Identification No. TO24B1010TN5601831N dated: 04/07/2024 which is enclosed as **Annexure – 1**. This EIA report is prepared adhere to all the conditions of ToR.

1.2 Identification of Project & Project Proponent

1.2.1 Project

Due to increase in demand for the Steel Rods, Angles, Squares, Flats, Channels & Rounds in the domestic as well as export market ARS Steels has proposed to expand the existing Steel plant with 4 Nos of Induction Furnace having capacity of 25 Tons each to melt the scrap and sponge iron and convert it to MS Billets using a concast machine to manufacture 6,00,000 TPA of MS Billets, 5,70,000 TPA of TMT Bars.

1.2.2 Project Proponent

ARS Steels and Alloy International Private Limited have been established with the objective of building long-term profitable and mutually valued partnerships with stakeholders. Known to have a unique distribution network that ensures the fulfilment of all client requirements, ARS provides easy access through authorized distributors, across South India. Aspiring to become a leader in the Steel and Metal sector, ARS Steel endeavors to sustain the progress and well-being of its esteemed stakeholders by setting the benchmark for value creation and revenue generation with the use of progressive, technical, and operational mechanisms.

1.3 Brief Description of the Project

The proposed expansion of existing steel plant is covered under the Schedule 3(a) "Metallurgical Industries" of Environmental Impact Assessment (EIA) Notification 2006 & its further amendments.

1.3.1 Nature of the Project

Steel being the basic commodity for all Industrial activities, quantum of its consumption is considered an index of Industrial prosperity. Since, independence, there has been a sustainable growth in the steel sector in India from 1.1 Million Tons crude steel production in 1950-51 to about 89 Million Tons in 2015-16 and the crude steel capacity in the country is envisaged to reach 300 MT by 2030-31 from the current level of 122 MT, capital requirement will be of gargantuan proportions. Despite the above, growth per capita steel consumption in India continues to remain at a level of 60 kg only, compared to about 350 kg in the developed countries. Further with nearly 20% of the World population, India's contribution is only 5.5% of the World steel production. It is expected that with the measures taken by Govt. of India for promotion of consumption of iron & steel and expected growth of Indian economy, the requirement of steel will significantly improve and accordingly the domestic manufacturing capacity needs to be increased.

1.3.2 Size of the Project

The unit has obtained Environmental Clearance vide EC No. EC24B008TN147742 - File No. 6443/2017 dated 17/04/2024 for the following:

- MS Billets – 2,88,000 TPA
- TMT Bars – 2,50,000 TPA

The unit has obtained Consent to Operate for the following:

- MS Billets – 2,88,000 TPA
- TMT Bars – 2,50,000 TPA.

They proposed to expand the production capacity of its existing unit to manufacture the following products.

- MS Billets – 6,00,000 TPA
- TMT Bars – 5,70,000 TPA

1.3.3 Location of the Project

The project site is located at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The Site location of the project area is represented in **Figure- 1.1**. The satellite image showing the project site is given in **Figure -1. 2** The topomap of the study area is given in **Figure –1.3.**

TABLE 1.1 DETAILS OF ENVIRONMENT SETTING

S. No.	Particulars	Details
1	Latitude	13°25'20.55"N
2	Longitude	80° 6'29.32"E
3	Elevation above MSL	28 m
4	Topography	Plain Terrain
5	Nearest Highway	NH- 5 (0.7 km,East)
6	Nearest Railway station	Gummidipoondi R.S. (2.2 km, SE)
7	Nearest Air Port	Chennai Intl. Airport (46.7 km, S)
8	Nearest Habitation	Kayalarmedu (0.4 km, NE)
9	Nearest Town	Gummidipoondi (1.7 km, S)
10	Reserve Forests	Puliyur forest R.F (6.8 km, W) Manali R.F (9.8 km, SW)
11	Nearest Waterbody	Thamarai Eari (1.7 km, ESE) Sri Amman Temple pond (2.2 km, SSE) Murugan Temple pond (2.4 km, SE) Siva Temple pond (2.6 km, SSE) Edappalayam lake (6.2 km, SE) Pulicat lake (6.4 km, NNW)

S. No.	Particulars	Details
		Rakkampalayam lake (7.1 km, NE) Arani River (7.2 km, S) Paatupalli lake (7.6 km, E) Poo-Vilambedu Pond (8.5 km, W) Kattavour Eari (9.5 km, SE)
12	Ecologically sensitive sites	Thamarai Eari (1.7 km, ESE)
13	Defence Installation	Sri Amman Temple pond (2.2 km, SSE)
14	Historical places	Murugan Temple pond (2.4 km, SE)

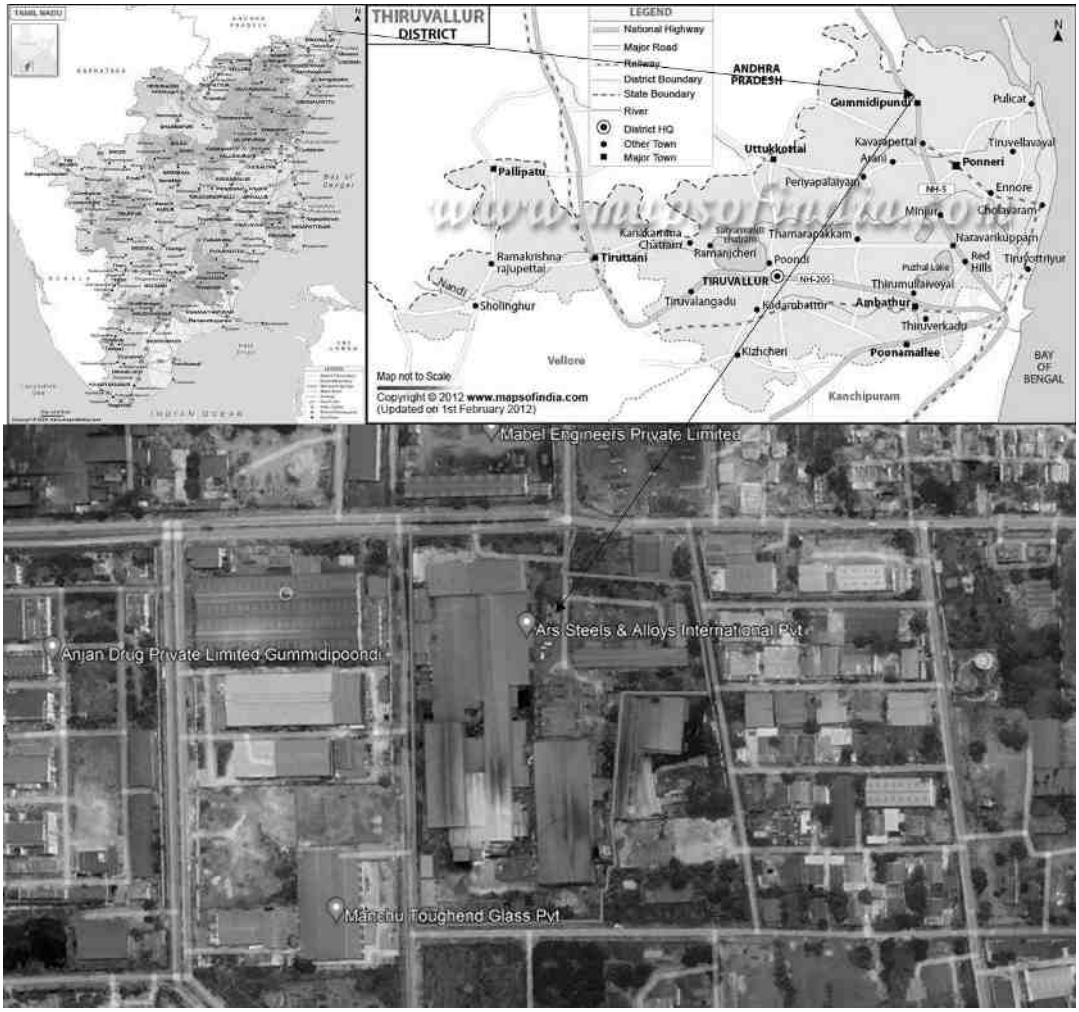


Figure 1-1 LOCATION MAP OF THE PROJECT SITE

FIGURE 1-2 SATELLITE IMAGERY SHOWING THE PROJECT SITE

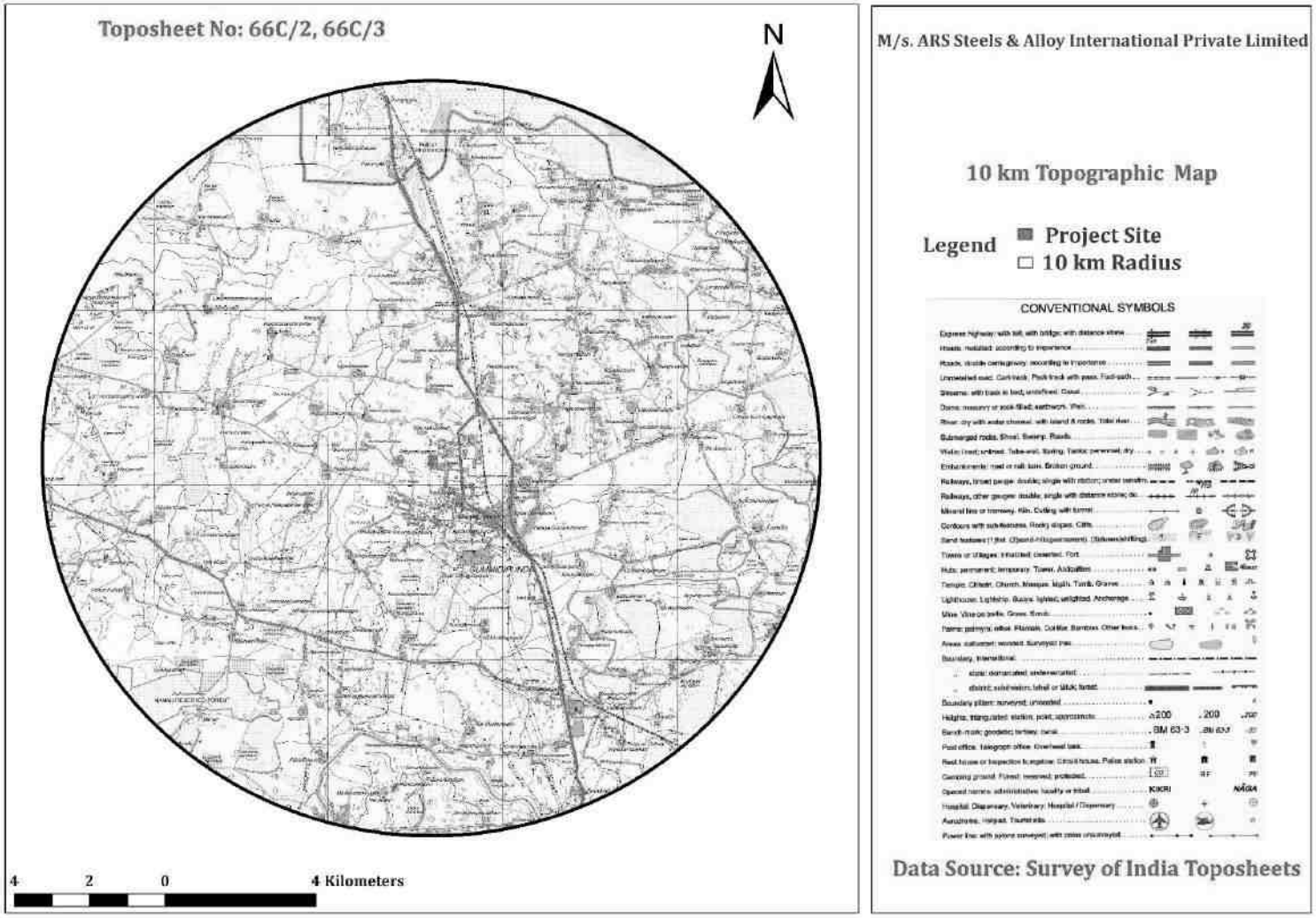


FIGURE 1-3 TOPO MAP OF THE STUDY AREA (10 KM RADIUS)

1.3.4 Importance to the Country and Region

Steel being the basic commodity for all Industrial activities, quantum of its consumption is considered an index of Industrial prosperity. Since, independence, there has been a sustainable growth in the steel sector in India from 1.1 Million Tons crude steel production in 1950-51 to about 89 Million Tons in 2015-16 and the crude steel capacity in the country is envisaged to reach 300 MT by 2030-31 from the current level of 122 MT, capital requirement will be of gargantuan proportions. Despite the above, growth per capita steel consumption in India continues to remain at a level of 60 kg only, compared to about 350 kg in the developed countries. Further with nearly 20% of the World population, India's contribution is only 5.5% of the World steel production. It is expected that with the measures taken by Govt. of India for promotion of consumption of iron & steel and expected growth of Indian economy, the requirement of steel will significantly improve and accordingly the domestic manufacturing capacity needs to be increased.

1.4 Scope of the Study

M/s. ARS Steels & Alloy International Private Limited has appointed the services of M/s. Ecotech Labs Private Limited, Chennai to carry out EIA study and preparation of Environment Impact Assessment (EIA) report to assess the anticipated impacts of the proposed expansion project on the environment and suggest suitable mitigation measures for likely adverse impacts due to the activities. The EIA/EMP report has been prepared for the project following the generic structure specified in the EIA Notification, 2006.

An EIA study is useful to understand and mitigate the impact of the proposed expansion project on various parameters of environment. Therefore, the scope of the EIA study includes detailed characterization of the existing status of the land, water, air, biological and socio-economic environment in the project area. It also includes identification of the potential environment impacts of the project and formulation of an effective Environment Management Plan (EMP) and monitoring plan. The scope of EIA study includes,

- Literature review and collection of data relevant to the study area;
- Collection of data related to the project related activities;
- Establish the baseline environment aspects in and around the proposed expansion project;

- Collate secondary data including socio-economic data from published literature / government publications;
- Identify various existing pollution loads due to various proposed activities;
- Predict incremental levels of pollutants in the study area due to the proposed expansion operations;
- Evaluate the predicted impacts on various environment attributes in the study area by using scientifically developed and widely accepted environment impact assessment methodologies;
- Preparation of cost effective and appropriate Environment Management Plan (EMP) encompassing strategies for minimization of potential adverse impacts on various environment components along with budgetary provisions for implementation of pollution control measures;
- To delineate measures for human health and safety during operation of proposed expansion project; and
- Delineation of post-study Environment quality monitoring programme.

The scope also includes all the conditions given in the ToRs prescribed by SEAC-TN, Chennai for the steel plant. Baseline studies were carried out for a period of three months from June 2024 to August 2024, representing Summer season. Field studies have been conducted to determine existing conditions of various environment attributes as outlined in **Table-1.2**.

TABLE 1.2 ENVIRONMENT ATTRIBUTES AND FREQUENCY OF MONITORING

S. No.	Environment Component	Sampling Locations	Sampling Parameters	Sampling Period	Sampling Frequency
1	Meteorology	One central location	Temperature, Relative Humidity, Wind Speed, Wind Direction & Rain fall	3 months	Hourly / Rainfall – Daily
2	Ambient Air Quality	8 Locations	PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, O_3, Pb, NH_3, C_6H_6, BaP, As, Ni	Two days per week for 12 weeks	24 hourly

S. No.	Environment Component	Sampling Locations	Sampling Parameters	Sampling Period	Sampling Frequency
3	Water Quality	8 Ground Water & 2 surface water	As per IS:10500-2012	Grab sampling	Once during study period
4	Noise	8 Locations	L_{day} & L_{night}	24 hourly	Once during study period
5	Soil	8 Locations	Soil profile, Chemical constituents, Suitability for agricultural growth	Composite sample	Once during study period
6	Terrestrial Ecology	Study area	Flora and fauna	Field observations	Once in study period
7	Demography and Socio-economic aspects	Study area	Demographic profile	Based on data collected from secondary sources	
8	Land Use	Study area	Land use data based on recent satellite data	Based on availability	Once in study period
9	Geology & Hydrogeology	Study area	Geological history, Drainage area and pattern, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources	

Since, Ecotech Labs Private Limited has been carrying out the EIA studies for the similar projects earlier, the points mentioned in the ToR were contemplated beforehand and the same were included in the study.

1.5 Methodology

Environment Impact Assessment report has been prepared with the following steps:

1.5.1 Establishment of Baseline Environment Status

A comprehensive database on the baseline environment status of the study area has been established through review, compilation & analysis of

- Existing published secondary data/literature/information, and
- Primary data generated/collected through initial site surveys and field study

The field monitoring has been carried out as per the guidelines of CPCB and requirement of the MoEF for one complete season. Field study/monitoring has been conducted on:

- Ambient Air Quality;
- Noise;
- Water Quality;
- Soil Quality;
- Ecological Aspects;
- Land Use Pattern;
- Socio- Economic Aspects;

1.5.2 Environment Impact Assessment

The project data/activities has been analyzed & linked with the existing baseline environment conditions in order to list out the affected environment parameters and assess the likely impacts on such parameters. Compliance of the project with national standards has been duly checked.

1.5.3 Preparation of Environment Management Plan

Environment Management Plan (EMP) is the key to ensure a safe and clean environment. The desired results from the environment mitigation measures existing in the project may not be obtained without a management plan in order to assure its proper implementation & function. The EMP envisages the plans for the proper implementation of mitigation measures to reduce the adverse impacts arising out of the project activities. EMP has been prepared addressing issues such as:

- Details of management plans
- Pollution control / mitigation measures for abatement of the undesirable impacts caused during operational activities
- Maintenance of water resources and water quality
- Institutional set up identified/recommended for implementation of the EMP
- Post project environment monitoring programme.

2 PROJECT DESCRIPTION

2.1 Type of Project

The proposed expansion project involves expansion of existing Steel plant. Since the project activity comes under secondary metallurgical processing industry as per the EIA Notification, 2006, the project activity falls under Category "B". It requires Environmental Clearance from State Environmental Impact Assessment Authority (SEIAA), Tamil Nadu under Category 'B' in the Schedule 3(a) of EIA Notification 2006.

2.2 Need of the Project

Steel being the basic commodity for all Industrial activities, quantum of its consumption is considered an index of Industrial prosperity. Since, independence, there has been a sustainable growth in the steel sector in India from 1.1 Million Tons crude steel production in 1950-51 to about 89 Million Tons in 2015-16 and the crude steel capacity in the country is envisaged to reach 300 MT by 2030-31 from the current level of 122 MT, capital requirement will be of gargantuan proportions. Despite the above, growth per capita steel consumption in India continues to remain at a level of 60 kg only, compared to about 350 kg in the developed countries. Further with nearly 20% of the World population, India's contribution is only 5.5% of the World steel production. It is expected that with the measures taken by Govt. of India for promotion of consumption of iron & steel and expected growth of Indian economy, the requirement of steel will significantly improve and accordingly the domestic manufacturing capacity needs to be increased.

2.3 Project Location & Layout

The project site is located at Plot No. E - 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.

Geographically, the plant is situated at latitude 13°25'20.55"N, and longitude 80° 6'29.32"E. The Site location of the project area is represented in Figure-1.1 of Chapter – 1. The google image showing the project site is given in Figure – 1.2. The Topo map of the study area is given in Figure 1.3.

2.4 Size or Magnitude of Operation

The unit has obtained Environmental Clearance vide EC No. EC24B008TN147742 - File No. 6443/2017 dated 17/04/2024 for the following:

- MS Billets – 2,88,000 TPA
- TMT Bars – 2,50,000 TPA

The unit has obtained Consent to Operate for the following:

- MS Billets – 2,88,000 TPA
- TMT Bars – 2,50,000 TPA

They proposed to expand the production capacity of its existing unit to manufacture the following products.

- MS Billets – 6,00,000 TPA
- TMT Bars – 5,70,000 TPA

2.4.1 Land Requirement

The total area of land available for the proposed expansion is 4.51 Ha which is under the ownership of project proponent and the land use classification is industrial Land use. The land-use breakup of the site area is given in **Table 2.1**.

TABLE 2.1 LAND USE BREAK-UP OF PLANT AREA

S. No.	Description	Existing		After Expansion	
		Area (Ha)	Percentage (%)	Area (Ha)	Percentage (%)
1.	Factory shed area	1.02	22.6	1.24	27.5
2.	Scrap yard	0.68	15.1	0.46	10.2
3.	Product storage area	0.32	7.1	0.32	7.1
4.	Solid waste storage area	0.30	6.7	0.30	6.7
5.	Greenbelt development	1.52	33.7	1.52	33.7
6.	Road	0.60	13.3	0.60	13.3
7.	Open space area	0.07	1.5	0.07	1.5
	Total	**4.51**	**100.0**	**4.51**	**100.0**

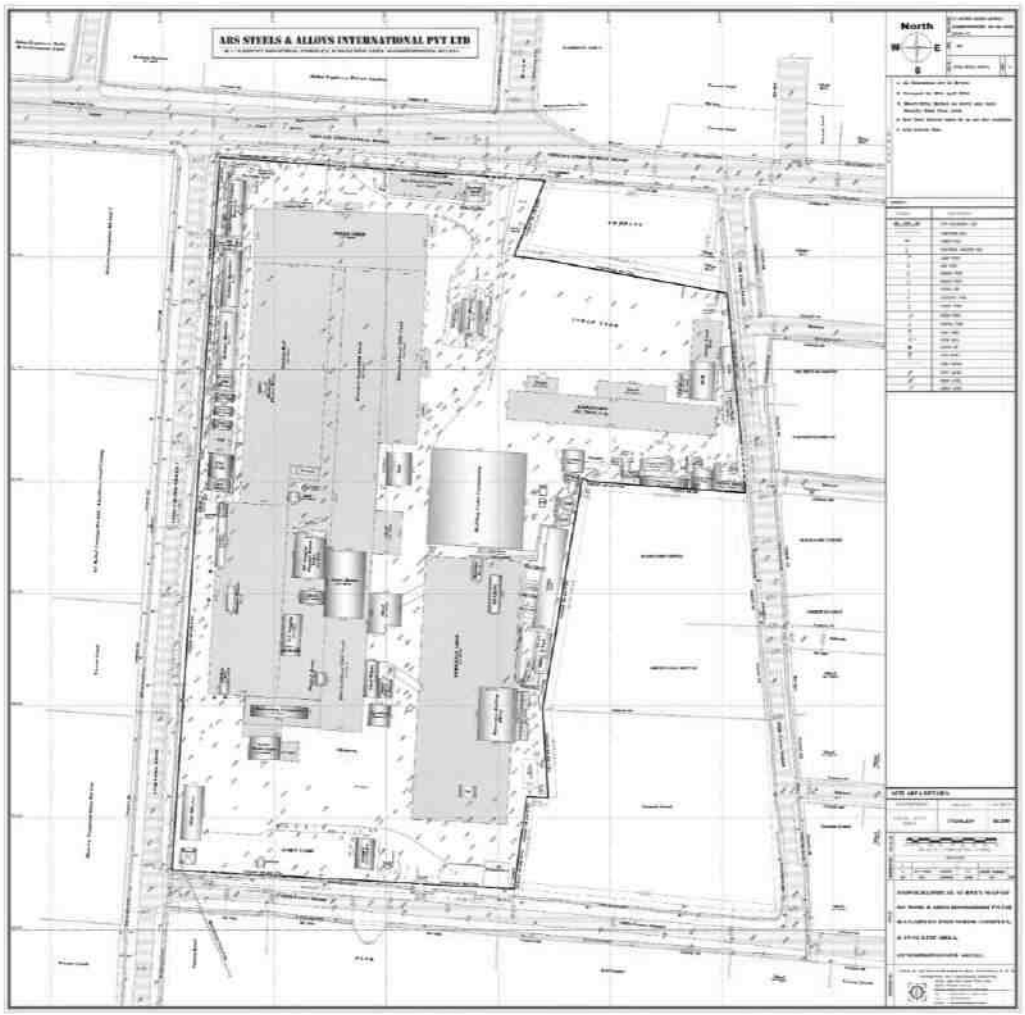


FIGURE 2-1 PLANT LAYOUT OF THE PROJECT

2.4.2 Raw Material Requirement & Material Balance

The raw materials required for the production of MS Billets followed by TMT bars including its quantity are tabulated in **Table – 2.2.** The Mass balance of making MS Billets, Steels Rods & components is shown in **Figure–2.2.**

TABLE 2.2 RAW MATERIAL REQUIREMENT (MS BILLETS)

EXISTING:

S. No.	Raw Material	Requirement (Tons/Annum)
1	Virgin Scrap	2,82,412
2	Sponge Iron	15,102
3	Ferro Alloys	4,531

PROPOSED:

S. No.	Raw Material	Requirement (Tons/Annum)
		After Expansion
1	Cold Rolled Cuttings	261940
2	Non Tin Plated	77705
3	Sponge Iron	10653
4	Turning and Boring	72691
5	MS Scrap	203035
	Total	**626650**

TABLE 2.3 RAW MATERIAL REQUIREMENT (STEEL RODS & STRUCTURAL COMPONENTS)

S. No.	Raw Material	Requirement (Tons/Annum)	
		Existing	After Expansion
1	MS Billets	2,88,000	6,00,000

Unit – Tons/Annum

Raw Material	Quantity (TPA)		Products & Wastes	Quantity (TPA)
Cold Rolled Cuttings	261940	⇨	MS Billets	6,00,000
Non Tin Plated	77705		Furnace Slag	21,780
Sponge Iron	10653		CCM Scale	3,020
Turning and Boring	72691		Burning Loss	1,850
MS Scrap	203035			
Total	**6,26,650**		**Total**	**6,26,650**

FIGURE 2-2 MASS BALANCE – STEEL MELTING SHOP

Raw Material	Quantity (TPA)		Products & Wastes	Quantity (TPA)
MS Billets	6,00,000	⇨	TMT Bars	5,70,000
			Mill Scale	10,200
			Miss Roll, End Cutting & Defectives	19,800
Total	**6,00,000**		**Total**	**6,00,000**

FIGURE 2-3 MASS BALANCE – STEEL ROLLING

2.4.3 Manpower Requirement

The proposed project will provide employment to about 350 persons directly and 300 persons indirectly. So about 650 families get benefited due to the project and economic condition of the family improved due to the proposed expansion project. Adequate capacity of social infrastructure like road, water supply, etc. is available in the region to manage the current proposal.

2.4.4 Power and Fuel Requirement

The total power requirement of the plant will be 55000 KVA. For its existing power requirement, the plant is currently procuring around 50% electricity from renewable energy such as wind and by entering into long-term our purchase agreements. The plant will also source renewable energy for its proposed expansion by entering into similar Power Purchase agreements. Out of total power requirement, the plant aims to consume around 90% power from renewable energy (green) and the balance from TANGEDCO after proposed expansion. To meet the emergency power requirement during grid failure a DG set having capacity of 1 No. of 500 KVA & 1 No. of 750 KVA is available.

Diesel will be used as fuel in standby DG sets and requirement will also vary with TANGEDCO's power failure and its maximum requirement will be about 200 Lit/hr during its operation.

2.4.5 Water Requirement

Water is required in the plant for Induction Furnace Cooling, Concast Cooling, TMT Bar Cooling and domestic purposes. The total water requirement of the plant is 136 KLD with freshwater requirement of 53 KLD and recycled water requirement of 83 KLD after the proposed expansion proposal. Water requirement in the plant is for Induction Furnace Cooling, Concast Cooling, TMT Bar Cooling, and domestic purposes. The entire water requirement will be sourced from SIPCOT bore wells. Water requirement details are provided in **Table – 2.4**. The water balance diagram showing source, water requirement and wastewater generation & usage of treated water is shown in **Figure – 2.4**.

TABLE 2.4 WATER REQUIREMENT

S. No.	Activity	Fresh Water Requirement (KLD)	
		Existing	After Expansion
1	Cooling Tower make-up	87.08	106
2	Scrubber make-up	0.42	-

3	Domestic requirement	22.25	16
4	Plantation & Water sprinkling	22.25	14
	Total	**132.0**	**136**

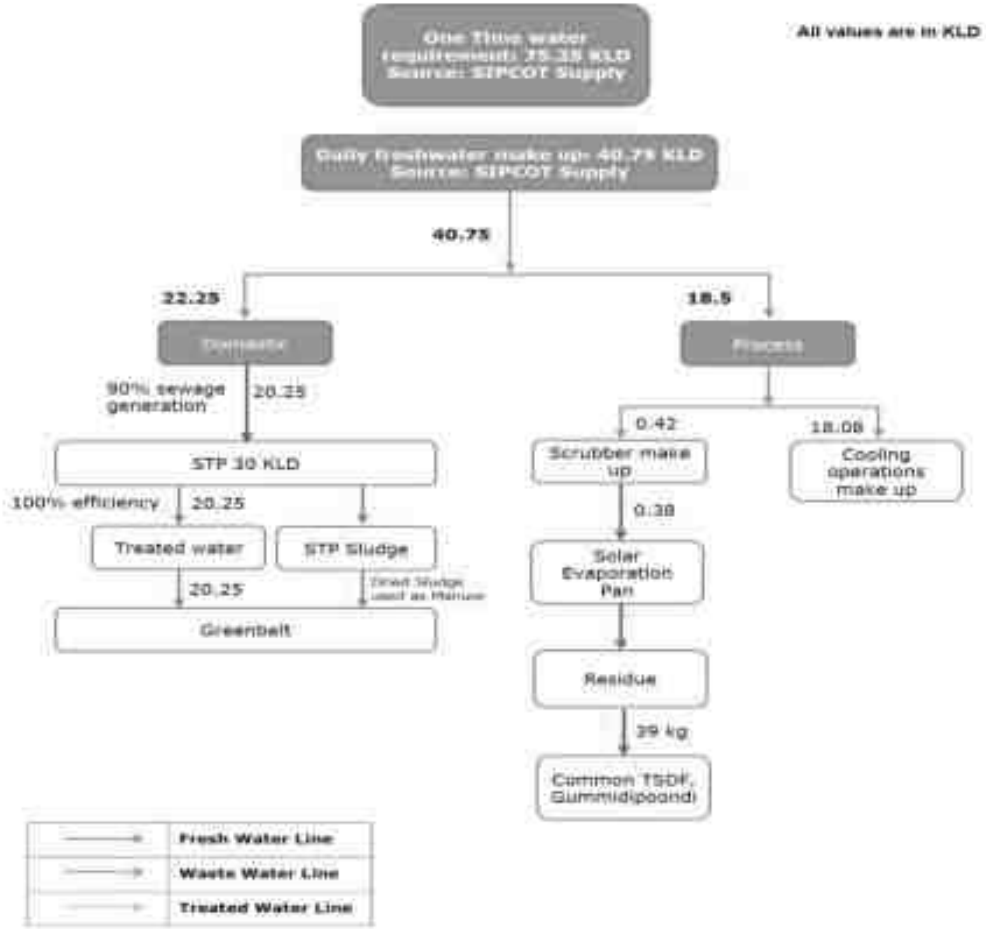


FIGURE 2-4 WATER BALANCE-EXISTING

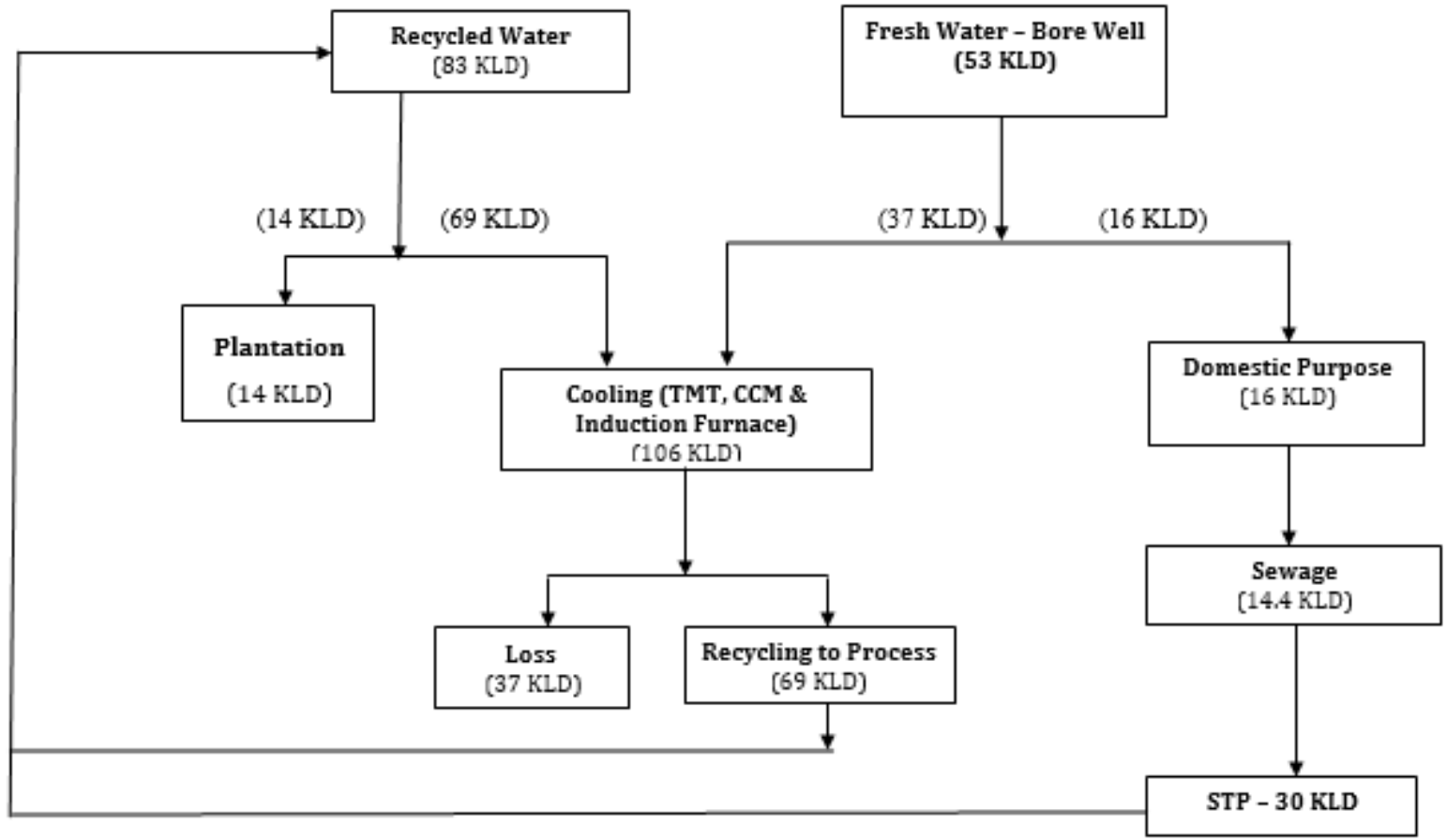


FIGURE 2-5 WATER BALANCE-EXPANSION

2.4.6 Infrastructure Facilities

The industrial unit is located in an industrial area with all sort of required infrastructure facilities. The water requirement will be sourced from SIPCOT borewell. Adequate power is being sourced from by TANGEDCO. The manpower will be sourced locally. The raw materials and other spares are sourced from Gumidipoondi region. All sort of supply as well as supporting industries are also available in the region to support the growth of this plant.

2.5 Proposed schedule for approval and implementation

The proposed expansion will be implemented immediately after obtaining EC from SEIAA and CTE from TNPCB. The implementation period of the project is 1 year from the date of implementation to achieve the significant production with new equipment.

2.6 Technology and Process Description:

The conversion of iron scrap into billets does not requires any sophisticated technology. Various grades of scraps and sponge iron are melted in electrically operated induction furnace and will be convert into billets using a Continuous casting machine.

The billets to the desired finished section in the hot condition by way of passing the material between a pair of grooved rolls and providing suitable drafts at various stages. The whole operation is conducted at a particular temperature range and within a limited time span. The stages of rolling operation are comprised of rolling the feeding stock in different mill stands, cropping the hot bar during the process of rolling between mill stands as applicable and subsequently finishing in form of hot rolled deformed bar in straight length. The hot bar coming out of the last pass is then conveyed through TMT line and collecting in a cool bed after shearing.

Charging:

- Analyze the time required to load materials (such as ingots, billets, or scrap) into the rolling mill or furnace.
- Evaluate the efficiency of charging processes and identify any delays or bottlenecks.

- Propose strategies to streamline the charging process, reduce loading times, and minimize idle periods.

Slagging:

- Studied the slagging process, which involves removing impurities and excess slag from the molten metal.
- Quantify the time and energy consumed during slagging operations.
- Optimize slagging process, enhance efficiency, and reduce downtime.

Sampling:

- Examine the frequency and duration of sampling activities to monitor product quality.
- Assess the impact of sampling on operational downtime and efficiency.
- Suggest ways to improve sampling techniques and practices to minimize disruptions.

Charge Material Handling:

- Evaluate the handling and preparation of charge materials before they are fed into the melting furnace or rolling mill.
- Analyze the time and steps involved in preparing charge materials for processing.
- Recommend approaches to expedite charge material handling and minimize delays.

Molten Heel Practice:

- Investigate the practice of maintaining a molten metal "heel" in the furnace or rolling mill between processing batches.
- Assess the benefits of this practice in terms of energy efficiency and operational readiness.
- Propose strategies to optimize molten heel practices and reduce startup times during subsequent operations.

Furnace Cover Losses:

- Study the time and energy losses associated with opening and closing furnace covers for various activities.
- Analyze the impact of cover operations on downtime and overall process efficiency.
- Identify methods to minimize cover-related idle periods and improve cover handling practices.

2.6.1 Manufacturing Process of Steel Billets

Various types of iron scraps and Sponge Iron (Direct Reduced Iron) are added into the furnace and the scraps are melted in the Medium Frequency Induction Furnace. When the scraps are melted into fluid, certain additives like,

a) Ferro Manganese - added to strengthen the fluid
b) Ferro Alloys - to achieve the metal fluidity
c) Aluminium ingots - to reduce the carbon contents

The above additives will be added at various intervals. Accurate temperature and compositional control is ensured in this melting system. The melting process will be carried for duration of 1½ hrs. Before the molten metal is poured into the ladles, they will be tested for their chemical composition.

Continuous casting is the process where the molten steel will be solidified into a "Semi finished" billets, bloom or slab for subsequent rolling in the finishing mills. Continuous casting has opted to achieve improved yield, quality and cost efficiency. Steel from the electric furnace is tapped into a ladle and taken to the continuous casting machine. The ladle is raised onto a turret that rotates the ladle into the casting position above the Tundish. Liquid steel flows out of the ladle, into the tundish and then into a water-cooled copper mould. Solidification begins in the mould and continues through the first one and stranded. In this configuration, the strand is straightened, torch-cut, then discharged for intermediate storage or hot charged for finished rolling. Depending on the product end-use various shapes are casted. In recent years, the melting / casting / rolling processes have been linked while casting a shape that substantially confirms to the finished product. The complete process chain from liquid metal to finished rolling can be achieved within two hours and the above process is represented in the following flowchart **Figure – 2.6**.

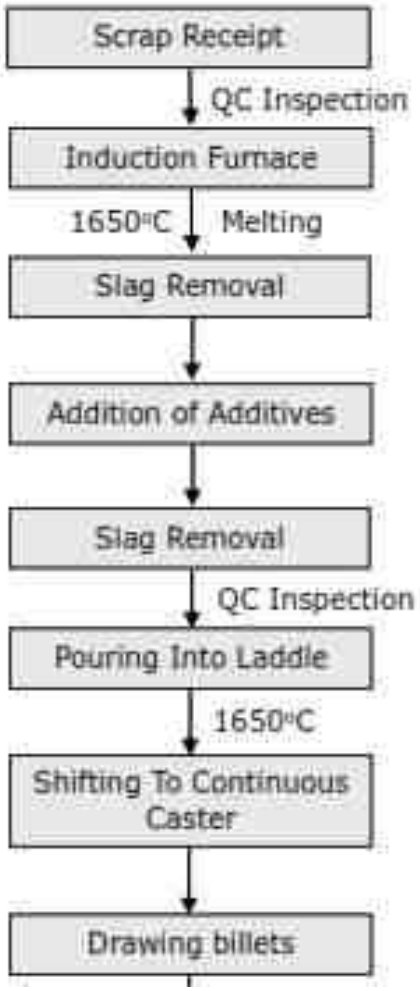


FIGURE 2-6 MANUFACTURING PROCESS OF MS BILLETES

2.6.2 Manufacturing process of Steel Rods & Structural Components

The hot billet from concast machine is pass through the rough rolling mill strand to elongate and reduce the diameters. Such reduced rods are passed through an intermediate mill strand followed by finish mill strand to achieve the required diameter of the rod / structural component.

TMT bars are produced using the Tempcore process designed by Ra TMT, against cold twisting which is used to manufacture CTD Bars. The TMT Bars are produced using the "Quenching & Tempering" process. As the bar leaves the last finishing stand it is subjected to undergo the following three stages.

- In the first stage quenching takes place, where the bar is rapidly quenched by a special water spray system. While the core remains hot and austenitic forms an outer surface of crude martensitic.
- In the second stage the bar is subjected to self-tempering where it leaves the TMT box and is exposed to air. The heat from the core flows to the surface causing tempering of the outer martensitic layer. This ensures adequate ductility while maintaining high Yield Strength levels.
- The final stage takes place on the cooling bed where the still un-transformed austenite in the rod converts to ferrite-pearlite structure.

The resultant bar structure is of tempered martensite at the periphery (surface hardness) and of fine-grained ferrite pearlite at the core (ductility). The product exhibits high yield point, surface hardness, toughness, ductility and weldability.

Steps involved in manufacturing of steel rods & structural components are shown in the following flowchart **Figure -2. 7**.

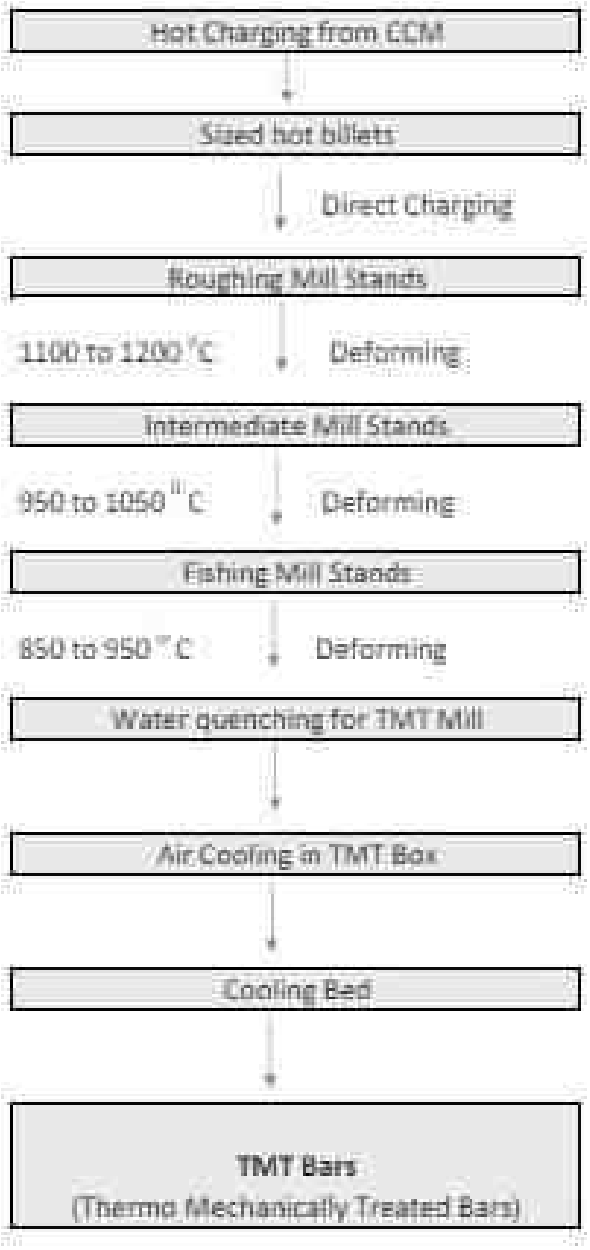


FIGURE 2-7 MANUFACTURING PROCESS OF STEEL RODS & STRUCTURAL COMPONENTS

Project Description

The additional facilities proposed in the project includes two new induction furnaces having melting capacity of 25.0 Ton each and a concast machine to cast the billets.

2.6.3 Induction Furnaces

The proposed Induction Furnaces represents the most contemporary technology with static power supply, proven low loss melting furnace.

- **Furnace, Power Source & Control system**

The installation will comprise of a set of Induction Steel Melting equipment consisting of two numbers of crucibles to function alternately in running or standby mode and powered by suitable Solid-State Power Supply, with one Hydraulic Power Unit remote controlled through an operating console to facilitate Furnace Tilting / Metal Pouring. One Operator's Control Desk shall be provided to facilitate start-up, shutdown, power control, metering and annunciation; while lever operated switches shall be provided with each Furnace Crucible for quick selection and changeover.

- **Electrical Mains Equipment**

The mains input power source voltage level is 110KV and Furnace Incoming Voltage level shall be 33 kV. A Furnace Duty Converter Transformer shall be provided to step down the voltage at an 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. Included in each furnace will be:

1. A set of Hydraulic cylinders for the hydraulic tilting of each set of furnaces
2. Manually operated hydraulic direction control valve for tilting

3. Ground Leak detector assembly with stainless steel probe wires and hardware
4. Flexible water-cooled power leads for connection between the power Induction coil and power supply unit
5. Water cooled leads are with sleeves for protection against metal splash

❖ **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 reservoir of suitable capacity is 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 SFC 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 41^0C down to 32^0C. The Technical Specification of proposed Induction Furnaces details is presented in **Table-2.5.**

TABLE 2.5 TECHNICAL SPECIFICATION OF INDUCTION FURNACES

S. No.	Description of Items	Specifications
1	**Application Requirements**	
	Alloy to be melted	Steel
	Melting Temperature	1600°C
2	**Characteristics of recommended power unit**	

	Rated KW	
	Type of Furnace	Induction Melting
	Maximum KW	10000KW
	Nominal furnace frequency	248Hz.
	Line Power Factor	0.98 and above
	KVA required at input	10205 KVA on load
	Melt rate at 10000 KW	15000 Kg/hour – Steel
	Power Connection	575 V, 12 Phase – 24 Pulse, 50 Hz
3	Characteristics of recommended melting furnace	
	Nominal capacity (Steel capacity)	25000 Kg
	Style of Furnace	Steel Frame
	Pouring Mechanism	Hydraulic tilt
	Furnace lining	Silica

2.6.3.1 Charging and operation of Melting for better and efficient operation of induction furnaces

Operating induction furnaces efficiently in a steel plant involves specific considerations due to the unique properties of steel and the requirements of the steelmaking process. Here's a guide on charging and operating induction furnaces for better efficiency in a steel plant:

1. Charge Preparation:

- Ensure the scrap metal and other raw materials are clean, dry, and free from contaminants. Contaminants like oil, paint, and moisture can lead to inefficient melting and reduced quality.
- Sort and segregate the scrap materials based on their composition and size. This helps achieve a more homogeneous melt and prevents overheating in localized areas.

2. Charging Strategy:

- Use a balanced charging strategy to evenly distribute the scrap materials within the furnace. Avoid creating air gaps or areas with excessive material buildup, as these can lead to inefficiencies and uneven melting.

3. Power and Frequency Settings:

- Experiment with power levels and frequency settings to determine the most efficient combination for melting steel. Higher power levels and lower frequencies are often used for steel melting compared to other metals.

4. Stirring and Mixing:

- Consider using electromagnetic stirring systems to ensure thorough mixing and temperature uniformity. This is particularly important for steel melting, as it helps in achieving consistent quality.

5. Temperature Control:

- Implement accurate and responsive temperature control systems to maintain the desired melting temperature. Rapid temperature changes and fluctuations can lead to inefficiencies and quality issues.

6. Refractory Maintenance:

- Regularly inspect and maintain the refractory lining of the furnace. Proper refractory materials and lining design are essential for withstanding the high temperatures and corrosive nature of steel melting.

7. Energy Management:

- Implement energy-saving measures such as optimizing power factor correction, using energy-efficient power supplies, and minimizing heat losses through insulation improvements.

8. Process Monitoring and Automation:

- Implement real-time process monitoring and automation systems to track temperature, power levels, and other relevant parameters. Automation can help optimize the melting process and reduce human errors.

9. Skimming and Slag Removal:

- Regularly remove slag from the surface of the molten steel to maintain efficient heat transfer and prevent re-absorption of unwanted elements.

10. Charging Sequence and Recipe Optimization:

- Develop optimized charging sequences and recipes based on the types of steel being melted. Different steel grades and compositions might require specific charging patterns for efficient melting.

11. Training and Skill Development:

- Provide comprehensive training to furnace operators regarding the nuances of steel melting in induction furnaces. Skilled operators can make informed decisions to enhance efficiency and product quality.

12. Data Analysis and Process Improvement:

- Utilize data analytics to identify trends, patterns, and areas of improvement in furnace operation. This data-driven approach can lead to continuous process optimization.

Efficiently operating induction furnaces in a steel plant involves a combination of technical expertise, process optimization, and equipment management. Regularly reviewing and adjusting your practices based on the specific requirements of steel melting will help you achieve better efficiency and product quality.

2.6.4 Continuous Casting Machine

Continuous Casting Machine is an equipment to convert liquid steel into cast semis of the desired size. The main features of this machine are:

- Ladle stool
- Tundish
- Tundish Car
- Mould Jacket Assemblies
- Mould Oscillator
- Secondary cooling
- Strand Guide Frames
- Withdrawal-cum-straightening machine
- Hydraulic pusher type skid bank
- Electrical / Instrumentation etc.

Molten Steel from the furnace is poured at correct temperature into the Ladle and the Ladle is brought to the casting position. After ascertaining the temperature of the liquid metal Slide Gate is opened so as to allow the liquid metal to flow into the Tundish, which is placed on the Tundish car. After metal reaches the ferro static height the refractory nozzle of the Tundish is opened to allow the metal to distribute in the mould assembly. The mould box contains the copper mould. Primary water circulates around the periphery of the mould to form a shell around the molten core. The Stand is withdrawn with the help of the dummy bar.

The surface of the mould is lubricated to minimize any sticking of the molten metal to the copper mould. This lubrication is accomplished with rapeseed oil at water free condition. Mould Oscillation Mechanism is used for oscillating the mould so that the newly formed stand shell does not stick to the mould wall. Good oscillator mechanism provided good surface quality to the stand and minimizes the transverse cracks and deep oscillation marks.

The newly formed stand leaves the mould and passes through the cooling chamber to complete the solidification process. Suitable Metallurgical length is provided for this purpose. Cooling water volume can be adjusted to suit the steel grade and size of casting. Exhaust fan is provided to suck off the steam produced due to the contact of cooling water and hot strand. After passing through the cooling chamber the strand passes through the withdrawal and straightening unit. This unit provided the drive for withdrawal and straightening for each of the hot stand. It also provides the drive the dummy bar for its insertion in Mould during start of the east. Here the strand radius changes for 4 M to 7 M to infinite radius i.e. straight. Cutting of the strand into billets is affected with manual / auto gas cutting torches. Cutting of strands into billet takes place between intermediate and cutting roller table. The cut billets are then transported to discharge area until it comes in contact to the end buffer which in terms actuates the pusher which carries the billet to cooling bed. In discharge area, two ventilated rooms are located one below the other for electrical and hydraulic controls. The multi-motor control centre is positioned on the top floor and hydraulic power pack on the ground floor. The Continuous Caster Machine design data are presented in **Table - 2.6.**

TABLE 2.6 CONTINUOUS CASTING MACHINE DESIGN DATA

S. No.	Description	Specifications
1	Type of Machine	Curved Mould, Bow type
2	Number of Machine	1
3	Number of Strands	2
4	Design Limits	100 mm sq to 140 mm sq
5	Machine equipped to cast	100 mm sq
6	Casting Radius	4 m with second unbending Radius of 7 m
7	Billet Length	1.2 – 4 M
8	Type of Ladle	Bottom Pouring with slide gate

9	Ladle support	Ladle stand
10	Melting Unit	2 x 25 Ton
11	Ladle capacity	30 Tons
12	Method of Discharge	On Horizontal Discharge Roller Table to Cooling beds
13	Steel Grade	Mild Steel
14	Dummy bar	Rigid Dummy Bar
15	Casting practice	Open Casting
16	Tundish Practice	Cold
17	Mould support	Long lever Oscillator
18	Automation	Secondary (Spray) Water Automation & Drive Communication

2.7 Waste generation & Mitigation measures

In the process, along with the useful product several waste materials will also be generated. These waste materials include gaseous emissions, wastewater generation and solid wastes generation. By volume, gaseous waste is the largest waste source from steel plant. But most of the gaseous emissions are captured in the emissions control systems attached to emission sources like furnaces.

The quantities and the composition of the gaseous and solid waste that are generated in the plant will be regulated such that their final disposal into the environment meets all the statutory requirements and the environment impacts are minimized.

- The sources of emissions are Induction Furnaces, and standby DG sets.
- The solid wastes generated from the plant are Furnace Slag, Steel Scraps, Fly Ash and Bag Filter.

2.7.1 Gaseous Emission and Control measures

The pollutants in the form of particulates and gases are generated from various parts of the steel complex. This has been taken into account and adequate measures are being taken to

arrest the emission of pollutants within the stipulations of statutory norms. Adoption of technology like recovery of dust / ash for re-use as raw material is fulfilling the twin objectives of material conservation and pollution control. The measures to control the air pollution ensure the ambient air quality standards as laid down by Central Pollution Control Board for industrial and mixed-use areas. The details of the stacks are given in **Table – 2.7.**

TABLE 2.7 EXISTING & PROPOSED STACK DETAILS

Stack No.	Stack attached to	Height above GL in m	Control Measure
	Existing		
1	Reheating Furnace (25 TPH) – At present not in use	34.0	Wet Scrubber with stack
2	Induction Furnace (2 Nos. of 25 MT)	34.0	Bag filter with stack
3	DG Set – 500 KVA	6.0	Acoustic enclosures followed by stack
4	DG Set – 750 KVA	18.0	Acoustic enclosures followed by stack
	After Expansion		
1	Induction Furnace (4 Nos. of 25 MT)	34.0	Bag filter with stack
2	DG Set – 500 KVA	6.0	Acoustic enclosures followed by stack
3	DG Set – 750 KVA	18.0	Acoustic enclosures followed by stack

2.7.1.1 Fugitive Emissions

All other dust sources are considered as secondary sources since they are not process implied. These dust sources may occur wherever relatively dry or dusty material is handled, conveyed, pumped or extracted. Water spray is being carried out to control fugitive dust due to wind. All the materials will be stored in covered storage facilities.

2.7.2 Wastewater Generation and Disposal Measures

The quantity of wastewater generation depends on the quantity of water used for various purposes. As the steel melting and rolling plant will be operated on the dry process, water is mainly used only in a stage in the processes like Cooling of Concast, TMT bar and Induction furnace. Water is used for domestic usages. No wastewater is generated from the processes and there is no cooling blow down and the entire quantity of the make-up water lost into the atmosphere due to evaporation and wind.

No effluent will be generated from the process. From the domestic uses, the waste will be generated about 14.4 KLD. The total quantity of the sewage will be treated in Sewage Treatment Plant and used for green belt development.

2.7.3 Solid Waste Generation and Management

The quantities of solid waste generation and their disposal in the plant are presented in **Table – 2.8.**

TABLE 2.8 SOLID WASTE GENERATION AND DISPOSAL

S. No.	Source	Quantity (TPA)		Disposal Method
		Existing	After Expansion	
	Billet Division – Non – hazardous			
1.	Furnace Slag	6,041	12,082	Sold to Contractors
2.	Returnable	6,313	12,626	Re-melt in induction furnace
3.	CCM Scale	1,510	3020	Sold to contractors
4.	STP Sludge	4.41	4.41	Manure in Gardening

	Billet Division– Hazardous			
5.	Solar Pan residue	1.8	-	TSDF, Gummidipoondi
6.	Oil bearing cotton waste	0.3	0.6	TSDF, Gummidipoondi
7.	Spent Oil	0.96	1.92	Authorized Recyclers
	Rolling Mill division – Non hazardous			
8.	Miss Roll, End Cuttings & Defective	13,900	19,800	Re-melt in induction furnace
9.	Mill Scale	5,100	10,200	Re-melt in induction furnace
10.	Ash	73.5	147	Fly ash brick manufactures

- The solid wastes will be stored in designated storage areas.
- The scrap and mill scale from rolling mill will be reuse in the melting.
- The furnace slag from the furnaces not contains any hazardous / heavy metals and it will be disposed to cement plant as alternate raw material or the contractors to reuse it as filing material in road lying / construction / brick making.

2.7.4 Noise Pollution and Mitigation Measures

The major noise generating sources in the proposed expansion plant will be Induction Furnace, Continuous Casting Machine, Rolling Mill, Cooling Tower pumps and DG sets. The noise levels anticipated from the different machineries are given below in **Table-2.9.** A perusal of the above table reveals that the work zone noise levels from all important equipment vary in the range of 69 to 85dB(A). However, people working at high noise generating equipment are provided with earplugs / earmuffs.

TABLE 2.9 NOISE LEVELS ANTICIPATED AT THE PROPOSED PLANT

S. No.	Location	Noise Levels - dB (A)
1	Induction furnaces	69
2	Scrap unloading	74
3	Continuous Casting Machine	73
4	Rolling Mill	77
5	DG set	85

3 DESCRIPTION OF THE ENVIRONMENT

3.1 Introduction

The Environment Impact Assessment Study includes an assessment of the various environment impacts likely to be caused on the surrounding nature in and around the proposed expansion project. It will also incorporate the appropriate control measures required to be adopted or implemented in order to minimize the adverse effects thereof.

In order to carry out such assessment study, it is first necessary to delineate and define the existing environment factors in and around the proposed expansion project on the existing environment scenario which will include various environs like Ecology, Flora-fauna, Socio economic profiles, Environment quality in respect of air, water, noise & soil etc.

This section incorporates the description of the existing environment settings within the area encompassed by a circle of 10 km radius around the project site. The base line study was conducted during Winter from the month of June 2024 to August 2024 and secondary data collected from various Government, Semi-Government and public sector organizations.

3.2 Meteorology

The meteorological data recorded during the study period is very useful for proper interpretation of the baseline information as well as for input to prediction models for air quality dispersion.

On site monitoring was undertaken for various meteorological parameters in order to generate the site-specific data. The central monitoring station (CMS), equipped with continuous monitoring equipment to record wind speed, wind direction, temperature, humidity and rain fall was set up at the top of an industry at a height of ~ 5.0 m above the ground level located adjacent to the project site as there is no permanent structure and power source available at project site. The methodology adopted for monitoring surface observations was as per the Standard norms laid down by the Bureau of Indian Standards (IS: 8829) and IMD.

3.2.1 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 - 3.1**. The graphical presentation of wind direction and speed for the period of post mansoon is shown in **Figure - 3.1.**

TABLE 3.1 SUMMARY OF THE METEOROLOGICAL DATA GENERATED AT SITE

Month	Temperature (˚C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	
June - 2024	36	24	100	38	63
July - 2024	34	21	97	36	72
August - 2024	35	22	94	35	95

Source: Eco Tech Labs Pvt Ltd

3.2.2 Secondary Data from Indian Meteorological Dept. (IMD), Chennai (Meenambakkam)

The nearby India Meteorological Department station that is generating meteorological data is 58 km from the plant site i.e. IMD, Chennai, Meenambakkam. Hence, secondary information on meteorological conditions has been collected from IMD station at Chennai International Airport. Indian Meteorological Department at Chennai regularly monitors wind direction, wind speed, relative humidity, temperature, rainfall, evaporation and pressure at 08.30 hours and 17.30 hours every day. Wind rose diagrams are collected from IMD for the period 1969-1990 and are shown in **Figure 3.1.**

3.2.2.1 Temperature

The period from March to June is generally hot and dry. The weather is pleasant during the period from November to January. Usually mornings are more humid than afternoons. The annual mean minimum and maximum temperature are 24.3 ° and 32.9°C respectively. The day time heat is oppressive and the temperature is as high as 41.2°C. The lowest temperature recorded is of the order of 18.1°C.

3.2.2.2 Relative Humidity

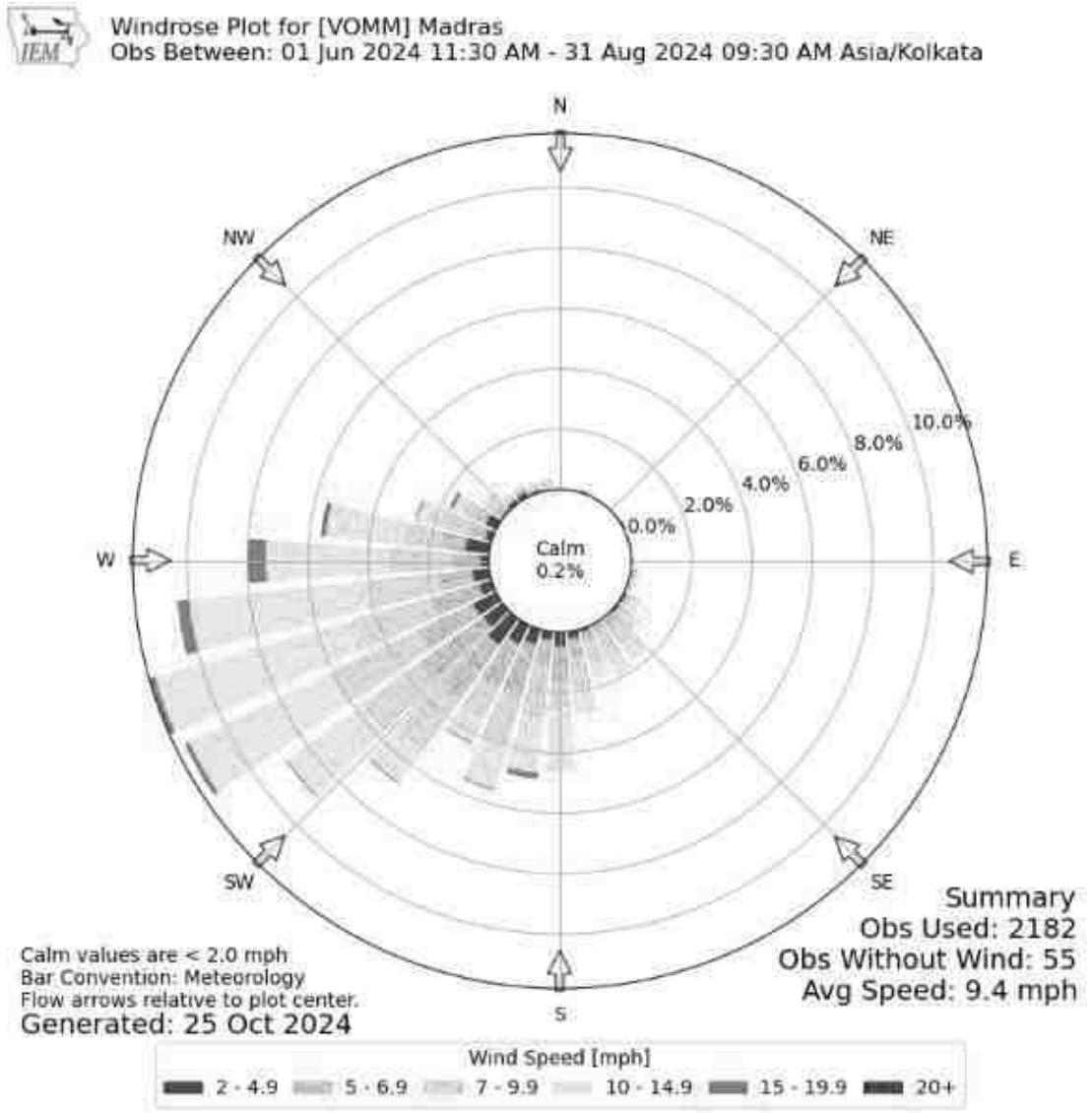
The relative humidity varies between 65 and 85% in the mornings while in the afternoon it varies between 40 and 70%.

3.2.2.3 Rainfall

To show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-day period centered around each day of the year. Gummidipoondi experiences extreme seasonal variation in monthly rainfall.

The rainy period of the year lasts for 9.5 months, from April 6 to January 22, with a sliding 31-day rainfall of at least 0.5 inches. The month with the most rain in Gummidipoondi is November, with an average rainfall of 10.7 inches.

The rainless period of the year lasts for 2.5 months, from January 22 to April 6. The month with the least rain in Gummidipundi is March, with an average rainfall of 0.3 inches.



Source: IMD regional office, Chennai

FIGURE 3-1 WINDROSE DIAGRAM OF IMD, CHENNAI

3.3 Air Environment

The prime objective of the baseline air monitoring is to evaluate the existing air quality of the project area. This will also be useful for assessing the conformity to standards of the ambient air quality during the operation of the proposed expansion project. This section describes the selection of sampling locations, methodology adopted for sampling, analytical techniques and frequency of sampling.

3.3.1 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:

- Topography / Terrain of the study area
- Human Settlements
- Health status
- Accessibility of monitoring site
- Resource Availability
- Representativeness of the region for establishing baseline status
- Representativeness with respect to likely impact areas

Ambient Air Quality Monitoring (AAQM) stations were set up at five (5) locations with due consideration to the above-mentioned points. The Ambient Air Quality monitoring locations are given in the **Table - 3.2** and shown in the **Figure - 3.2.**

TABLE 3.2 DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

Code	Location	Latitude	Longitude	Direction	Distance w.r.t. plant (km)
AAQ1	Project site	13°25'20.11"N	80° 6'29.32"E	Within site	
AAQ2	Viki Steel, SIPCOT	13°25'1.66"N	80° 6'55.63"E	SE	0.76
AAQ3	Peddikuppam	13°25'21.27"N	80° 7'31.32"E	E	1.78
AAQ4	Theruali	13°25'17.55"N	80° 8'12.26"E	E	3.10
AAQ5	Pappankuppam	13°25'19.50"N	80° 5'57.44"E	W	0.86
AAQ6	ARS Energy Private Limited	13°25'24.62"N	80° 4'2.93"E	W	4.30
AAQ7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	13°26'12.37"N	80° 5'33.16"E	NW	2.25
AAQ8	Gumidipoondi	13°24'22.03"N	80° 7'29.06"E	SE	2.64

FIGURE 3-2 AIR QUALITY SAMPLING LOCATIONS

3.3.2 Frequency and Parameters for Sampling

Ambient air quality monitoring was carried out at a frequency of two days per week at each location for three months.

3.3.3 Instruments used for Sampling

Respirable Dust Samplers APM 460 BL of Envirotech was used for monitoring Particulate matter (PM_{10}) and Fine Particulate Samplers APM 550 of Envirotech was used for monitoring ($PM_{2.5}$). For gaseous pollutants APM 411 has been used along with APM-460.

3.3.4 Sampling and Analytical Techniques

The sampling and analytical techniques used for the monitoring of Ambient Air quality is given in **Table - 3.3.**

TABLE 3.3 TECHNIQUES USED FOR AMBIENT AIR QUALITY MONITORING

S. No.	Parameter	Technique	Detectable Limit
1	Particulate Matter (PM_{10})	EPA -40 (CFR Part 50)	2.0 µg / m^3
2	Particulate Matter ($PM_{2.5}$)	EPA -40 (CFR Part 50)	2.0 µg / m^3
3	Sulphur Dioxide (SO_2)	Improved West and Gaeke	5.0 µg / m^3
4	Nitrogen Dioxide (NO_2)	Modified Jacob & Hochheiser	5.0 µg / m^3
5	Carbon Monoxide (CO)	IS 13270 : 1992	0.1 mg / m^3
6	Ozone (O_3)	KI Absorption Method	5.0 µg / m^3
7	Lead (Pb)	IS 5182 P 22	0.1 µg / m^3
8	Ammonia (NH_3)	Nessler's Method	5.0 µg / m^3
9	Benzene (C_6H_6)	IS 5182: Pt 22: 2004	0.01 µg / m^3
10	Benzo (a) pyrene – Particulate Phase	IS 5182: Pt 22: 2004	0.1 ng / m^3
11	Arsenic (As);	IS 5182: Pt 22: 2004	1.0 ng / m^3
12	Nickel (Ni):	IS 5182: Pt 22: 2004	1.0 ng / m^3

3.3.5 Presentation of Results

The survey results for the study period of three months are presented in detail in **Annex - 2.** The summary of these results for each location is presented in **Table-3.4.** These are compared with the standards prescribed by Central Pollution Control Board (CPCB).

TABLE 3.4 AMBIENT AIR QUALITY RESULTS

Code	Location	PM_{10} µg/m³				$PM_{2.5}$ µg/m³				SO_2 µg/m³			
		Min	Max	Avg	98%	Min	Max	Avg	98%	Min	Max	Avg	98%
AAQ1	Project site	57	65	61.7	65	25	31	27.7	30.54	12	20	17.5	20
AAQ2	Viki Steel, SIPCOT	51	61	57	61	22	29	26	29	8	15	11	15
AAQ3	Peddikuppam	36	50	43.1	49.08	14	21	18.2	21	6	12	9.5	12
AAQ4	Theruali	31	45	37.8	44.08	12	19	15.8	19	4	7	5.8	7
AAQ5	Pappankuppam	41.3	52	47.1	51.816	15.3	25	19.9	24.448	5.6	11	8.1	11
AAQ6	ARS Energy Private Limited	48	57	53.3	57	21	28	24.3	27.54	14	23	19.9	23
AAQ7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	51	61	55.4	60.08	23	31	25.7	30.08	19	25	22.5	25
AAQ8	Gumidipoondi	59	69	63.4	68.08	26	34	28.7	33.08	15	23	19.5	22.54
CPCB Standards[#]		**100**				**60**				**80**			

**** All values are expressed in µg/m³***

[#]Standards for Industrial /Residential / Rural and Other Area

Source: Eco Tech Labs Pvt Ltd

Code	Location	NO_2 µg/m^3			
		Min	**Max**	**Avg**	**98%**
AAQ1	Project site	25	38	31.0	37.54
AAQ2	Viki Steel, SIPCOT	14	27	20	27
AAQ3	Peddikuppam	12	23	18.2	23
AAQ4	Theruali	6	15	11.2	15
AAQ5	Pappankuppam	11.2	23	16.4	22.54
AAQ6	ARS Energy Private Limited	20	33	26.6	32.54
AAQ7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	24	36	30.3	35.54
AAQ8	Gumidipoondi	29	42	35.3	41.54
CPCB Standards[#]		**80**			

**** All values are expressed in µg/m^3***

[#]Standards for Industrial /Residential / Rural and Other Area

Source: Eco Tech Labs Pvt Ltd

3.3.6 Observations

PM_{10}: The maximum and minimum concentrations for PM_{10} were recorded as 69 μg/m^3 and 31 μg/m^3 respectively. The maximum concentration was recorded at Gumidipoondi and the minimum concentration was recorded at Theruli. The average concentrations were ranged between 37.8 – 63.4 μg/m^3.

$PM_{2.5}$: The maximum and minimum concentrations for $PM_{2.5}$ were recorded as 34 μg/m^3 and 12 μg/m^3 respectively. The maximum concentration was recorded at Gumidipoondi and the minimum concentration was recorded at Theruli. The average values were observed to be in the range of 15.8-28.7 μg/ m^3.

SO_2: The maximum and minimum concentrations for SO_2 were recorded as 25 μg/$m^3$and 4 μg/ m^3 respectively. The maximum concentration was recorded at MTC Business Pvt Ltd Unit-3 - Pappankuppam and the minimum concentration was recorded at Theruali. The average values were observed to be in the range of 5.8 – 22.5 μg/m^3.

NO_2: The maximum and minimum NO_2 concentrations were recorded as 42 μg/$m^3$and 6 μg/m^3. The maximum concentration was recorded at Gumidipoondi and the minimum concentration was recorded at Theruali. The average values were observed to be in the range of 11.2– 35.3μg/m^3

The values of PM_{10}, $PM_{2.5}$, SO_2, NO_2 were observed well within the standards prescribed by Central Pollution Control Board (CPCB) for Industrial, Rural, Residential and Other area.

3.4 Noise Environment

Noise survey has been conducted in the study area to assess the background noise levels in different zones viz., Residential, Industrial, Commercial and Silence zones. The main objective of noise monitoring in the study area is to establish the baseline noise levels and assess the impact of the total noise expected to be generated in the surrounding areas.

3.4.1 Methodology

❖ ***Identification of Sampling Locations***

A preliminary reconnaissance survey was undertaken to identify the major noise generating sources in the area. The noise monitoring has been conducted at five (5) locations in the study area. The physical location of noise monitoring stations is given in **Table - 3.5.** The map showing Noise Quality Monitoring Locations is enclosed as **Figure – 3.3.**

TABLE 3.5 DETAILS OF NOISE MONITORING LOCATIONS

Code	Location	Latitude	Longitude	Direction w.r.t. plant	Distance w.r.t. plant (km)
N1	Project site	13°25'20.11"N	80° 6'29.32"E	Within site	
N2	Viki Steel, SIPCOT	13°25'1.66"N	80° 6'55.63"E	SE	0.76
N3	Peddikuppam	13°25'21.27"N	80° 7'31.32"E	E	1.78
N4	Theruali	13°25'17.55"N	80° 8'12.26"E	E	3.10
N5	Pappankuppam	13°25'19.50"N	80° 5'57.44"E	W	0.86
N6	ARS Energy Private Limited	13°25'24.62"N	80° 4'2.93"E	W	4.30
N7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	13°26'12.37"N	80° 5'33.16"E	NW	2.25
N8	Gumidipoondi	13°24'22.03"N	80° 7'29.06"E	SE	2.64

FIGURE 3-3 NOISE SAMPLING LOCATIONS

- ***Instrument Used for Monitoring***

Noise levels were measured using a Sound Level Meter. The sound level meter measures the Sound Pressure Level (SPL), the Maximum Sound Pressure Level (max) and the equivalent continuous noise level (Leq) by switching on the corresponding functional modes.

- ***Method of Monitoring***

Sound Pressure Level (SPL) measurements were taken at the specified locations, with an interval of 1 minute over a period of one hour for 24 hours. The noise levels during day time have been monitored between 6 am to 10 pm and night noise levels during 10 pm to 6 am at all the locations covered in the study area. Noise levels were recorded every one minute in the following manner. To obtain noise levels at 8 AM, noise readings, with setting at 'A'

response – slow mode, were recorded continuously for 60 minutes. All the readings were obtained for 24 hours.

❖ ***Parameters Measured During Monitoring***

For noise levels measured over a given period of time interval, it is possible to derive important features of noise using statistical methods.

- L_{day} Average noise levels between 6.00 hours to 22.00 hours.
- L_{night} Average noise levels between 22.00 hours to 6.00 hours.

3.4.2 Presentation of Results

The summary of computed ambient noise level parameters like L_{day} and L_{night} for all the sampling locations are presented in **Table – 3.6** and compared to the standards specified by CPCB as given below in **Table - 3.7.**

TABLE 3.6 AMBIENT NOISE LEVELS RECORDED IN THIS STUDY AREA

Code	Location	L_{day} [dB(A)]	L_{night}[dB(A)]
N1	Project site	62	50
N2	Viki Steel, SIPCOT	64	51
N3	Peddikuppam	53	41
N4	Theruali	48	39
N5	Pappankuppam	52	40
N6	ARS Energy Private Limited	56	47
N7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	58	48
N8	Gumidipoondi	61	40

Source: Eco Tech Labs Pvt Ltd

TABLE 3.7 AMBIENT NOISE STANDARDS

Land Use	L_{day} [dB(A)]	L_{night}[dB(A)]
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

❖ **Observations**

Day time Noise Levels

The Average Noise levels during day time were found to be in the range 48 to 64 dB(A). The maximum noise level was observed to be 64 dB(A) at Viki Steel, SIPCOT and a minimum of 48 dB(A) was observed at Theruli.

Night time Noise Levels

Noise levels observed to fall in the range 39 to 51 dB(A) during the night time. The maximum of 51 dB(A) was observed at Viki Steel, SIPCOT and a minimum of 39 dB (A) was observed at Theruli.

3.5 WATER QUALITY

Water sampling has been conducted to establish baseline water quality in the area. Water analysis was carried out for physical and chemical parameters as per the methods prescribed in IS and "Standard Methods for the Examination of Water and Wastewater (American Public Health Association)". Water samples were examined to assess the effect of industrial and other activities on ground water. Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO_3. Samples for bacteriological analysis were collected in sterilized glass bottles.

3.5.1 Water Sampling Locations

Eight (8) ground water samples & Two (2) surface water samples were collected as grab samples and analyzed for various parameters to compare with the standards for drinking water as per IS: 10500:2012. The water sampling locations are identified in **Table-3.8** and shown in **Figure-3.4**.

TABLE 3.8 WATER SAMPLING LOCATIONS

Code	Location	Latitude	Longitude	Direction w.r.t. plant	Distance w.r.t. plant (km)
GW1	Project site	13°25'15.81"N	80° 6'30.57"E	Within site	
GW2	Viki Steel,	13°24'59.76"N	80° 6'56.91"E	SE	0.92

	SIPCOT				
GW3	Peddikuppam	13°25'27.08"N	80° 7'33.17"E	E	1.85
GW4	Theruali	13°25'16.92"N	80° 8'5.98"E	E	2.82
GW5	Pappankuppam	13°25'22.12"N	80° 6'2.88"E	W	0.89
GW6	ARS Energy Private Limited	13°25'20.91"N	80° 3'57.95"E	W	4.64
GW7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	13°26'11.97"N	80° 5'38.54"E	NW	2.29
GW8	Gumidipoondi	13°24'20.84"N	80° 7'27.05"E	SE	2.43
SW1	Thamarai Eri	13°24'45.80"N	80° 7'26.61"E	SE	1.92
SW2	Panapakkam Lake	13°22'37.06"N	80° 7'47.81"E	SE	5.44

FIGURE 3-4 WATER SAMPLING LOCATIONS

3.5.2 Presentation of Results

The results of the ground water quality are tabulated in **Table – 3.9** and the surface water quality results are tabulated in **Table – 3.10**.

TABLE 3.9 GROUND WATER QUALITY RESULTS

S. No.	Parameters	Unit	Test Method	Limit as per IS 10500	GW1	GW2	GW3	GW4	GW 5
1	pH (at 25°C)	-	IS:3025(P - 11)1983 RA: 2012	6.5-8.5	7.16	7.15	7.33	7.64	7.1
2	Electrical Conductivity	µS/cm	IS:3025(P - 14) 2013	Not Specified	574	1245	239	1401	489
3	Colour	Hazen Unit	IS:3025 (P - 4)1983 RA: 2012	5-15	BQL(LOQ:5)	2	BQL(LOQ:5)	BQL(LOQ:5)	BQL(LOQ:5)
4	Turbidity	NTU	IS:3025(P - 10)1984 RA: 2012	1-5	BQL(LOQ:1)	BQL(LOQ:1)	BQL(LOQ:1)	BQL(LOQ:1)	BQL(LOQ:1)
5	Total Dissolved Solids	mg/L	APHA 23rd Edn.2017-2540-C	500-2000	345	795	131	931	334
6	Total Suspended Solids	mg/L	IS:3025(P-17)-1984 RA:2012	Not Specified	BQL(LOQ:2)	BQL(LOQ:2)	BQL(LOQ:2)	BQL(LOQ:2)	BQL(LOQ:2)
7	Total Hardness as CaCO3	mg/L	APHA 23rd Edn.2017-2340-C	200-600	223	448	74.1	661	189
8	Calcium	mg/L	APHA 23rd	Not	153	345	55.9	422	135

S. No.	Parameters	Unit	Test Method	Limit as per IS 10500	GW1	GW2	GW3	GW4	GW 5
	Hardness as CaCO3		Edn2017.3500 Ca-B	Specified					
9	Magnesium Hardness as CaCO3	mg/L	APHA 23rd Edn.2017-3500 Mg-B	Not Specified	70.7	103	18.2	239	54.7
10	Calcium as Ca	mg/L	APHA 23rd Edn2017.3500 Ca-B	75-200	61.2	138	22.4	169	53.9
11	Magnesium as Mg	mg/L	APHA 23rd Edn.2017-3500 Mg-B	30-100	17.2	25.5	4.44	58.2	13.3
12	Chloride as Cl	mg/L	IS:3025(P - 32)-1988 RA: 2014	250-1000	93.8	166	24.9	211	86.1
13	Sulphate as SO4	mg/L	APHA 23rd Edn.2017-4500 SO4—E	200-400	5.41	149	10.6	32.5	8.68
14	Total Alkalinity as CaCO3	mg/L	APHA 23nd Edn.2017-2320-B	200-600	87.1	234	55.4	279	65.3
15	Iron as Fe	mg/L	IS:3025(P - 53):2003 RA: 2014	0.3	BQL(LOQ:0.1)	BQL(LOQ:0.1)	BQL(LOQ:0.1)	BQL(LOQ:0.1)	BQL(LOQ:0.1)
16	Silica as SiO2	mg/L	IS:3025(P - 35)1988 RA: 2014	Not Specified	21.7	28.1	18.1	91.9	37.3
17	Fluoride as	mg/L	APHA 23rd	1-1.5	0.21	0.64	0.25	0.11	0.18

S. No.	Parameters	Unit	Test Method	Limit as per IS 10500	GW1	GW2	GW3	GW4	GW 5
	F		Edn.2012-4500-F-D						
18	Nitrate as NO3	mg/L	IS:3025(P - 34):1988 RA: 2014	45	13.1	7.52	12.2	16.6	8.1
19	Potassium as K	mg/L	IS:3025(P - 45):1993 RA: 2014	Not Specified	5.3	10.8	BQL(LOQ:1)	7.2	2.5
20	Sodium as Na	mg/L	IS:3025(P - 45):1993 RA: 2014	Not Specified	65.3	129	11.9	185	61.2

Source: Eco Tech Labs Pvt Ltd

S. No.	Parameters	Unit	Test Method	Limit as per IS 10500	GW6	GW7	GW8
1	pH (at 25°C)	-	IS:3025(P - 11)1983 RA: 2012	6.5-8.5	7.91	6.67	8.08
2	Electrical Conductivity	µS/cm	IS:3025(P -14) 2013	Not Specified	291	1439	1391
3	Colour	Hazen Unit	IS:3025 (P - 4)1983 RA: 2012	5-15	BQL(LOQ:5)	BQL(LOQ:5)	BQL(LOQ:5)
4	Turbidity	NTU	IS:3025(P - 10)1984 RA: 2012	1-5	BQL(LOQ:1)	BQL(LOQ:1)	BQL(LOQ:1)
5	Total Dissolved	mg/L	APHA 23rd	500-2000	186	891	765

S. No.	Parameters	Unit	Test Method	Limit as per IS 10500	GW6	GW7	GW8
	Solids		Edn.2017-2540-C				
6	Total Suspended Solids	mg/L	IS:3025(P-17)-1984 RA:2012	Not Specified	BQL(LOQ:2)	BQL(LOQ:2)	BQL(LOQ:2)
7	Total Hardness as CaCO3	mg/L	APHA 23rd Edn.2017-2340-C	200-600	119	616	490
8	Calcium Hardness as CaCO3	mg/L	APHA 23rd Edn2017.3500 Ca-B	Not Specified	80.9	354	353
9	Magnesium Hardness as CaCO3	mg/L	APHA 23rd Edn.2017-3500 Mg-B	Not Specified	37.6	262	137
10	Calcium as Ca	mg/L	APHA 23rd Edn2017.3500 Ca-B	75-200	32.4	141	142
11	Magnesium as Mg	mg/L	APHA 23rd Edn.2017-3500 Mg-B	30-100	9.15	63.8	33.3
12	Chloride as Cl	mg/L	IS:3025(P -32)-1988 RA: 2014	250-1000	20.1	206	225
13	Sulphate as SO4	mg/L	APHA 23rd Edn.2017-4500 SO4--E	200-400	9.89	24.3	32.5
14	Total Alkalinity as CaCO3	mg/L	APHA 23nd Edn.2017-2320-B	200-600	83	474	152
15	Iron as Fe	mg/L	IS:3025(P -53):2003 RA: 2014	0.3	BQL(LOQ:0.1)	BQL(LOQ:0.1)	BQL(LOQ:0.1)
16	Silica as SiO2	mg/L	IS:3025(P -	Not Specified	22.1	35.9	84.2

S. No.	Parameters	Unit	Test Method	Limit as per IS 10500	GW6	GW7	GW8
			35)1988 RA: 2014				
17	Fluoride as F	mg/L	APHA 23rd Edn.2012-4500-F-D	1-1.5	0.25	0.18	0.15
18	Nitrate as NO3	mg/L	IS:3025(P - 34):1988 RA: 2014	45	22.1	20.2	23.3
19	Potassium as K	mg/L	IS:3025(P - 45):1993 RA: 2014	Not Specified	BQL(LOQ:1)	13.9	17.6
20	Sodium as Na	mg/L	IS:3025(P - 45):1993 RA: 2014	Not Specified	10.6	147	108

TABLE 3.10 SURFACE WATER QUALITY RESULTS

S. No.	Parameters	Test Method	Units	Limit as per IS 10500 : 2012	SW1	SW2
1	pH (at 25°C)	IS:3025(P -11)1983 RA: 2012	-	6.5-8.5	8.56	7.8
2	Electrical Conductivity	IS:3025(P -14) 2013	µS/cm	Not Specified	574	2710
3	Colour	IS:3025 (P -4)1983 RA: 2012	Hazen Unit	5-15	10	12
4	Turbidity	IS:3025(P -10)1984 RA: 2012	NTU	1-5	15	20
5	Total Dissolved Solids	APHA 23rd Edn.2017-2540-C	mg/L	500-2000	346	1491
6	Total Suspended Solids	IS:3025(P-17)-1984 RA:2012	mg/L	Not Specified	7	8.5
7	Total Hardness as CaCO3	APHA 23rd Edn.2017-2340-C	mg/L	200-600	146	445
8	Calcium Hardness as CaCO3	APHA 23rd Edn2017.3500 Ca-B	mg/L	Not Specified	70.7	319
9	Magnesium Hardness as CaCO3	APHA 23rd Edn.2017-3500 Mg-B	mg/L	Not Specified	75.2	126
10	Calcium as Ca	APHA 23rd Edn2017.3500 Ca-B	mg/L	75-200	28.3	128
11	Magnesium as Mg	APHA 23rd Edn.2017-3500 Mg-B	mg/L	30-100	18.3	30.5
12	Chloride as Cl	IS:3025(P -32)-1988 RA: 2014	mg/L	250-1000	79.4	374
13	Sulphate as SO4	APHA 23rd Edn.2017-4500 SO4-	mg/L	200-400	56.5	252

		-E				
14	Total Alkalinity as CaCO3	APHA 23nd Edn.2017-2320-B	mg/L	200-600	127	389
15	Iron as Fe	IS:3025(P -53):2003 RA: 2014	mg/L	0.3	0.48	1.5
16	Silica as SiO2	IS:3025(P -35)1988 RA: 2014	mg/L	Not Specified	3.1	44.7
17	Fluoride as F	APHA 23rd Edn.2012-4500-F-D	mg/L	1-1.5	0.21	0.25
18	Nitrate as NO3	IS:3025(P -34):1988 RA: 2014	mg/L	45	22.5	25.8
19	Potassium as K	IS:3025(P -45):1993 RA: 2014	mg/L	Not Specified	2.8	30.3
20	Sodium as Na	IS:3025(P -45):1993 RA: 2014	mg/L	Not Specified	68.5	328
21	Total Kjeldahl Nitrogen as N	APHA 23rd Edn.2012-4500	mg/L	Not Specified	21	28
22	Biochemical oxygen Demand @ 27c	IS:3025(P -45):1993 RA: 2014	mg/L	Not Specified	18.2	29.1
23	Chemical Oxygen Demand	IS:3025(P -45):1993 RA: 2014	mg/L	Not Specified	60.5	97.6
24	Dissolved Oxygen	IS:3025(P -45):1993 RA: 2014	mg/L	Not Specified	5.1	3.5

❖ **Observations**

Ground Water

The pH value of the collected ground water in the study area varies between 6.67 to 8.08 and conductivity varies from 239 to 1439 µS/cm. TDS values were found to be from 131 to 93 mg/L. The Total alkalinity varies from 55.4 to 474 mg/L and Total Hardness varied from 74.1 to 661 mg/L.

The chloride values were found to be in the range 20.1 mg/L to 225 mg/L and Sulphate values varies from 5.41 mg/L to 149 mg/L. The Calcium and Magnesium values range from 22.4 to 169 mg/L and 4.44 to 63.8 mg/L respectively.

Surface Water

The pH value of the collected Surface water in the study area is 7.8 & 8.56 and conductivity 574 & 2710 µS/cm. TDS values were found to be 346 & 1491 mg/L. The Total alkalinity is 127 & 389 mg/L and Total Hardness is 146 & 445 mg/L.

The chloride values were found to be 79.4 374 mg/L and Sulphate values is 56.5 & 252 mg/L. The Calcium and Magnesium are 28.3 & 128 mg/L and 18.3 & 30.5 mg/L respectively.

3.6 Soil Environment

The present study of the soil quality establishes the baseline characteristics and this will help in future in identifying the incremental concentrations if any, due to the operation of the proposed project. The sampling locations have been identified with the following objectives;

- To determine the baseline soil characteristics of the study area; and
- To determine the impact of proposed project on soil characteristics

3.6.1 Data Generation

For studying soil quality of the region, five (5) sampling locations were selected to assess the soil conditions in and around the project area based on various land use conditions. The physical and chemical concentrations were determined. The samples were collected from different specified depths viz., 30 cm, 60 cm and 90 cm. The samples were analyzed for physical and chemical characteristics. The samples have been analyzed as per the established scientific methods for physio-chemical parameters.

3.6.2 Soil Sampling Locations

The details of the sampling locations selected for soil sampling are given in **Table - 3.11** and shown in **Figure – 3.5.**

TABLE 3.11 DETAILS OF SOIL SAMPLING LOCATIONS

Code	Location	Latitude	Longitude	Direction w.r.t. plant	Distance w.r.t. plant (km)
S1	Project site	13°25'20.11"N	80° 6'29.32"E	Within site	
S2	Viki Steel, SIPCOT	13°25'1.66"N	80° 6'55.63"E	SE	0.76
S3	Peddikuppam	13°25'21.27"N	80° 7'31.32"E	E	1.78
S4	Theruali	13°25'17.55"N	80° 8'12.26"E	E	3.10
S5	Pappankuppam	13°25'19.50"N	80° 5'57.44"E	W	0.86
S6	ARS Energy Private Limited	13°25'24.62"N	80° 4'2.93"E	W	4.30
S7	MTC Business Pvt Ltd Unit-3 - Pappankuppam	13°26'12.37"N	80° 5'33.16"E	NW	2.25
S8	Gumidipoondi	13°24'22.03"N	80° 7'29.06"E	SE	2.64

Source: Eco Tech Labs Pvt Ltd

FIGURE 3-5 SOIL SAMPLING LOCATIONS

3.6.3 Baseline Soil Status

The soil quality at all the locations during the study period is tabulated in **Table-3.12.** The results are compared with "Standard Soil Classification" given in **Table-3.13**.

TABLE 3.12 SOIL QUALITY RESULTS

S. No.	Parameters	S1	S2	S3	S4	S5	S6	S7	S8
1	pH	7.23	7.55	7.21	7.17	5.81	8.09	7.36	7.09
2	Electrical Conductivity	0.89	2.86	0.23	0.54	0.09	0.43	0.44	0.59
3	Water holding Capcity	15.1	6.6	7.5	7.2	2.9	12.5	7.7	11.9
4	Chloride	74	339	84	25	22	26	34	104
5	Calcium	81.6	264	95.3	29.1	38.8	27.7	31.7	88.5
6	sodium	50.3	943	156.0	30.2	50.3	63.3	45.3	141
7	Potassium	22.3	787	145.0	16.3	25.5	25.5	26.4	132
8	Organic matter	0.67	3.64	0.46	1.30	1.05	1.05	1.06	0.30
9	Magnesium	61.1	47.4	38.6	22.3	12.7	13.7	25.7	36.8
10	sulphate	287	882	39.8	279	73.3	146	153	1082
11	CEC	9.30	11.8	9.30	10.2	8.11	10.1	12.2	11.2
12	Carbonate	Nil	nil	Nil	Nil	Nil	Nil	Nil	Nil
13	BiCarbonate	116	58.3	161	67.9	49.9	120	136	189
14	TKN	0.23	0.04	0.18	0.33	0.22	0.17	0.19	0.23
15	bulk dencity	1.33	1.32	1.21	1.11	1.16	1.19	1.31	1.11
16	Phosphorous	193	165	165	172	183	166	167	192
17	sand	54	71.5	59	73	46	60	59	55
18	clay	15	7.14	15	9	23	20	24	8
19	Silt	31	21.4	26	18	31	20	18	37
20	SAR	8.4	14.0	27.0	8.4	14.0	19.7	12.0	25.2
21	Silicon	0.13	0.091	0.13	0.14	0.12	0.15	0.10	0.11

Source: Eco Tech Labs Pvt Ltd

TABLE 3.13 STANDARD SOIL CLASSIFICATION

S. No.	Soil Test	Classification
1	pH	<4.5 Extremely acidic 4.51- 5.50 Very strongly acidic 5.51-6.00 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	Electrical Conductivity (mS/cm)	Upto 1.00 Average 1.01-2.00 Harmful to germination 2.01-3.00 Harmful to crops
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	Potash (Kg/ha)	0 -120 very less 120-180 less 181-240 medium 241-300 average 301-360 better > 360 more than sufficient

❖ ***Observations***

- It has been observed that the pH of the soil was ranging from 5.81 to 8.01 indicating the soils are neutral to slightly alkaline in nature.
- Conductivity of the soil ranges from 0.09 to 2.86 mS/cm indicating the soil in the study area is non-saline in nature.

- Soil organic content varied from 0.3 to 3.64% which indicates average to more than sufficient quantities of organic matter.
- The available nitrogen content ranges between 0.04 to 0.33 kg/ha, indicate in the soil has better quantity of Nitrogen in the locality.
- The value of phosphorus content varies between 165 to 193 kg/ha indicates that the soil has average sufficient quantities of Phosphorus.
- The potassium content varies from 22.3 to 787 kg/ha which indicates that the soils have sufficient quantities of potassium.

3.7 Ecological Environment

Ecology and Biodiversity is studied for 10 km radius around the project site. Project site is considered as core zone and from radius of 5 km radius, it is considered as buffer zone.

- Primary field survey is carried out for the assessment of flora and fauna
- In addition to that, Secondary data from Journals/Literature were studied and compiled to understand the species present

Survey Purpose and Approach:

The basic purpose is to explore the biological environment under Environment Impact Assessment (EIA) and to assist in the decision-making process and to ensure that the project options under consideration are bio-environmentally friendly. EIA identifies ways of improving project environmentally by preventing, minimizing, mitigating or compensating for adverse impacts before construction and development phase. The present study on the floral & faunal assessment of the proposed project is based on field survey of the area supported by secondary data from various governmental and non-governmental sources.

Objectives of the Study:

The objectives of this study were as follows:

- To conduct detail study for floral/faunal/avifaunal elements in the Study area.
- To assess scheduled species in the Study area (Rare, endangered, critically endangered, endemic and vulnerable).
- Baseline data for the study area along with a description of the existing terrestrial, wetland and aquatic vegetation.

- To identify impact of project on the biological environment, this will be discussed under Chapter 4.

Tools used for field study

- Nail
- String/Ropes,
- Paper,
- Pen,
- Tape &
- Hammer

Monitoring Locations

TABLE 3.14 ECOLOGY & BIODIVERSITY – MONITORING LOCATIONS

S. No	Location	Distance w.r.t. project site	Direction w.r.t. project site
1.	Project site	-	-
2.	Viki Steel, SIPCOT	SE	0.76
3.	Peddikuppam	E	1.78
4.	Theruali	E	3.10
5.	Pappankuppam	W	0.86
6.	ARS Energy Private Limited	W	4.30
7.	MTC Business Pvt Ltd Unit-3 - Pappankuppam	NW	2.25
8.	Gumidipoondi	SE	2.64

3.7.1 List of Flora in the study area

The list of flora in the study area is given below:

TABLE 3.15 LIST OF FLORA IN THE STUDY AREA

S. No	Scientific Name	Family
1.	Emblica officinalis	Euphorbiaceae
2.	Mangifera indica	Anacardiaceae
3.	Spondias mangifera	Anacardiaceae
4.	Saraca asoca	Caesalpiniaceae
5.	Ficus religiosa	Moraceae

6.	Annona squamosa	Annonaceae
7.	Ziziphus jujuba	Rhamnaceae
8.	Ficus hispida	Moraceae
9.	Semecarpus anacardium	Anacardiaceae
10.	Anacardium occidentale	Anacardiaceae
11.	Helictres isora	Tiliaceae
12.	Anogeissus latifolia	Combrataceae
13.	Ficus carica	Moraceae
14.	Ficus glomerata	Moraceae
15.	Ocimum sanctum	Labiatae
16.	Jatropha gossypifolia	Euphorbiaceae
17.	Jusrtia simplex	Acanthaceae
18.	Jussiaea suffraticosa	Onagraceae
19.	Abutilon indicum	Malvaceae
20.	Mimosa pudica	Mimosaceae
21.	Osimum americanum	Labiataceae
22.	Desmodium trifolium	Fabaceae
23.	Casurina	Casuarinaceae
24.	Melia azadiractha	Meliaceae
25.	Oxalis cornicula	Oxalidaceae
26.	Aegle marmelos	Rutaceae
27.	Aegle marmelos	Rutaceae
28.	Tephrosia purpuria	Fabaceae
29.	Polyalthia longifolia	Annonaceae
30.	Feronia elephantum	Verbanaceae

3.7.2 List of Fauna in the study area

The list of fauna in the study area is given below:

TABLE 3.16 LIST OF FAUNA IN THE STUDY AREA

Sr. No.	Scientific name	Common name	Conservation status as per WPA (1972)
I.Aves			
1	Apus affinis	House Swift	Sch-IV
2	Corvus corvus	Jungle crow	Sch-IV
3	Corvus splendens	House crow	Sch-V
4	Halcyon symyrnensis	White Kingfisher	Sch-IV
5	Ceryle rudis	Pied kingfisher	Sch-IV
6	Columba livia	Rock Pigeon	Sch-IV
7	Bubo bubo	Indian great horned Owl	Sch-IV
8	Copsychus saularis	Magpie Robin	Sch-IV
9	Oriolus oriolus	Indian Oriole	Sch-IV
10	Temenuchus pagodarum	Brahmny Myna	Sch-IV
11	Acridotheres tristicus	Common myna	Sch-IV

12	Ploceus philippinus	Weaver bird	Sch-IV
13	Uroloncha striata	Spotted munia	Sch-IV
14	Passer domesticus	House Sparrow	Sch-IV
15	Megalaima merulinus	Indian Cuckoo	Sch-IV
16	*Eudynamis scolopaceus*	Asian Koel	Sch-IV
17	*Centropus sinensis*	Crow Pheasant	Sch-IV
18	*Psittacula crammeri*	Rose ringed parakeet	Sch-IV
19	*Coracias bengalensis*	Indian Roller	Sch-IV
20	*Merops leschenaultia*	Chestnut headed BeeEater	Sch-IV
21	*Alcedo atthis*	Common Kingfisher	Sch-IV
22	*Fulica atra*	Common Coot	Sch-IV
23	*Caprimulgus asiaticus*	Common Indian jar	Sch-IV
24	*Bubulcus ibis*	Cattle Egret	Sch-IV
25	*Ardeola grayii*	Pond Heron	Sch-IV
II.Reptiles			
1	*Calotes versicolor*	Common garden lizard	Sch-IV
2	*Chameleon zeylanicus*	Indian chameleon	Sch-II
3	*Bangarus caeruleus*	Krait	Sch-IV
III.Butterflies			
1	*Pachliopta hector Lin.*	Crimson rose	Sch-IV
2	*Papilio demoleus*	Lime butterfly	Sch-IV
3	*Junoria almanac*	Peacock pansy	Sch-IV
4	*Hypolimnas bolina*	Great egg fly	Sch-IV
5	*Euploea core*	Common crow	Sch-IV
6	*Neptih hylas moore*	Common sailor	Sch-IV
7	*Eurema hecabe*	Common grass yellow	Sch-IV
IV.Amphibians			
1	*Rana tigrina*	Bull frog	Sch-IV
2	*Bufo malanosticus*	Common Toad	Sch-IV
V.Mammals			
1	*Bandicota indica*	Bandicoot	Sch-IV
2	*Rhinolopus* spp.	Bat species	Sch-IV
3	*Hipposiderus* spp.	Bat species	Sch-IV
4	*Macaca mulatta*	Monkey	Sch-II
5	*Rattus* sp.	Rat	Sch-V
6	*Funambulus* spp.	Palm Squirrel	Sch-IV
7	*Rattus norvegicus*	Field mouse	Sch-V
8	*Lepus nigricollis*	Hare	Sch-IV
9	*Rattus rattus*	House rat	Sch-V

Aquatic Systems

Phytoplankton

Phytoplankton forms the basis of food chain in any aquatic water body. The diversity and abundance of phytoplankton mainly depends on the region, type of water body, either lentic or lotic, the nutrient flux in the system and the amount of sunlight available for photosynthesis. These factors together form the dynamic s of phytoplankton productivity over the seasons. The phytoplankton of given water body determines the zooplankton populations and the fish productivity of the ecosystem.

Phytoplankton group reported from the study area were Basillariophyceae, Chlorophyceae, Myxophyceae and Euglenophyceae members. About 20 species of phytoplankton were reported from all the locations. Dominanc e of Bacillariophyceae members followed by Myxophyceae was observed in studied samples. The highest percentage observed was Ankistrodesmus sp. and Navicula sp. and the lowest percentage observed was Ophora sp and Synedra sp.

Zooplankton

The zooplankton of the aquatic water body are the primary consumers and also in cases secondary producers which play an important role for the fisheries of that system. The diversity and abundance of zooplankton also depends on whether the water body is eutrophic or oligotrophic. About 14 species of zooplankton were reported from all the locations. They also are good representatives of the ecosystem health. The amount and type of pollutants in the water body determine the type of zooplankton species. Species of copepod will usually dominate in the tropical region while more eutrophicated waters with high nutrient or organic loads will harbor high number of crustaceans and arthropods. The less polluted waters will have more of cladocerans and rotifers.

Detailed studies were conducted near to villages, forest blocks and along the highways to identify the common plant species and to identify the presence of any threatened, medic inal and rare plant species in study area.

Among the zooplankton group, Asplancha sp. had highest percentage composition and the lowest percentage composition was of Ceriodaphnia sp. The list of plankton recorded in fresh water bodies in study area during the study period is presented in Table 3.17

TABLE 3.17 List of plankton recorded during study period

S. No.	Phytoplankton	Zooplankton

1	Gyrosigma sp.	Keratella monospina
2	Achananthes affinis	Brachirous caudatus
3	Gyrosigma accuminatus	Asplancha brighwell
4	Pandorina sp.	Colpidium colpoda
5	Ankistrodesmus falcatus	Daphnia sp.
6	Ankistrodesmus sp.	Ceriodaphnia reticulate
7	Pediastrum boryanum	Mesocyclops leuckarti
8	Scenedesmus bijuga	Mesocyclops hyalinus
9	Melosira granulate	Coleps hirsutus
10	Cyclotella meneghiana	Arcella sp.
11	Microcystis sp.	Actinophyros sp.
12	Navicula gracilis	Asplancha sp.
13	Nitzschia gracilis	Ceriodaphnia sp.
14	Chroococcus minutes	Mesocyclops sp.
15	Spirulina princepes	
16	Pinnularia braunii	
17	Synedra tabulate	
18	Ophora sp.	
19	Cymbella sp.	
20	Navicula radiosa	

Fishes

The Arani River is the principle fish catchment areas in the study area. The list of aquatic fauna in the study area is given in Table 3.18.

TABLE 3.18 AQUATIC FAUNA FROM STUDY AREA

S.No.	Local Name	Zoological Name
1	Catla	*Catla catla*
2	Rohu	*Labeo rohita*
3	Mrigal	*Cirrhinus mrigala*
4	Silver Carp	*Thirmethrix molitrix*
5	Grass Carp	*Ctenopheringodon idella*

6	Common Carp	*Cyprinus carpio*
7	Mullet	*M. cunnesius*
8	Catfish	*Macrones Vittatus*

3.7.3 Conclusion

From the field observations it can be concluded that the forests in the study area are under anthropogenic pressure and show signs of degradation in the form of tree cutting, lopping, grazing and collection of Non- timber forest products (NTFPs) and habitat fragmentation. As per MoEF and Forest Department of Tamil Nadu state, there are no Wildlife sanctuaries, National parks/biosphere reserves in 10 km radius from the plant boundary. 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 that there are no species belonging to Sch- I, two Sch-II species present in the study area and rest of the species belongs to Sch-III, Sch-IV and Sch-V of Wildlife Protection Act, 1972

3.8 Traffic Density

The traffic studies have been conducted to know the prevailing traffic volumes on the existing roads. It is essential to consider these details for assessing the anticipated future traffic volumes as a part of overall impacts assessment for the project. The variations of traffic densities depending upon the working days and time and also varies in day and night times. In order to assess the prevailing traffic volumes on the roads, the survey was conducted during normal working days of the week by avoiding local holidays or abnormal situations to reflect the true picture of the traffic densities. The traffic study was conducted at three locations for 24 hours.

3.8.1 Methodology

3.8.1.1 Vehicle Count

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

3.8.1.2 Categorization of Traffic

The engine driven vehicles were categorized into various heads viz. Multi Axle Vehicles, Trucks/Bus, Light Motor Vehicles (LMV), Two, Three Wheelers and others.

3.8.2 Sampling Locations

Traffic locations are represented in **Table-3.19.**

FIGURE 3-6 ROAD CONNECTIVITY

TABLE 3.19 DETAILS OF TRAFFIC MONITORING LOCATIONS

Location Code	Location Details	Distance w.r.t site (km)	Direction w.r.t site
T1	NH-16, West Bengal - Tamilnadu – 0.01 km, W	0.55	E

3.8.3 Presentation of Results

The hourly vehicular traffic densities for continuous normal day at each location observed during the study period and the same are presented in **Table - 3.20 & 3.21.**

TABLE 3.20 TRAFFIC DENSITIES

Location Number : T1

Details of Location Highway : NH-16, West Bengal - Tamilnadu – 0.55 km, E

NH-16, West Bengal - Tamilnadu – 0.55 km, E			
Six Lane One way			
Time	**Two Wheelers**	**Four Wheelers**	**Six Wheelers**
	(Motorcycle, Scooter etc.)	**(Passenger cars, Pickup vans etc.)**	**(Light commercial vehicles, Trucks etc.)**
07.00 - 07.30 Hrs	630	580	390
07.30 - 08.00 Hrs	581	620	371
08.00 - 08.30 Hrs	669	610	257
08.30 - 09.00 Hrs	585	587	373
09.00 - 09.30 Hrs	593	461	362
09.30 - 10.00 Hrs	475	518	351
10.00 - 10.30 Hrs	528	524	348
10.30 - 11.00 Hrs	567	635	343
Item Total	4628	4535	2795
M. Factor	0.75	1	1.2
PCU	3471	4535	3354
Total No. of PCUs (For 4 Hrs)	11360		
Total No. of PCUs/Hr (Avg.)	2840		

NH-16, West Bengal - Tamilnadu – 0.55 km, E			
Six Lane One way			
Time	**Two Wheelers**	**Four Wheelers**	**Six Wheelers**

	(Motorcycle, Scooter etc.)	(Passenger cars, Pickup vans etc.)	(Light commercial vehicles, Trucks etc.)
07.00 - 07.30 Hrs	697	652	523
07.30 - 08.00 Hrs	675	596	576
08.00 - 08.30 Hrs	578	518	612
08.30 - 09.00 Hrs	520	671	532
09.00 - 09.30 Hrs	638	681	584
09.30 - 10.00 Hrs	551	657	568
10.00 - 10.30 Hrs	619	662	610
10.30 - 11.00 Hrs	586	574	528
Item Total	4864	5011	4533
M. Factor	0.75	1	1.2
PCU	3648	5011	5440
Total No. of PCUs (For 4 Hrs)	14099		
Total No. of PCUs/Hr (Avg.)	3525		

Existing Traffic Load in NH 16 Main Road (PCUs)	**Increase in Vehicular Population due to the Proposed Residential Development (PCUs)**	**Estimated Future Traffic Volume in PCUs (V)**	**Capacity of Existing Road in PCUs per Hour as per IRC 106-1990 (C)**	**V/C Ratio**
MP-2840, EP-3525	300 PCU	MP-3140, EP-3825	5400 PCU	0.71

The proposed project consists of Six- Lane one -way traffic.

The capacity of road for Urban Arterial Two-lane road as per IRC 106-1990 = 5400 PCU. The existing traffic flow in the road is 3525 PCU/hour and estimated future traffic volume in

PCU is 3825 and hence it is well below the capacity of existing road. Driveway is provided within the project site for the internal movements of vehicles without traffic congestion. The site will be completely barricaded with compound wall to prevent the mitigate the noise from movement of vehicles in the nearest road. In addition, two-tier tree belt is provided along the periphery of the project site to prevent noise and air pollution.

Source: Eco Tech Labs India Private Limited

3.9 Geology and Hydrogeological Aspects

3.9.1 Geology

The Thiruvallur district can be geologically classified into hard rock and sedimentary (alluvial) formation. This district is principally made up of Archaean, upper Gondwana and the tertiary formations. These are over laid by laterites and alluvium. The oldest of the crystalline rocks of Archaean age are of Biotite and Hornblende Gneiss, Charnockite and granite. These are intruded by Amphibole dykes, and occasionally with veins of quartz and pegmatites. Granites and gneisses of Archaean age are mainly seen in Tiruthanitaluk. These crystalline rocks have under gone weathering to variable extent.

Source: District Survey Report

3.9.2 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 183 m amsl in the west to sea level in the east. Four cycles of erosion gave raise 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. **Figure-3.7.**

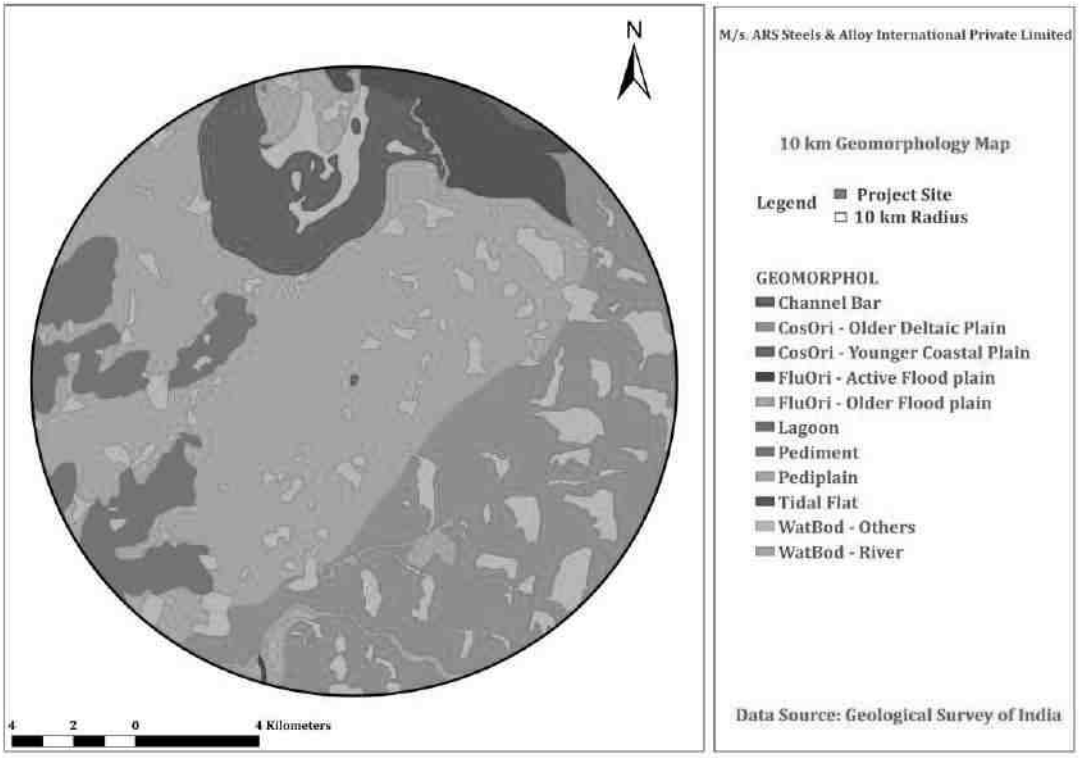


FIGURE 3-7 GEOMORPHOLOGY AROUND 10 KM RADIUS

3.9.3 Soil

Soils in the area have been classified into i) Red soil ii) Black soil iii) Alluvial soil iv) colluvial soil. The major part is covered by Red soil of red sandy/clay loam type. Ferrugineous red soils are also seen at places. Black soils are deep to very deep and generally occurs 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.

3.9.4 Hydrogeology

The district is underlain by both porous and fissured formations. . The important aquifer systems in the district are constituted by i) unconsolidated & semi-consolidated formations and ii) 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 the bedding planes and thin fractures in shales. In the area underlain by Cretaceous sediments, ground water development is rather poor due to the rugged nature of the terrain and the poor quality of the formation water. Quaternary formations comprising mainly sands, clays and gravels are confined to major drainage courses in the district. The maximum thickness of alluvium is 30.0 m. whereas the average thickness is about 15.0 m. Ground water occurs under phreatic to semi-confined conditions in these formations and is being developed by means of dug wells and filter points. Alluvium, which 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. Ground water generally occurs under phreatic conditions in the weathered mantle and under semi-confined conditions in the fissured and fractured zones at deeper levels. The thickness of weathered zone in the district is in the range of 2 to 12 m. The depth of the wells ranged from 8.00 to 15.00 m bgl. The yield of large diameter wells tapping the weathered mantle of crystalline rocks ranges from 100 to 500 lpm and are able to sustain pumping for 2 to 6 hours per day. 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. The depth to water level in the district varied between 2.38 – 7.36 m bgl during pre-monsoon (May 2006) and 0.79 – 5.30 m bgl during post monsoon (Jan 2007). The seasonal fluctuation shows a rise between 0.28 and 4.80 m bgl. The piezometric head varied between 2.20 to 10.30 m bgl (May 2006) during premonsoon and 2.72 to 8.55 m bgl during post monsoon.

3.9.5 Drainage

Araniyar, Korattalayar, Cooum, Nagari and Nandhi are the important rivers. The drainage pattern, in general, is dendritic. All the rivers are seasonal and carry substantial flows during monsoon period. Korattaliar 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. The drainage pattern and nearest water bodies are shown in **Figure -3.8.**

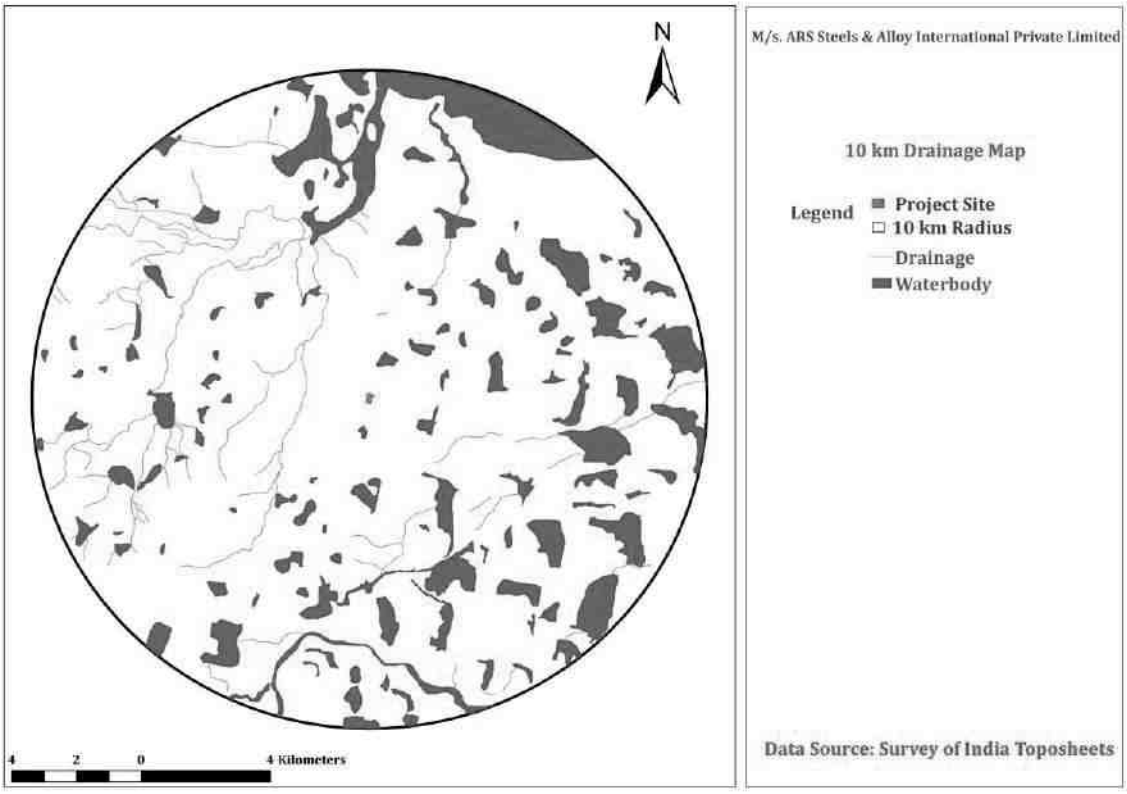


FIGURE 3-8 DRAINAGE PLAN AROUND 10 KM RADIUS

3.10 Land Use Studies

3.10.1 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 plant site in the study area;
- To give recommendations for optimizing the future land use pattern and associated impacts.

3.10.2 Land use pattern based on remote sensing data

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

3.10.2.1 Land use / Land cover classification system

The present land use / land cover maps were prepared based on the classification system of National standards.

3.10.2.2 Data requirements

IRS-P6 Geo-Coded FCC on 1:50000 scale of LIS IV acquired during January 2023 and was used for the mapping and interpretation. Besides, other collateral data as available in the form of maps, charts and census records other reports and especially topographical survey of India maps on 1:50000 scale are used. In addition to this, ground truth survey was also conducted to verify and confirm the ground features.

3.10.2.3 Methodology

The methodology adopted for preparation of Land use/ land cover thematic map is monoscopic visual interpretation of geo coded scenes of IRS-P6 Satellite LIS-IV and field observations are aken. The various steps involved in the study are preparatory field work, field survey and post field work.

3.10.2.4 Pre field Interpretation of Satellite Data

The False Color Composite (FCC) of IRS-P6 satellite data at 1:50000 scale is used for pre field interpretation work. Taking the help of toposheets, geology, geomorphology and by using the image elements the features are identified and delineated the boundaries roughly. Each feature identified on the 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 topo sheets 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 on 1:50000 scale. Preliminary interpreted land use and the land cover featuers boundaries from IRS-P6 False color 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 color coding and detailed description of feature with standard symbols. All the classes noted and marked by the standard legend on the map.

3.10.2.5 Final Output

The final output would be the land use/land cover map on 1:50000 scale, numerals were given different colour code for each category as shown in map. Area estimation of all features of land use/land cover categories was noted.

3.10.2.6 Observations

The following are the main interpreted land use / land cover classes of the study area and their respective areas are given in hectares in **Table – 3.21**. The land use / land cover map within 10-km radius is shown in **Figure – 3.9.**

TABLE 3.21 LAND USE PATTERN OF STUDY AREA

S. No.	Land use	Area (Sq.km.)	Percentage (%)
1.	Water Body	12.63	3.95
2.	Trees	10.36	3.24
3.	Grass	0.86	0.27
4.	Flooded Vegetation	1.29	0.40
5.	Crops	218.9	68.53
6.	Scrub/Shrub	29.8	9.33
7.	Built-up Area	45.21	14.15

8.	Barren Land	0.38	0.12
	Total Area	**319.43**	**100**

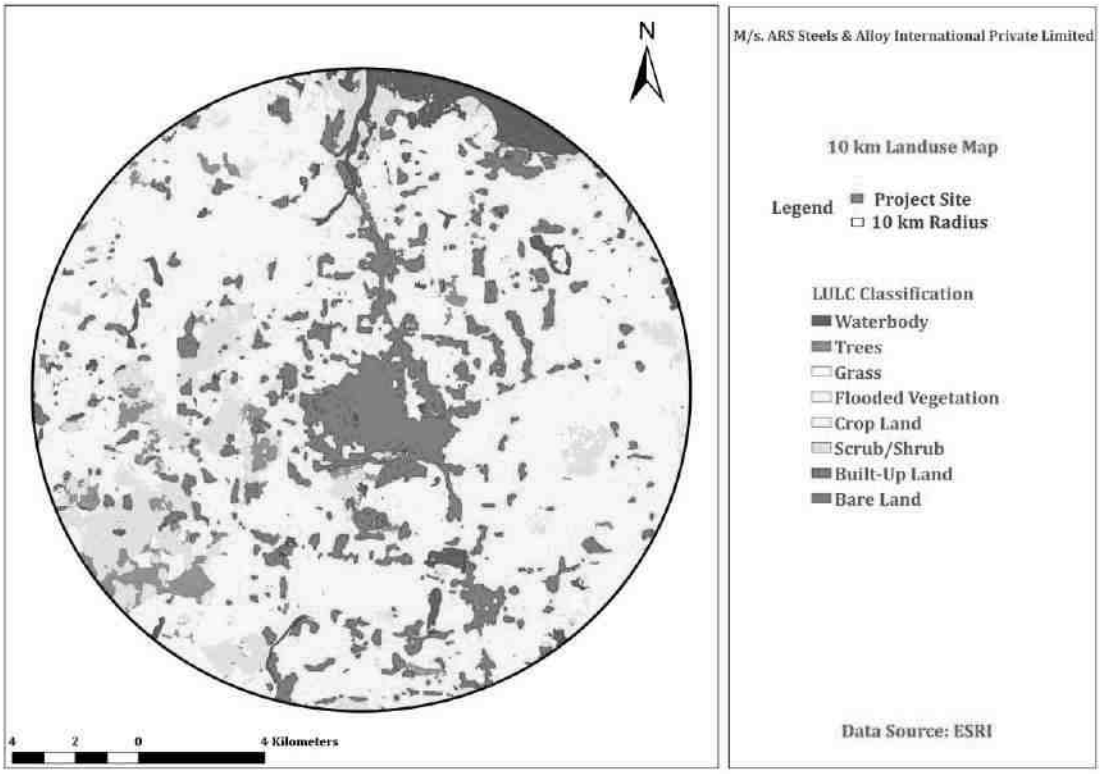


FIGURE 3-9 LAND USE/LAND COVER MAP AROUND 10 KM RADIUS

3.11 Demography and Socio-economics

For assessing the prevailing socio-economic aspects of people in the study area around the proposed plant, the required data has been collected from various secondary sources and analyzed.

3.11.1 Methodology Adopted for the Study

The methodology adopted for the study is primarily based on the review of secondary data, such as District Primary Census Statistical Handbook of Thiruvallur District, 2011 for the parameters of demography, occupational structure of people within the study area of 10-km radius around the expansion plant. The village wise demographic data as per 2011 census is

presented in **Annex - 3**. The salient features of the demographic and socio-economic aspects of the study area are described in the following sections.

3.11.2 Demographic Aspects

❖ ***Distribution of Population***

As per 2011 census the study area consisted of 143893 persons inhabited in the 10 km radius study area. The distribution of population in the study area is shown in **Table-3.22.** The males and females constitute about 72076 and 71817 of the study area.

TABLE 3.22 DISTRIBUTION OF POPULATION IN STUDY AREA - 2011

Particulars	General Study Area
No. of Households	38100
Male Population	72076
Female Population	71817
Total Population	143893

Source: District Primary Census Hand Book – Tiruvallur District, 2011

❖ ***Sex Ratio***

The configuration of male and female indicates that the males and females constituted about 50% and 50% of the total population respectively, as per 2011 census records.

3.11.3 Social Structure

In the study area, as per 2011 census, 27% of the population belonged to Scheduled Castes (SC) and 3% to the Scheduled Tribes (ST). The distribution of population in the study area by social structure is shown in **Table-3.23.**

TABLE 3.23 DISTRIBUTION OF POPULATION BY SOCIAL STRUCTURE - 2011

S. No.	Particulars	Population	Percentage (%)
1	Scheduled Castes	39031	27
2	Scheduled Tribes	3943	3
	Total	**42974**	**30**

Source: District Primary Census Hand Book – Thiruvallur District, 2011

3.11.4 Literacy Levels

The analysis of the literacy levels in the study area reveals a moderate literacy rate in the study area. The litrecy rate of the study area is 100% in 2011. If this is computed only for the people of above the age group of 5 years, i.e. the school going age people, this would considerably increase the literacy rates. The distribution of literates and literacy rates in the study area is given in **Table-3.24.**

TABLE 3.24 DISTRIBUTION OF LITERATES AND LITERACY RATES - 2011

S. No.	Particulars	Study Area
1	Total Literates	93731
2	Average Literacy Rate (%)	100
3	Male Literates	52077
4	Male Literacy (%)	56
5	Female Literates	41654
6	Female Literacy (%)	45

Source: District Primary Census Hand Book – Thiruvallur District, 2011

3.11.5 Occupational Structure

The occupational structure of the study area is presented in **Table-3.25.**

TABLE 3.25 OCCUPATIONAL STRUCTURE – 2011

S. No.	Occupation	Study Area	
		Population	Percentage (%)
1	Total main workers	63996	100
	Male	43499	68
	Female	20497	32
2	Marginal workers	15653	100
	Male	7989	51
	Female	7664	49
3	Non-workers	79897	100

S. No.	Occupation	Study Area	
		Population	**Percentage (%)**
	Male	28577	36
	Female	51320	64
Total Population		**159546**	

Source: District Primary Census Hand Book – Thiruvallur District, 2011

4 ANTICIPATED ENVIRONMENT IMPACTS & MITIGATION MEASURES

4.1 Introduction

This chapter presents identification of impacts and appraisal of various impacts due to the proposed expansion on the surroundings and proposed mitigation measures to minimize the adverse impacts. The impacts have been studied for the proposed expansion project, taking into account that the pollution due to the activities has already been covered under baseline environment monitoring and will continue to remain same during the operation of the project.

Impact assessment describes identification and appraisal of various impacts due to the proposed expansion. "Environment Impact" can be defined as any alteration of environment conditions or creation of a new set of environment conditions, adverse or beneficial, caused or induced by the action or set of actions under consideration.

Generally, the environment impacts can be categorized as either primary or secondary.

- Primary impacts are those, which are attributed directly by the project,
- Secondary impacts are those, which are indirectly induced and typically include the associated investment and changed patterns of social and economic activities by the proposed action.

Mitigation is the implementation of measures designed to reduce the undesirable effects of the proposed expansion on the environment. For mitigation to be effective the following factors should be taken care of

- The measure proposed must be achievable within time, resources and capabilities
- The mitigation measures must correspond to impacts
- Funding must be adequate over the life of the activity
- Preventive mitigation is usually cheapest and most effective. It must be done at design stage.

4.2 Identification of Impacts & Mitigation Measures

The construction and operation of the proposed expansion comprises various activities each of which may have an impact on some or other environment parameters. Various impacts during the construction and operation phase on the environment parameters have been studied to estimate the impact on the environment and are elaborated in the subsequent sections.

4.3 Impacts during Construction Phase

For the proposed expansion, the construction activity is temporary and the impact during the construction phase will be short term. This includes the activities related construction of infrastructures like plant facilities for the proposed machineries and installation of equipment during constructional phase will have varying impacts on the following attributes.

4.3.1 Topography

a. Impact

The topography of the project site is plain without any undulations. No major levelling would be required for the proposed construction. During construction of foundation, excavated top soil will be removed which may be lost. Thus, the impact during the construction is reversible, short term and insignificant.

b. Mitigation Measures

During construction, excavated topsoil will be conserved and reutilized for gardening/landscape development. The development being proposed on a flat terrain, there will not be any significant impact on the topography. However, the existing topography will be maintained during construction for the proposed plant.

4.3.2 Land use

a. Impact

The proposed expansion will be developed within the existing land. Moreover, the land use classification is industrial land use. No felling of timber yielding trees except some bushes and shrubs which will be cleared for construction of proposed buildings. Thus, the overall impact on land use will be Nil.

b. Mitigation Measures

It will be developed greenbelt in 33.7 % of the total site area covering all along the plant boundary as well as vacant places to control the pollution within the plant premises and improve the aesthetics of the area.

4.3.3 Drainage Pattern

a. Impact

The overall terrain of the project site will be changed by the construction of buildings and this will bring moderately significant change in the existing pattern of surface drainage. The change of surface drainage will lead to increase the run-off water during monsoon season. Mainly, the impact will arise from the creation of impermeable surfaces (roofs, pavements, etc.) which results in reduction of percolation.

b. Mitigation Measures

Adequate rain water harvesting system is proposed in the plant as detailed in EMP. Rainwater harvesting structures will prevents the flooding of low-lying areas in the project premises. A basic surface drainage system can be provided for the site to avoid water runoff on to the surrounding properties and roads, especially during the monsoon.

4.3.4 Material Transportation

a. Impact

The various materials required for construction (e.g. Steel, Blocks, Cement, Stones, Asphalt, etc.) will be obtained from sources elsewhere and transported to the site. Transportation of these materials, typically in over-laden and sometimes uncovered trucks, usually results in undue road wear-and tear. In the case of fine earth materials, dusting and spillages occur on the roadways between source and site. Dusting degrades local air quality and material spillages worsen road-driving conditions and increase the risk of road accidents. These occurrences represent indirect, short-term, reversible, negative impacts on public health and safety related to the project.

b. Mitigation Measures

- All fine earth materials should be covered during transportation to the site to prevent spillage and dusting.

- Trucks used for that purpose on the project should be fitted with tailgates that close properly and with tarpaulins to cover the materials.
- The cleanup of spilled earth and construction material on the main roads should be the responsibility of the contractor and should be done in a timely manner (say within 4 hours) so as not to inconvenience or endanger other road users.
- Transportation of lubricants and fuel to the site should only be done in the appropriate vehicles and containers, i.e. fuel tankers and sealed drums.
- As far as possible, transportation of construction materials should be scheduled for off-peak traffic hours. This will reduce the risk of traffic congestion and of road accidents on the access roads to the site.

4.3.5 Soil Quality

a. Impact

The soil at the plant site predominantly consists of Red Loam. Moreover, the site is plain, it may not require any filling and leveling, but just grading the site may be enough to start the construction. Topsoil loss is envisaged from the project as new buildings are proposed to construct. Apart from much localized construction impacts at the plant site, no significant adverse impact on soil in the surrounding area is anticipated.

b. Mitigation Measures

The following mitigation measures shall be adopted for soil and land environment:

- 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;
- After completion of the construction, the surplus earth shall be utilized to fill up the low-lying areas, the debris shall be cleared and all un-built surfaces will be reinstated;
- 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;
- There shall be minimum concreting of the top surfaces so that there is a scope for maximum ground water recharge due to rainfall; and

- Plantation outside the plant premises, in the nearby villages shall be encouraged by supplying free saplings to the villagers.

4.3.6 Air Quality

a. Impact

The various activities include during construction phase such as drilling, foundation, deployment of machinery, erection, transportation, dumping will cause dust and gaseous emissions. These emissions are expected to result in change in baseline air quality, primarily in the working area and cause immediate effect on the construction workers. The particulate matter will be the main pollutant from the above activities. Further, concentration of NO_2 and CO may also slightly increase due to increased vehicular traffic movement. However, the increase in ambient concentrations of air quality will be negligible and short term. As most of the construction equipment will be mobile, the emissions are likely to be fugitive. The impacts will be localized in nature and the areas outside the project boundary are not likely to have any major adverse impact with respect to ambient air quality.

b. Mitigation Measures

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. 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 shall be done at frequent intervals by preferably using truck-mounted sprinklers;
- Sprinkling of water shall be done along the roads and work zone areas to reduce the fugitive dust;
- All machineries to be used for construction purpose will be of highest standard of reputed make and company will emphasize compliance of noise pollution control norms by these equipments.
- Construction equipment shall be maintained and serviced regularly such that the gaseous emissions from this equipment are maintained within the design specifications; and

- Since temporary electrical power is possible in the proposed plant, attempts shall be made to utilize the electrically powered machinery to the extent possible to minimize the emissions of SO_2 and NO_2 during construction.

4.3.7 Water resources and quality

a. Impact

The water requirement during construction phase is estimated at 10 - 15 m^3/day. The water requirement will be sourced from SIPCOT. The wastewater generation during the construction period will be from the sanitary units provided for the workers. This waste will be treated in the proposed septic tanks / mobile STP and discharged into soak pits. Hence, there will not be any impact on the water regime due to discharge of sanitary treated wastewater.

b. Mitigation Measures

The earthwork (cutting and filling) will be avoided during rainy season and will be completed during 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. Also, development of green belt in and around plant will be taken up during the monsoon season and in-plant roads will be paved.

4.3.8 Noise Environment

a. Impact

The major sources of noise during the construction phase are vehicular traffic, construction equipment like dozers, scrapers, concrete mixers, cranes, pumps, compressors, pneumatic tools, saws, vibrators etc. The operation of these equipments will generate noise ranging between 85-90 dB(A) near the source at 1-m distance. These noises will be generated within the plant boundary and will be transient in nature.

b. Mitigation Measures

Equipment will be maintained appropriately to keep the noise level within 85- 90 dB (A). Wherever possible, equipment will be provided with silencers and mufflers. Construction activities will be restricted to day time only. Greenbelt will be developed from construction stage. Further, workers working in high noise areas will be provided with necessary

protective devices e.g. ear-plug, ear-muffs, etc.

4.3.9 Ecology

a. Impact

Dust emissions from the construction activity will affect the plant and animal respiration activity. Construction activities change the natural environment. Emissions such as PM, NOx, SOx from D.G sets and other equipment / vehicles may also cause respiration problem for the surrounding organisms. The anticipated impact on biological environment (both terrestrial and aquatic) is very low magnitude, short term and overall impact on biological environment is insignificant.

b. Mitigation Measures

The dust emissions will be suppressed by spraying water. Emissions from D.G sets and vehicles will be minimized by proper maintenance and by avoiding use of adulterant fuels and will be maintained below the standard limits prescribed by competent authority.

4.3.10 Socio Economic Condition

The impact of construction of the proposed expansion project would be both positive and negative impact on Socio-Economic Environment. The beneficial impacts are significant, short term as well as long term and regional level. Whereas, the adverse impacts will be extended either within the site or extent to immediate vicinity only and it will be short term, low magnitude. The mitigation measures may prevent the adverse impact on human environment.

a. Positive Impacts

- Income to the Equipment and Material suppliers
- This project will promote the procurement of equipment and machineries for various activities involved during the construction phase.
- Procurement of material suppliers for various activities involved in the construction phase which will also promote economic growth of local material suppliers in and around the proposed Project site.
- Proposed project will create employment opportunities to the local people present around the Project Site.

b. Negative Impacts

- During construction phase of the proposed project the employers are subject to Health and Safety Risks.
- At the project site direct exposure to dust generation and high noise generation sources will cause occupant health related impact such as asthma, bronchitis and noise induced hearing loss, etc.

c. Mitigation Measures

- To eradicate the Health and Safety risks to the employees Personal Protective Equipment will be provided
- Ensuring good housekeeping and cleaning operations
- Proper on-site sanitation facilities will be provided for the employees
- The wastewater generated during construction phase will be treated in the proposed septic tank / mobile STP.

4.4 Impacts during Operational Phase

The envisaged operation that will impact the environment would be the production activities of the proposed expansion. Activities related to the operational phase will have varying impacts on the following attributes:

- Land use;
- Air quality;
- Water quality;
- Noise levels;
- Soil;
- Ecology; and
- Demography and socio-economics.

4.4.1 Land use

The impact on the land use during the operational phase of the proposed expansion will not be distinct as there will be no major change after completion of the construction activities. Moreover, the proposed project land is under the ownership of project proponent and the land

use classification is industrial land use. Hence, any additional impact on land use will be insignificant.

4.4.2 Air Quality

a. Impact

Being a steel plant, the main source of air pollution is Induction Furnaces, and standby DG Sets. The major pollutant envisaged from the above sources is Particulate Matter (PM). Along with above gaseous pollutants like Sulphur dioxide (SO_2) and Nitrogen dioxide (NO_2) are also envisaged to increase due to the DG sets operation along with increased vehicle movement. The sources of air pollution have been identified and quantified to predict the impact of proposed project on air quality.

4.4.2.1 Mathematical Modeling - AERMOD

Prediction of impacts on air environment has been carried out by employing a mathematical model. In the present case, Dispersion modeling of approved substances was performed in accordance with the Air Quality Model Guidelines developed by USEPA. These guidelines ensure consistency in the use of dispersion models in air quality assessments.

A new generation dispersion model AERMOD recommended by USEPA as a replacement of ISCST3, was selected for this project. Emission rates of substances were used as AERMOD input values to obtain the maximum Ground Level Concentration (GLC) and two-dimensional concentration distribution for each of the modeled substances around the plant. The computations deal with major pollutants like Particulate Matter (PM10 & PM2.5), Sulphur dioxide and Oxides of Nitrogen.

The AERMOD dispersion model is a steady-state Gaussian plume model that can be used to assess pollutant concentrations and/or deposition fluxes from a wide variety of sources associated with an industrial source complex. The EPA's Regulatory Model Improvement Committee (AERMIC) developed AERMOD specifically as a replacement for previous generation dispersion model ISCST. AERMOD is intended to use hourly averaged meteorological data sequentially through at least one year, although 5-year meteorological data is desired. AERMOD includes improved treatment of the atmospheric boundary layer

and a more complete understanding of diffusion processes. EPA refers to AERMOD as "state-of-the practice".

The AERMOD can use measured values of horizontal and vertical turbulence directly in calculating diffusion. This capability is a significant improvement over ISCST model because it replaces the empirically derived Pasquill-Gifford-Turner stability categories (A through F) with direct measurements. This provides a much more accurate approach to diffusion estimation. This capability is not available unless the turbulence parameters are measured. AERMOD includes a new computational method for evaluating the effects of building downwash on stack emissions with the algorithm PRIME. This algorithm is more accurate than the previously used ISCST model. When comparing the results of the old algorithms with PRIME, some situations may see significant decreases in model concentrations, while others may see increases. The AERMOD model was designed to support the U.S. EPA regulatory modelling options, as specified in the EPA Guidelines on Air Quality Models (Revised). This model is considered as a supporting tool for ambient air quality regulations across the world.

Model Options used for Computations

The options used for short-term computations are:

- The plume rise is estimated by Briggs formulae, but the final rise is always limited to that of the mixing layer;
- Stack tip down wash is not considered;
- Buoyancy induced dispersion is used to describe the increasing plume dispersion during the ascension phase;
- Calms processing routine is used by default;
- Wind profile exponents are used by default, 'Irwin';
- Flat terrain is used for computations;
- It is assumed that the pollutants do not undergo any physicochemical transformations and that there is no pollutant removal by dry deposition;
- Washout by rain is not considered; and
- Cartesian co-ordinate system has been used for computations.

4.4.2.2 Model Input Parameters

Emission Sources

The primary pollutants from the stack/point sources are the particulates which are emitted from stacks within the facility. The SO_2 and NOx are also emitted from stacks whenever they are in operation. Based on the manufacturers and client information, all stack meets the corresponding emission limits. The names of primary point emission sources, emission parameters and stacks/vents dimensions are listed in **Table – 4.1**.

TABLE 4.1 DETAILS OF ADDITIONAL STACK EMISSIONS

S. No.	Stack attached to	Units	Induction Furnace - 25 Ton	Induction Furnace - 25 Ton
1	Stack Height	m	34	34
2	Stack Diameter	m	2.00	2.00
3	Temperature	^oC	90	90
4	Velocity	m/s	19.6	19.6
5	Flow Rate	m^3/hr	200,000	200,000
6	Particulate Matter	mg/Nm^3	50	50
		g/s	2.78	2.78
7	Sulphur Dioxide	mg/Nm^3	70	70
		g/s	3.89	3.89
8	Nitrogen Dioxide	mg/Nm^3	50	50
		g/s	2.78	2.78

Source: ARS Steels & Alloys International Private Limited

Traffic Sources

It is anticipated there would be increase in traffic for shipment of raw materials and finished to and from the facility. About 100 numbers of trucks/day are anticipated upon full operation of the proposed plant. The traffic movement would be along the main roadways and therefore any traffic congestion due to the movement of trucks is not anticipated. The emission factors used to estimate the corresponding emissions from the movement of trucks are given in **Table-4.2.**

TABLE 4.2 AVERAGE EMISSION RATES FOR HEAVY DUTY VEHICLES

Pollutant of Concern	Emission Factor (g/km)
PM_{10}	0.14
$PM_{2.5}$	0.13
SO_2	0.01
NO_X	5.38

Ref: USEPA, MOVES2010b

In order to estimate the incremental increase in the ambient air quality, the above-mentioned sources (point and traffic sources) were combined.

Meteorological Input 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, New Delhi.

4.4.2.3 Modeling Results

Modeling results consist of maximum concentrations (in $\mu g/m^3$) for each of the modeled substances. The concentration isopleths are shown in **Figure – 4.1 to 4.4** and the summary of dispersion modeling results for each of the selected substances is given in **Table - 4.3**.

TABLE 4.3 SUMMARY OF DISPERSION MODELING RESULTS

S. No.	Pollutant	Predicted GLC, $\mu g/m^3$
1	Particulate Matter (PM10)	2.73

S. No.	Pollutant	Predicted GLC, µg/m^3
2	Particulate Matter (PM2.5)	1.40
3	Sulphur Dioxide (SO_2)	5.78
4	Nitrogen Dioxide (NO_2)	4.13

Source: Ecotech Labs Private Limited

Cumulative impact on baseline ambient air quality, after the implementation of the proposed expansion has been arrived by superimposing the present baseline maximum air quality levels of each pollutant. The resultant ambient air quality after implementation of the proposed expansion is given in **Table - 4.4.**

TABLE 4.4 RESULTANT CONCENTRATIONS FOR PROPOSED PLANT

S. No.	Pollutant	Concentration (µg/m^3)			NAAQS Limits
		Baseline	Incremental	Resultant	
1	PM_{10}	61.7	2.73	64.43	100
2	$PM_{2.5}$	27.7	1.40	29.10	60
3	SO_2	17.5	5.78	23.28	80
4	NO_2	31.0	4.13	35.13	80

Source: Ecotech Labs Private Limited

The predictions indicate that the PM_{10}, $PM_{2.5}$, SO_2 and NO_2 concentrations are likely to be well within the prescribed limit for industrial, residential and rural zone even after proposed machineries comes into operation.

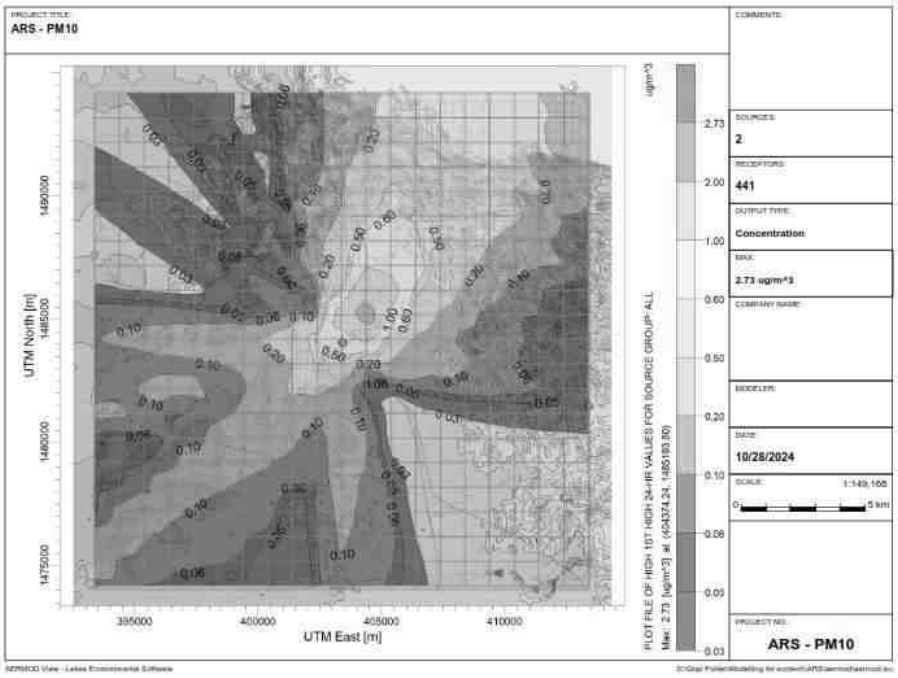


FIGURE 4-1 SHORT TERM 24 HOURLY INCREMENTAL GLCs – PM10

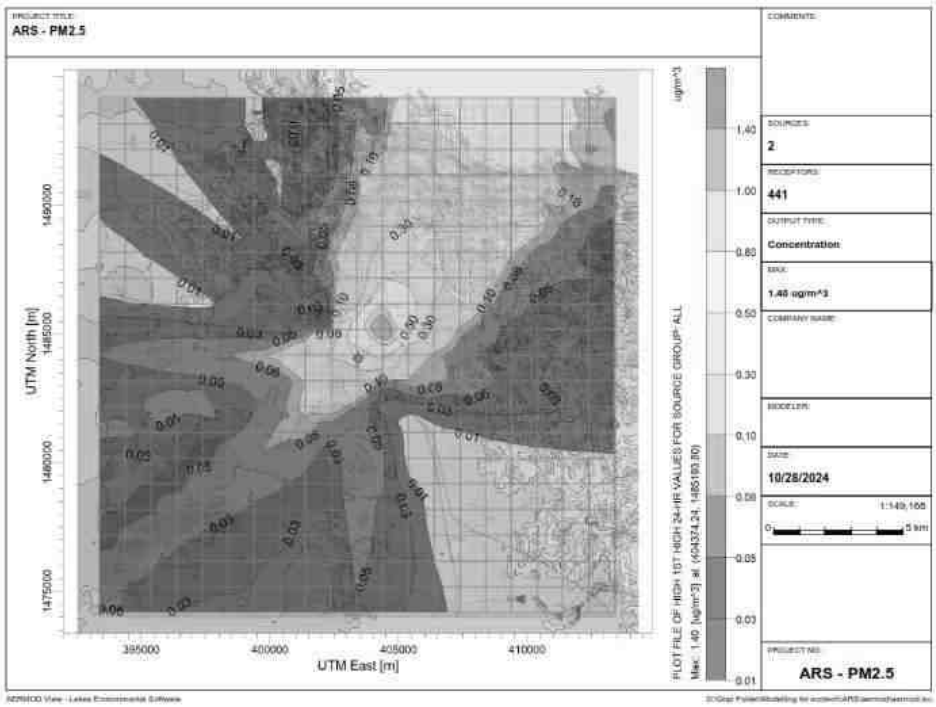


FIGURE 4-2 SHORT TERM 24 HOURLY INCREMENTAL GLCs – PM2.5

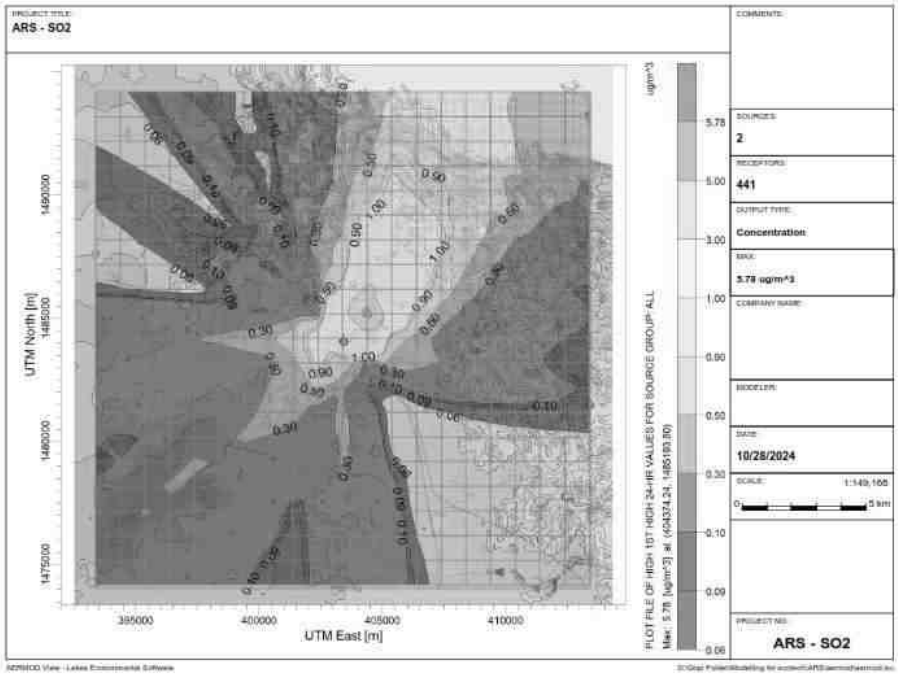


FIGURE 4-3 SHORT TERM 24 HOURLY INCREMENTAL GLCs - SO2

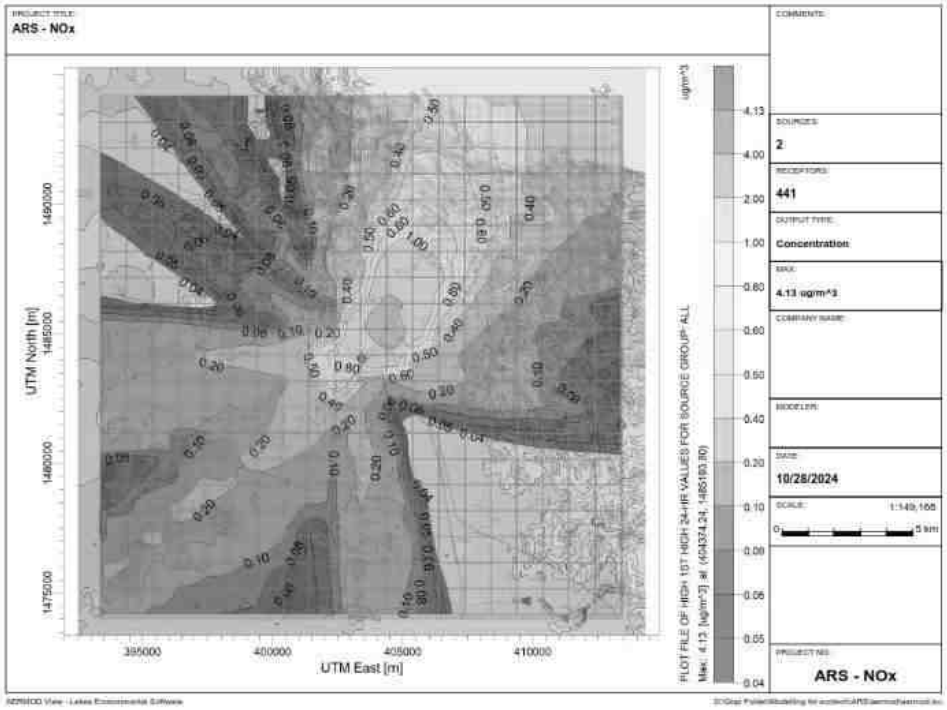


FIGURE 4-4 SHORT TERM 24 HOURLY INCREMENTAL GLCs – NO2

b. <u>Mitigation Measures</u>

Adequate and efficient Air Pollution Control (APC) measures will be installed for the proposed induction furnaces, and DG generator to keep the emissions below the standards prescribed by TNPCB and ambient air quality levels in the surroundings are meeting the prescribed standards.

Major pollutants envisaged from the proposed expansion are Particulate Matter. Minor quantity of gaseous pollutants like Sulphur Dioxide and Nitrogen Dioxide are also envisaged from the induction furnace. It is proposed to provide APC measures as already detailed in Table – 2.7 of Chapter – 2.

4.4.2.4 Fugitive Emissions and Control Measures

Fugitive dust emissions from the proposed expansion project would be significant as there will be air pollution due to activities like transport of raw materials, products, solid waste, unloading of scrap & boring, etc. The impact due to fugitive emissions would be significant.

All the internal roads within the project area will be black topped. Hence, dust arising from the internal roads will be reduced. The proposed greenbelt and regular water sprinkling will help reduction in fugitive emissions.

4.4.3 Noise Quality

a. Impact

Any industry in general consists of several sources of noise in clusters or single. These clusters / single source may be housed in buildings of different dimensions made of different materials or installed in open or under sheds. The noise levels at the source will be in the range of 70 - 90 dB(A). For computing the noise levels at various distances with respect to the plant site, noise levels are predicted using a user-friendly model, Sound Plan.

4.4.3.1 Input for the Model

The prediction of incremental noise levels due to the operation phase of the expansion has been carried out using a mathematical model. Noise levels are mainly generated from

Induction Furnaces, unloading of scraps, CCM, Rolling Mill, standby DG sets. The noise sources have been defined with respect to plant and given in Table-2.9 of Chapter-2.

4.4.3.2 Presentation of Results

The model results are discussed below and the predicted model results at plant boundary are tabulated in **Table - 4.5.**

TABLE 4.5 PREDICTED NOISE LEVELS AT PLANT BOUNDARY

S. No.	Plant Boundary	Noise Level, dB(A)
1	North	53
2	South	50
3	East	53
4	West	61

The damage risk criteria as enforced by OSHA (Occupational Safety and Health Administration) to reduce hearing loss, stipulates that noise level upto 90 dB(A) are acceptable for 8 hour working shift per day. It was observed from the modeling results that high noise levels ranging between 70 – 88 dB(A) are limited to work zone only. At the corners of the plant boundary, noise levels will be varying between 40 dB(A) to 61 dB(A).
Day and night sound pressure levels L_{dn} is often used to describe the community noise exposure, which includes 10 dB(A) night time penalty. The predicted noise levels at a distance of 0.5 km and above from the plant boundary would be less than <50.0 dB(A). Most of the human settlements are at a distance greater than 0.5 km from the plant site. Hence, impact on general population would be insignificant.

b. Mitigation Measures

To minimize the impact of noise from the industrial operation within the unit as well as noise impact on the nearby areas from road traffic, following measures would be adopted.

- The specifications for procuring major noise generating machines / equipment such as Exhaust fans, Compressors would include built in design requirements to have minimum noise levels meeting OSHA requirement;

- The impact of noise emission from Generators will be minimized by acoustic enclosures and the noise levels will be limited to 75 dB(A);
- Appropriate noise barriers/shields would be provided on the equipment like motors, compressors etc.;
- Wherever no control equipments are possible, increase the distance between source and receiver and by altering the relative orientation of the source and receiver;
- Noise level at the receiver end reduces in inverse proportion to the square of the distance between the receiver and the source;
- Also, the workers/ operators working near to high noise generating machinery to be provided with ear mufflers/ ear plugs; and
- Provision of thick greenbelt to attenuate the noise levels;

4.4.4 Impact on Water Resources and Water Quality

a. Impact

As the project is operated on the dry process, water is not required in manufacturing process. Water is mainly used only in a stage in the processes like cooling of Induction furnace, Concast and TMT bar process. Nevertheless, wastewater is generated from the cooling process and recycled to cooling process and there is no cooling blow down too as the entire quantity of the make-up water lost into the atmosphere is due to evaporation and wind.

The estimated water requirement for the proposed project is about 53.0 KLD. The water is being sourced from SIPCOT. It is proposed to develop rainwater harvesting structures to recharge ground water in the project site area to enhance the ground recharge potential in the region.

About 14.4 KLD of sewage will also be generated from the domestic uses (drinking and sanitation) in the proposed expansion project, it will be treated in STP of 30 KLD. The water balance diagram is already provided in Figure – 2.5 of Chapter – 2.

b. Mitigation Measures

- The entire quantity of the sewage will be treated in the STP and the treated sewage will be reused for greenbelt development.

- The storm water in the project area will be collected through storm water drains to ensure that this is totally separated from process effluent.
- Rainwater harvesting system is also provided to recharge the ground water by means of percolation pits.

4.4.5 Soil Quality

a. Impact

The impact on soil could be due to the potential contamination of soil, which may happen due to improper handling and storage of solid wastes and hazardous chemicals. No hazardous chemicals will be stored in the Project area. The solid wastes generated from the plant are furnace slag, steel scraps, mill scale, fly ash and dust from bag filter. There will be minimum impact on the soil due to the proposed expansion.

b. Mitigation Measures

The furnace slag from the furnaces does not contains any hazardous / heavy metals. Since these wastes are inert, inorganic and non-hazardous, these wastes have no useful application in the plant. These wastes will be disposed to cement plant as alternate raw material or the contractors to reuse it as filing material in road laying along with dust from bag filter.

Steel scrap and mill scale will be recycled in the melting process.

4.4.6 Traffic

With the proposed expansion, the transportation is expected to increase on the existing road network during the operational phase on the nearest road. The impact of the traffic is assessed on the basis of adequacy of the existing road network.

4.4.6.1 Traffic due to proposed Project

It has been considered that the peak daily vehicle traffic due to proposed project would be about 150 Two Wheelers, 6 Cars and 97 Trucks i.e. 300 PCU (Passenger Car Unit) during functional phase per day.

4.4.6.2 Adequacy of the Existing Road network

The traffic counts were conducted at SIPCOT Entrance and SIPCOT Internal Road near project site to assess the existing traffic details. The present level of traffic has been converted to Passenger Car Units (PCU). The PCU Factors are considered as 0.5 for 2 wheelers, 1.0 for 3 wheelers / Light Duty Vehicles, 2.2 for trucks/buses/tractors and 3.0 for Multi Axle vehicles like containers as per the conversion factors stipulated by Indian Road Congress (IRC). The proposed estimated traffic is super imposed on the existing traffic to assess the adequacy of the road.

From the traffic count studies, the present traffic level is found to be on SIPCOT Entrance as 3525 PCUs. Further, it is expected that the additional peak daily vehicle traffic due to proposed activities would be about 300 PCU (Passenger Car Unit) during functional phase per day. Thus, the cumulative traffic load during the operational phase would be 3525 + 300 = 3825 PCUs in SIPCOT Entrance.

With present level of traffic and the increase in traffic due to the proposed expansion, adequacy of road / highway during operational phase has been estimated by comparison with the recommendations stipulated by Indian Road Congress (IRC). The IRC recommendations on traffic capacity are presented below in **Table - 4.6.**

TABLE 4.6 RECOMMENDATIONS ON TRAFFIC CAPACITY – IRC

S. No.	Category of Road	PCU As per IRC 106-1990
1	Six Lane Road	5400 PCU

As per the above standards, SIPCOT Entrance Road are having maximum capacity of 5400 PCU. The estimated peak traffic in terms of PCUs is compared with the stipulated standards by IRC for traffic capacity of the existing road network and it can be observed that the existing road will be adequate for the increased traffic also.

4.4.7 Ecology

a. Impacts

The baseline flora and fauna has been depicted in Chapter-3. There are no National Parks present within 10 km radius of the project site. Pulicat Bird Sanctuary is located at a distance of 6.48 km in north direction from the plant site. No migration route to avi-fauna is observed or recorded in study area. Similarly, as per the forest department records, no endangered or rare species of flora and fauna are reported or observed in the study area. The impact on terrestrial ecology will be due to emission of pollutants like PM, NO_2 and SO_2. However, the incremental concentrations of these pollutants are very less and the impacts on the terrestrial ecology will be insignificant.

Thamarai Eri is flowing in a distance of about 1.7 km from the project site. No treated effluent / sewage will be discharged into any surface water streams. Hence, no impact is envisaged from the proposed expansion on aquatic bodies.

b. Mitigation Measures

- The fugitive emissions from different sources will be suppressed by spraying water.
- Emissions from the proposed induction furnaces, and D.G sets will be maintained well within the standards prescribed by regulatory authorities.
- Adequate heights of stacks are proposed to provide for the Induction furnace to disperse the SO_2 emission.
- Vehicles emissions will also be minimized by proper maintenance and by avoiding use of adulterant fuels and will be maintained below the standard limits prescribed by competent authority.
- Development of a thick green belt will reduce the pollution loads in the surroundings areas and contain the negative impact on forests and terrestrial ecology.

4.4.8 Socio-Economics

It is obvious to assume that the activities of the proposed expansion will produce some improvements in the socio-economic levels in the study area. The anticipated impact of this project on various aspects is described below.

- The proposed expansion will be carried out within the land area owned by the proponents. Hence no impact due to land acquisition is envisaged.

- This project will not have any major impact on the population growth, as the proposed increase in manpower for the proposed expansion is not major.
- 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 proposed expansion project capacity.
- The positive impacts of plant activities on the civic amenities are substantial. With improved transportation facilities, there is always a scope for development.

The impact of industrialization on the economic aspects can be clearly observed. The proposed expansion activities will provide employment to persons of different skills and trades. The local population is the largest beneficiary among the employees. The employment will ameliorate 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.

4.4.9 Human Health

The impact from the air emissions is not expected to be significant since the stack design and the atmospheric conditions are such that the ambient air quality at present as well as in future after the implementation of the expansion will be well within the prescribed ambient air quality limits set forth by CPCB. The proponents of this facility will adopt effective control systems at all the identified sources of dust generation.

4.5 Impact during Temperature rise and climate change

1. Steel plants release waste heat into the atmosphere, which can contribute to localized temperature increases, especially in the immediate vicinity of the plant.

2. Large industrial complexes, including steel plants, can contribute to the urban heat island effect, where urban areas experience higher temperatures than surrounding rural areas due to human activities and built infrastructure.

Climate Change Impacts:

1. Steel production processes, particularly blast furnaces and coke ovens, release significant amounts of greenhouse gases (GHGs) such as carbon dioxide (CO2). These emissions contribute to global warming and climate change.

2. High energy consumption in steel production, especially from fossil fuels, contributes to increased carbon emissions and exacerbates climate change.

Control Measures:

1. **Energy Efficiency Improvements:**

- Will adopt energy-efficient technologies to reduce overall energy consumption and associated emissions.
- Waste heat recovery systems will be implemented to capture and reuse heat generated during the steelmaking process.

2. **Renewable Energy Integration:**

- Transition to renewable energy sources, such as solar or wind power, to reduce reliance on fossil fuels and lower emissions.

3. **Carbon Capture and Storage (CCS):**

- CCS technology will be implemented to capture and store CO2 emissions, preventing their release into the atmosphere.

4. **Process Optimization:**

- Optimize production processes to minimize waste and improve overall efficiency, leading to reduced energy consumption and emissions.

5. **Emission Reduction Technologies:**

- New technologies that reduce emissions during steelmaking, such as improving furnace efficiency and adopting cleaner smelting techniques.

6. **Afforestation and Greenery:**

- Green spaces will be created around the steel plant to mitigate the urban heat island effect and contribute to local cooling.

7. **Community Engagement:**

- Involvement with local communities and stakeholders in discussions about environmental impacts and potential mitigation strategies.

8. **Environmental Monitoring:**

- Comprehensive monitoring systems will be implemented to measure air quality, temperature changes, and other environmental factors. Use this data to assess the effectiveness of control measures.

9. **Carbon Offsetting:**

- Will Support carbon offset projects to counterbalance emissions from steel production by investing in initiatives that absorb or reduce CO2 elsewhere.

10. **Circular Economy Practices:**

- Recycling and reuse strategies will be implemented for materials to reduce the need for virgin resource extraction and minimize associated emissions.

5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITES)

5.1 General

Analysis of alternatives for project site as well as process technology and their assessment for selection of the most suitable location and technology as well in terms of environment affability, energy efficient and optimized land utilizing with maximum productivity is a good practice in EIA as a project of any nature comprising of activities involving large number of human-resource, material as well as financial investment.

5.2 Alternatives in Technology

The proposed induction furnaces represent the most contemporary technology with static power supply, proven low loss melting furnaces. The installation will comprise of one number of Induction Furnaces consisting of two numbers of crucibles to function standby mode. Operator's Control Desk shall be provided to facilitate start-up, shutdown, power control, metering and annunciations. Lever operated switches shall be provided with Furnace Crucible for quick selection and changeover. Hence no alternate technology is considered for the proposed expansion.

Similarly, Continuous casting is the process where the molten steel will be solidified into a "Semi finished" billets, bloom or slab for subsequent rolling in the finishing mills. Continuous casting has opted to achieve improved yield, quality and cost efficiency.

5.3 Alternatives in site

The proposed expansion of steel plant will be carried out within the existing plant. The project involves installation of components like induction furnaces and concast machine to convert the scrap into MS Billets. Hence naturally no alternative sites are considered. The site has the following additional advantages:

- The necessary infrastructure in terms of land, power, water and personnel are readily available

- There will be no significant or adverse impact on the Environment due to the project.
- There is no adverse factor such as reclassification of land use and pattern, displacement etc.

6 ENVIRONMENT MONITORING PROGRAM

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

6.1 Environment Monitoring

An Environment Monitoring Program provides feedback about the difference between actual environment scenario and the impacts of the project on the environment and helps to judge the adequacy of the mitigation measures in protecting the environment. The purpose of environment monitoring is to evaluate the effectiveness of implementation of Environment Management Plan (EMP) by periodically monitoring the important environment parameters within the impact area, so that any adverse effects are detected and timely action can be taken.

The sampling and analysis of the environment attributes will be as per the guidelines of Central Pollution Control Board/ Tamil Nadu State Pollution Control Board (TNPCB). The frequency of sampling and location of sampling will be as per the directives of CPCB/TNPCB

Environment monitoring will be conducted on regular basis by the Ecotech Private Limited to assess the pollution level in the area. Usually, as in the case of the study, an impact assessment study will be carried over a short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring program of the environment parameters will be essential to take into account the changes in the environment.

6.2 Objectives of Environment Monitoring

The basic objective of the environment monitoring program is as follows.

- To ensure implementation of mitigation measures during project implementation;

- To provide feedback to the decision makers about the effectiveness of their actions;
- To determine the project's actual environment impacts so that modifications can be made to mitigate the impacts;
- To identify the need for enforcement action before irreversible environment damage occurs;
- To provide scientific information about the response of an ecosystem to a given set of human activities and mitigation measures;
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new installations or through the modification in the operation of existing facilities;
- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures;
- To establish a database for future Impact Assessment Studies for Proposed projects.

6.3 Types of Environment Monitoring

The key issues associated with the life cycle of a project are the monitoring of environment parameters. Three types of environment monitoring are associated with the project, which includes.

a) Baseline monitoring
b) Effects/ Impacts monitoring and
c) Compliance monitoring.

a) <u>Baseline monitoring</u> - Baseline monitoring deals with the measurement of environment variables during a pre-project period to determine existing conditions, ranges of variation and process of change;

b) <u>Effects/impacts monitoring</u> – It involves measurements of environment variable during construction and operation phase of the project to assess the impact that may have been caused by the project.

c) <u>Compliance Monitoring</u> - It takes the form of periodic sampling and continuous measurements of level of pollutant emissions in the air, waste discharge on land or water, level of noise to ensure that standards are met.

6.4 Environment Monitoring Plan

The environment monitoring plan for the proposed expansion project has been developed in view of the institutional, scientific and fiscal issues pertaining to the project. For developing the monitoring plan, appropriate Value Ecosystem Components (VEC's) which are likely to be affected have been identified. For each component, suitable measurable environment indicators which are appropriate to the impact mechanism and scale of disturbance and have a low natural variability, broad applicability and an existing data series have been defined.

As per the guidelines of MoEF & CC, environment monitoring shall be required during construction and operational phases. The schedule for monitoring ambient air quality, ambient noise quality, source emission monitoring, ground water quality and waste water quality both during the construction and operation phases of the project is given in **Table 6.1.**

TABLE 6.1 ENVIRONMENT MONITORING PLAN

S. No.	Component	Parameter	No of Locations	Frequency/ Duration
1	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, Pb, As, Ni, NH3, O_3, C_2H_6 & BAP.	4	Once in a month
2	Fugitive Emission	PM_{10}, $PM_{2.5}$, SO_2, NO_2 & CO	4	Once in a month
3	Stack Emission Monitoring	PM, SO_2, NO_2, CO & HC	4	Once in a month
4	Source Noise	Instantaneous Noise level in dB(A)	6	Once in a month
5	Ambient Noise Quality	Ambient noise level (L_{eq}, L_{Day} & L_{Night})	4	Once in a month
6	Ground water Quality	Parameters specified under IS:10500, 1991	2	Once in 3 months
7	Soil Quality	Parameter for soil quality: pH, texture, EC, Organic Matter, N, P, K, Na, Ca & Mg	2	Once in 6 months

As per the guidelines of CPCB / TNPCB, online monitors will also be installed in the stack

attached to Induction Furnace for Particulate Matter which will be connected to the Care Air Centre of TNPCB.

6.5 Data Analysis

The monitored data will be analyzed and compared with the baseline levels as established in the EIA study and the regulatory standards specified by different government agencies. The standards against which the different environment components will be compared are as per **Table 6-2.**

TABLE 6.2 APPLICABLE ENVIRONMENT STANDARDS

S. No.	Component	Applicable Standards
1	Ambient Air Quality	National Ambient Air Quality Standards, CPCB
2	Fugitive Emission	Fugitive emission standards for Steel plant, CPCB
3	Source Emission	Industrial specific standards for Induction furnace, Electrical Arc Furnace & DG sets
4	Source Noise Quality	Standards for workers, Insp. of Factories / OSHA
5	Ambient Noise Quality	Ambient Noise Standards, CPCB
6	Ground water quality	IS: 10500 Standards, BIS
7	Soil quality	Standard Soil Classification, ICAR

6.6 Reporting Schedule

The monitoring results of the different environment components will be compiled every six months during the construction as well as operation phase while submitting the six-monthly compliance reports to Regional Office of MoEF & CC, SEIAA, CPCB & TNPCB. The report will also list the project activities along with the environment mitigation measures and will evaluate the efficacy of the Environment Management Plan.

6.7 Budget provision

The environment monitoring will be done through NABL accredited / MoEF&CC recognized laboratories located in Chennai region. So, no capital cost may be required for the

environment monitoring work. The annual recurring cost is required for environment monitoring which will be about Rs. 3 lakhs per annum.

7 ADDITIONAL STUDIES

This chapter describes the additional studies like Risk Assessment, Disaster Management Plan, Social Impact Assessment and Public Hearing.

7.1 Risk Assessment

Risk is defined as the unwanted consequences of a particular activity. The magnitude of risk varies with the total impact area for different scenarios. The risk assessment will be done for all the hazardous storages that are proposed in the project. The larger the storage, greater is the risk posed by the storage. The impact area increases proportionately with storage.

Risk assessment is a tool that is used to analyze the risk posed by different project activities vis-à-vis the area. The consequence analysis forms part of this assessment and helps in evaluation of different hazards that are to be considered for conducting consequence analysis. The risk assessment basically involves the prediction of the consequence in case there is a fire, explosion or toxic gas release that might occur due to handling, storage or processing of any of the hazardous materials by the industry. The findings of risk assessment are dovetailed into On-site emergency plan also known as Disaster Management Plan.

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;
- Assess the overall damage potential of the identified hazardous events and the impact zones from the accidental scenarios;
- Assess the overall suitability of the site from hazard minimization and disaster mitigation point of view;

- Preparation of broad DMP covering On-site and Off-site Emergency Plan.

7.1.2 Hazard Identification

Hazard Identification is a tool that is very useful for conducting a risk assessment as it helps in identification and detailing of hazards that exist in a given proposed expansion plant. The hazard identification will be done prior to the consequence analysis in a proposed plant and serves as the core base of information on which whole risk assessment is based. The basic principle of risk analysis lies in the answer to the questions about risk such as type, causes, consequences and frequency.

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

7.1.3 Classification of Major Hazardous Units

Hazardous substances may be classified into three main classes namely flammable substances and toxic substances. The ratings for a large number of chemicals based on flammability, reactivity and toxicity have been given in NFPA Codes 49 and 345 M. The major hazardous materials to be stored, transported, handled and utilized within the facility have been summarized below. The fuel storage details and properties are given in **Table-7.1** and **Table-7.2** respectively.

Materials Stored, Transported & Handled

High Speed Diesel (HSD

TABLE 7.1 DETAILS OF STORAGE

S. No.	Material	Listed in Schedule	Storage	Threshold Quantity (T) for Application of

				Rules	
				5,7-9,13-15	**10-12**
1	HSD	3 (1)	240 Lit & 160 Lit – Inbuilt storage within DG set (750 KVA & 500KVA)	25 MT	200 MT

TABLE 7.2 PROPERTIES OF FUELS USED IN THE PLANT

Chemical/ Fuel	Codes/Label	TLV	FBP	MP	FP	UEL	LEL
			°C			%	
HSD	Flammable	5 mg/m³	369	338	32.9	7.5	0.6

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

7.1.4 Identification of Major Hazard Installations Based on GOI Rules, 1989

Following accidents in the chemical industry in India over a few decades, a specific legislation covering major hazard activities has been enforced by Govt. of India in 1989 in conjunction with Environment Protection Act, 1986. This is referred here as GOI Rules 1989. For the purpose of identifying major hazard installations the rules employ certain criteria based on toxic, flammable and explosive properties of chemicals.

A systematic analysis of the fuels/chemicals and their quantities of storage has been carried out, to determine threshold quantities as notified by GOI Rules, 1989 and the applicable rules are identified.

7.1.5 Hazard Assessment and Evaluation

An assessment of the conceptual design is conducted for the purpose of identifying and examining hazards related to feed stock materials, major process components, utility and support systems, environment factors, proposed operations, facilities, and safeguards.

❖ ***Preliminary Hazard Analysis (PHA)***

A Preliminary Hazard Analysis will be carried out initially to identify the major hazards associated with storages and the processes of the proposed expansion. This is followed by consequence analysis to quantify these hazards. Finally, the vulnerable zones are plotted for which risk reducing measures are deduced and implemented. Preliminary hazard analysis for fuel storage area and whole plant is given in **Table-7.3** and **Table-7.4.**

TABLE 7.3 PRELIMINARY HAZARD ANALYSIS FOR STORAGE AREAS

PHA Category	Description of Plausible Hazard	Recommendation	Provision
Environ-mental 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.

TABLE 7.4 PRELIMINARY HAZARD ANALYSIS FOR THE WHOLE PLANT IN GENERAL

PHA Category	Description of Plausible Hazard	Recommendation	Provision
Environment factors- Fuel storage	• If there is any leakage and eventuality of source of ignition.	--	• All electrical fittings and cables are provided as per the specified standards. All motor starters are flame proof.
	• Highly inflammable nature of the chemicals may cause fire hazard in the storage facility.	• A well-designed fire protection including dry powder and CO2 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.
Work Areas and Passageway	• Absence of safety signage • Obstruction in the passage ways • Inadequate environment	• Appropriate safety signage indicating the passageways and emergency exit are available	• Good Housekeeping of the area • Assessment of environment conditions and provision of adequate

PHA Category	Description of Plausible Hazard	Recommendation	Provision
	conditions • Insufficient protection from physiochemical factor		protection
Loading and Unloading	• Overhead loads • Falling of loads • Dusty environment • Use of lifting equipment		• Use of authorized personnel • Provision of appropriate maintenance of the lifting equipment • Use of load limiting devices • Routine cleaning of the area

7.1.6 Fire Explosion and Toxicity Index (FE&TI) Approach

Fire, Explosion and Toxicity Indexing (FE & TI) is a rapid ranking method for identifying the degree of hazard. The application of FE & TI would help to make a quick assessment of the nature and quantification of the hazard in these areas. However, this does not provide precise information. The degree of hazard potential is identified based on the numerical value of F&EI as per the criteria given below:

F & EI Range	Degree of Hazard
0-60	Light
61-96	Moderate
97-127	Intermediate
128-158	Heavy
159-up	Severe

By comparing the indices F&EI and TI, the unit in question is classified into one of the following three categories established for the purpose **(Table-7.5).**

TABLE 7.5 FIRE EXPLOSION AND TOXICITY INDEX

Category	Fire and Explosion Index (F&EI)	Toxicity Index (TI)
I	F&EI < 65	TI < 6

II	65 < or = F&EI < 95	6 < or = TI < 10
III	F&EI > or = 95	TI > or = 10

Certain basic minimum preventive and protective measures are recommended for the three hazard categories.

❖ ***Results of FE and TI for Storage/Process Units***

Based on the GOI Rules 1989, the hazardous fuels and chemicals used by the proposed project were identified. Fire and Explosion are the likely hazards, which may occur due to the fuel and chemical storage. Hence, Fire and Explosion index has been calculated for in plant storage. Detailed estimates of FE&TI are given in **Table-7.6.**

TABLE 7.6 FIRE EXPLOSION AND TOXICITY INDEX FOR STORAGE FACILITIES

S. No.	Chemical/ Fuel	Total Capacity (KL)	F&EI	Category	TI	Category
1	HSD	4 x 6	39.9	Light	Nil	-

❖ ***Conclusion***

Results of FE & TI analysis show that the storage of HSD falls into ***Light*** category of fire and explosion index with a ***Nil*** toxicity index.

7.1.7 Maximum Credible Accident (MCA) Analysis

Maximum Credible Accident and Consequence Analysis (MCACA) is one of the methodologies evolved to quantify releases of hazardous chemicals. A Maximum Credible Accident can be described as the worst "credible" accident or as an accident with a maximum damage distance, which is still believed to be probable. The selection of
Maximum Credible Accidents is somewhat arbitrary. In practice the selection of accident scenarios are done on the basis of engineering judgment and expertise in the field of risk analysis especially in accident analysis.

The MCACA aims at identifying undesirable and hazardous events causing the maximum damage to human beings and environment in and around the industries under consideration.

This exercise is not only important to reduce the risks of existing units in industrial area, but also to provide valuable information for the location of future units for which there is little or only limited operating experience available.

The following steps are followed in the MCACA.

i. Preparation of an inventory of major chemical storages and rank them on the basis of their hazardous properties and storage quantities.
ii. Identification of potentially hazardous areas and representative failure cases from the vessels and pipes.
iii. Visualization of the chemical release scenarios.
iv. Short-listing of maximum credible accident scenarios.
v. Effect and damage calculations from the release cases through mathematical modelling.

Note: Since, there will not be bulk storages of flammable, Toxic, corrosive and reactive material in the facility, there will not be the possibilities of occurrences of catastrophic failures such as fire, toxic dispersion etc.

❖ ***Risk Assessment Summary***

- There will be no significant community impacts or environment damage consequences; 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 Disaster Management Plan

A comprehensive DMP is suggested herewith, which is required to be implemented for the proposed industry.

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 should be widely circulated and personnel training through rehearsals/drills.

To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a Disaster Management Plan has to be formulated and this planned emergency document is called "Disaster Management Plan".

The objective of the Industrial 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;
- 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, rehabilitate and render medical help and to restore normalcy.

7.2.1 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.

7.2.2 Emergency Organization

It is recommended to set up an Emergency Organization. A senior executive who has control over the affairs of the proposed plant would be heading the Emergency Organization. He would be designated as Site Controller. Production 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 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.

7.2.3 Emergency Communication

Whoever notices an emergency situation such as fire, escalation of fire, leakage etc would inform his immediate superior and Emergency Control Center. A place nearer to the security office / Admin Block 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.

7.2.4 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 are 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 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, inform the District Emergency Authority, Police, Hospital and seeks their intervention and help;
- Inform the Inspector of Factories, Deputy Chief Inspector of Factories, TNPCB and other statutory authorities;
- Give a public statement if necessary;
- Keep record of chronological events and prepares an investigation report and preserve evidence;

- 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 cause 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 advise them regarding the method of control to be used;
- 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;
- Ensure fire pumps in operating conditions and instructs pump house operator to ready for any emergency with standby arrangement;
- Guides the fire fighting crew i.e. firemen, trained plant personnel and security staff;
- Organizes shifting 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;
- Maintains law and order in the area, and if necessary seeks the help of police.

❖ ***Emergency Coordinator - Medical, Mutual Aid, Rehabilitation, Transport & 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;
- Ensure availability of canteen facilities and maintenance of rehabilitation centre;
- He will be in liaison with Site Controller/Incident Controller;
- Ensure transportation facility;
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure;
- Controls rehabilitation of affected areas on discontinuation of emergency;
- Makes available 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;
- 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.

7.2.5 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 e-mail 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 & 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 & 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, outside experts, chemical fact sheets population details around the factory

❖ ***Assembly Point***

Number of assembly 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***

Fire fighting equipment suitable for emergency should be maintained in each section in the plant. This would be as per statutory requirements. 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 production block 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 emergency control room. Medical superintendent of the plant will be the head of the casualty services ward. Private medical practitioners help would also be 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 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 nearby industrial management in this regard would be taken on mutual support basis.

7.2.6 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 bypass arrangements.

Methods of removing additional heat include removal through the normal cooling arrangements or use of an emergency cooling system. Cooling facilities, which use vapouring 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 will be provided adequate number of exits, 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, Fire Service personnel regarding help required or development of the situation into an Off-Site Emergency.

❖ ***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 offsite 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 extreme emergency local authorities help should be sought.

In the event of an emergency developing into an offsite 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 important on that of planning in 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.

❖ ***Important Information***

Important information such 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.

7.2.7 Off-Site Emergency Preparedness Plan

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 are likely to need evacuation, 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 downwind 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 can 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 300m 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.

7.2.7.1 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 centres. 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, 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 risk associated with them.

- **Meteorological information**

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

- **Humanitarian arrangements**

  Transport, evacuation centres, 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.

7.2.7.2 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. 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.

7.2.7.3 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 up to date.

It will be the responsibility of the EPO to ensure that all those organizations, which will be involved off site in handling the emergency, 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.

7.2.7.4 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.

7.2.7.5 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 apprised 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.

7.2.7.6 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.

7.2.7.7 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.

7.3 Occupational Health and Safety

A few major anticipated occupational health and safety hazards are enlisted below;

- Fire and electrical hazards
- Increased risk of communicable diseases due to water contamination
- Injuries associated with construction activities
    - Dust generation points/places
    - Working in heights
    - Over exertion
    - Moving machinery
    - Smoke by objects

7.3.1 Occupational Health

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

- **Construction Phase**

The occupational health problems envisaged at this stage can mainly be due to constructional accident and noise. Safety provisions will be made to conform to health/safety requirements by the contractor. Provisions like preventive protection equipments will be provided to workers for their protection and safety.

- **Operation phase**

The problem of occupational health, in the operation phase is due to disorders due to emission, noise and industrial accidents. Suitable personnel protective equipment should be given to the required employees. The working personnel should be given the following appropriate personnel protective equipment.

- Industrial Safety Helmet
- Face shield with replacement acrylic vision
- Zero power plain goggles
- Zero power goggles with blue colour glasses
- Welders equipment for eye and face protection
- Cylindrical type earplug
- Canister Gas mask
- Self contained breathing apparatus
- Leather apron
- Aluminized fiber glass fix proximity suit with hood and gloves
- Safety belt/line man's safety belt
- Leather hand gloves
- Asbestos hand gloves
- Canvas cum leather hand gloves with leather palm
- Electrically tested electrical resistance hand gloves
- Industrial safety shoes with steel toe
- Electrical safety shoes without steel toe and gum boots

A full fledge health centre facilities will be established to attend round the clock for emergency arising out of accidents, if any. All working personnel will be medically examined during employment and at least once in every year and the records will be maintained. The above examination covers Blood Test, Urine Test, Spirometry, Vision Testing, Chest X-ray, Audiometry, Vision Testing (Far & Near vision, colour vision and any other ocular defect) and ECG and opinion by practising Doctor.

7.3.2 Safety

Safety of both men and materials during the construction and operation phase of the industry is of concern. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan.

❖ **Safety Plan**

The disaster in plant is possible due to spillage of liquid metal, collapse of induction furnace, collapse of structures, fire/explosion, etc. The details of the fire fighting equipment to be installed are given below:

- Fire Extinguisher - Dry Chemical Powder (DCP) Type
- Fire Extinguisher - CO_2 Type
- Fire Extinguisher - Foam Type
- Fire Extinguisher - Soda Acid Type
- Fire buckets

The fire extinguishers will be located all over the building for immediate use. Fire extinguishers will be provided in DG room, MCC room, Furnace platform, Laboratory, Process area and Storage room. The type of hand appliances provided is such that the fire extinguishers can be directly taken and used for firefighting purpose at any location inside the building.

Keeping in view the safety requirement during construction, operation and maintenance phases at the plant should formulated safety policy with the following regulations:

- 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 materials, 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 experience and upto date knowledge.
- To provide appropriate facilities for first aid and prompt treatment of injuries and illness 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.
- To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees.
- To publish/notify regulations, instructions and notices in the common language of employees.
- To prepare separate safety rules for each type of occupation/processes involved in the project.
- To ensure regular safety inspection by a competent person at suitable intervals of all buildings, equipment, work places and operations.

❖ **Safety Organization**

During the construction and operation of proposed project the posting of safety officer should be in accordance with the requirement of Factories Act and their duties and responsibilities should be as defined thereof.

❖ **Safety Circle**

In order to 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 work. The circle would consist of 5-6 employees from that area. The circle normally should meet for about an hour every week.

❖ **Safety Training**

A full-fledged training centre should be set up at the plant. Safety training should be provided by the Safety Officer with the assistance of faculty members called from Professional Safety Institutions and Universities. In addition to regular employees, limited contractor labours should also be provided safety training. To create safety awareness safety films should be shown to workers and leaflets etc. Some precautions and remedial measures proposed to be adopting to prevent fires are:

- Compartmentation of cable galleries, use of proper sealing techniques of cable passages and crevices in all directions would help in localizing and identifying the area of occurrence of fire as well as ensure effective automatic and manual fire fighting operations;
- 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 alarms are effective protection methods for conveyor galleries.
- Housekeeping of high standard helps in eliminating the causes of fire and regular fire watching system strengthens fire prevention and fire fighting; and
- Proper fire watching by all concerned would be ensured.

❖ **Health and Safety Monitoring Plan**

All the potential occupational hazardous work places such as induction furnaces, transformers, casting machine, fuel storage areas, etc. should be monitored regularly. The health of employees working in these areas should be monitored once in a year for early detection of any ailment due to exposure to hazardous chemicals.

7.4 Public Hearing

The public hearing for the proposed project of expansion of steel plant will be conducted as per Environment Impact Assessment Notification dated 14th September 2006 and its further amendments.

7.5 Detail about various measures could be adopted during finishing and tapping of a heat.

Steel Rolling Mill: Finishing Stage

1.Rolling Process Optimization:

- computerized models will be used to predict rolling forces, temperatures, and profiles, optimizing the rolling process for desired product properties.

- Automatic gauge control systems will be implemented to ensure consistent thickness across the rolled product.

2.Cooling Strategies:

- Controlled cooling techniques will be employed to achieve the desired microstructure and mechanical properties of the rolled steel.

- Water or air cooling systems is used to rapidly cool and harden the steel, depending on the required characteristics.

3.Quality Control:

- Integrate advanced online monitoring and inspection systems to detect defects and deviations in real-time.

- Automatic surface defect detection and classification systems will be implemented to ensure product quality.

4.Reducing Idle Time:

- Optimize changeover times between different product sizes or grades to minimize downtime.

- Quick-change setups used for rolls and guides to expedite product changes.

5.Energy Efficiency:

- Regenerative braking systems used to recover and reuse energy during the rolling process.

- Energy-efficient motors will be implemented and drives for better overall energy consumption.

Melting Unit: Tapping Stage

1.**Tapping Optimization:**

- Predictive models to determine the optimal tapping time for maximizing yield and minimizing metal loss.

- Sensors will be used and data analysis to monitor and control the chemical composition of the molten metal during tapping.

2.**Slag Management:**

- Optimize slag composition and properties to enhance the separation of impurities from the molten metal.
- Slag control techniques will be implemented to ensure efficient removal and minimal metal loss.

3.**Crucible Design and Maintenance:**

- High-quality refractory materials and proper crucible design to minimize erosion and extend the crucible's lifespan.
- Regularly inspection and maintain crucibles to prevent leaks and maintain operational efficiency.

4.**Safety Measures:**

- Safety protocols will be implemented and personal protective equipment for workers involved in tapping operations.
- Automated tapping systems to minimize human exposure to high-temperature and hazardous environments.

5.**Furnace Lining Inspection:**

- Regularly inspection and repair the furnace lining to prevent leaks and maintain proper heat containment.
- Predictive maintenance techniques will be implemented to schedule lining repairs before significant damage occurs.

6.**Automated Systems:**

- Automated tapping systems will be implemented that can precisely control the pouring process, reducing metal loss and ensuring consistent quality.

7.**Environmental Considerations:**

- Proper emissions control systems will be implemented to minimize the release of pollutants during the tapping process.
- Recycling and reusing by-products like slag for various applications to reduce waste.

7.6 Detail about operational control measures to Minimize and control the refractory wall wearing:

Steel Rolling Mill:

1.**Proper Material Selection:**

- Refractory materials that are suitable for the specific conditions and temperatures encountered in the rolling mill.
- Materials with good thermal shock resistance and high abrasion resistance.

2.**Lining Design and Installation:**

- The lining layout will be adopted to minimize stress concentrations and ensure uniform wear.
- Anchor the refractory linings to prevent shifting during operation.

3.**Regular Inspection:**

- Regular visual inspections of the refractory linings will be performed to detect signs of wear, cracks, or erosion.
- Thermographic imaging or other non-destructive testing methods to identify areas of concern.

4.**Temperature Monitoring:**

- Monitor and control the operating temperature to prevent excessive thermal stresses that can accelerate refractory wear.
- Cooling systems will be implemented to maintain temperature within acceptable limits.

5.**Surface Coatings:**

- Protective coatings will be applied to the refractory surfaces to reduce wear caused by abrasion and chemical reactions.
- Coatings can also improve resistance to slag and other corrosive substances.

6.**Maintenance Practices:**

- Regular maintenance will be scheduled and repairs to address refractory wear before it becomes severe.
- Skilled technicians will be used for repairs to ensure proper installation and extended lining life.

Melting Unit:

1.**Refractory Material Selection:**

- Refractory materials that are compatible with the type of metal being melted and the surrounding conditions.
- Materials with good resistance to thermal shock and corrosion.

2.**Slag Control:**

- Optimize slag composition to minimize its corrosive effects on refractory linings.
- Will maintain a consistent slag composition to reduce wear on the refractory walls.

3.**Lining Thickness:**

- Designing refractory linings with adequate thickness to withstand the mechanical and thermal stresses of the melting process.
- Insulating refractory layers will be used to minimize heat transfer to the lining.

4.**Vibration Control:**

- Measures to reduce mechanical vibrations will be implemented that can contribute to refractory wear.
- Properly balance rotating equipment and use vibration dampening systems.

5.**Lining Repair and Replacement:**

- Schedule timely repairs and replacements for worn refractory linings.
- Use refractory materials with quick curing times for rapid repairs.

6.**Pouring Techniques:**

- Optimize pouring techniques to minimize impacts on the refractory lining during metal transfer.
- Use automated pouring systems for precise and controlled metal delivery.

7.**Slag Removal Techniques:**

- Efficient slag removal techniques will be implemented to prevent excessive mechanical stress on the refractory lining.
- Avoid aggressive slag removal methods that can accelerate lining wear.

7.7 State-of-the-art technology.

1. **Production Process Optimization:**

- **Industry 4.0 Integration:** Smart manufacturing concepts using IoT (Internet of Things), AI (Artificial Intelligence), and data analytics will be implemented to monitor and control various stages of production.
- **Digital Twin:** Create a digital twin of the plant to simulate processes, predict performance, and

optimize operations in real time.

• **Predictive Maintenance:** Sensor data and predictive analytics to identify potential equipment failures and schedule maintenance before breakdowns occur.

2. **Energy Efficiency:**

• **Energy Management Systems:** Advanced energy management systems will be utilized to monitor and optimize energy consumption throughout the plant.

• **Waste Heat Recovery:** Waste heat recovery systems will be implemented to capture and reuse energy from various processes.

• **High-Efficiency Motors and Drives:** Replace older motors and drives with energy-efficient models to reduce power consumption.

3. **Quality Control:**

• **Real-time Inspection:** Integrate automated inspection technologies such as AI-powered vision systems to detect defects and ensure product quality.

• **Online Monitoring:** Continuously monitor critical process parameters to maintain product consistency and quality standards.

4. **Material Handling and Logistics:**

• **Automated Material Handling:** Automated guided vehicles (AGVs) or robotics will be implemented for material movement and storage, reducing human intervention and errors.

• **Supply Chain Integration:** Use advanced inventory management systems and real-time tracking for efficient material procurement and delivery.

5. **Environmental Sustainability:**

• **Emission Control:** Install advanced emission control systems to minimize air and water pollutants generated during the production process.

• **Recycling and Waste Management:** Implement efficient recycling systems to reduce waste and reuse by-products.

6. **Safety and Workforce Management:**

• **Remote Monitoring:** Use remote monitoring technologies to keep workers safe in hazardous areas.

• **Training Simulators:** Train employees using virtual reality (VR) or augmented reality (AR) simulators to enhance safety and skill development.

7. **Research and Development:**

• **Collaboration with Research Institutions:** Partner with research institutions to develop innovative technologies specific to TMT steel production.

8. **Smart Sensors and Instrumentation:**

• **Wireless Sensors:** Wireless sensors will be implemented for real-time data collection on temperature, pressure, and other critical parameters.

• **Remote Control:** Enable remote operation and control of equipment through smart devices.

9. **Efficient Water Management:**

• **Water Recycling and Treatment:** Water recycling systems will be implemented to minimize water consumption and treat effluents before discharge.

10. **Employee Training and Skill Development: - Advanced Training Tools:** e-learning platforms, virtual reality, and simulation-based training to enhance workforce skills.

7.8 Innovative good housekeeping practices.

- **Clear walkways**

Ensure walkways are clear and navigable, and mark them with signage. Install mirrors to eliminate blind spots.

- **Sustainable practices**

Use eco-friendly cleaning products and minimize waste.

- **Random quality control inspections**

Random inspections can help keep standards in check without taking a big hit on productivity.

- **Proper waste management**

Place waste in the right containers to reduce exposure to harmful substances.

- **Regular cleaning schedule**

Clean floors and surfaces regularly, and clean up spills immediately.

- **Housekeeping inspections**

Conduct monthly housekeeping inspections to ensure compliance with procedures.

- **Manage materials**

Ensure floors and walkways are free of hazards, and properly store tools and materials.

- **Mopping**

Use the correct mop types to clean, sanitize, and sterilize floors. Using the wrong mop can spread harmful bacteria and micro-organisms

8 PROJECT BENEFITS

8.1 Improvement in the Physical Infrastructure

The impacts of the proposed expansion of steel plant on the civic amenities are substantial. The basic requirement of the community needs will be strengthened by extending health care, educational facilities to the community, strengthening of existing roads in the area. ARS Steels & Alloy International Private 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 road facilities are already available in the plant site for the transportation facilities. With improved transportation facilities there is always a scope for development. Medical facilities will be augmented in dispensaries located near 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 proposed expansion project will result in improving the social infrastructure in following manner:

- Generation of employment and improved standard of living;
- Establishment of small-scale ancillary & supply industries;
- Increased revenue to the state by way of royalty, taxes and duties;
- Improved communication and transport facilities etc.

In addition to above, the local community will also get benefits through the following aspects.

- There shall be significant change in the socio-economic scenario of the area.
- The proposed expansion project shall enhance the prospects of direct and in direct employment during construction and in operation phase. Most of the unskilled and semiskilled workers for the proposed expansion are from the nearby villages.

- Overall, the proposed expansion will change the living standards of the people and improve the socio-economic conditions of the area.

8.3 Employment Potential

The impact of proposed expansion on the economic aspects can be clearly observed. The activities of project will provide employment to persons of different skills and trades. The local population is getting preference to get employment. The employment potential is ameliorating 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 proposed expansion shall upgrade the prosperity of the region. This will in turn improve the socio-economic conditions of the area. The total manpower required for the proposed expansion during the operation phase is about 750 persons which would be mainly sourced from local community in and around the industry and few technical persons will be employed from outside area. In addition to the above, direct employment shall be provided to the contractual labour and indirect employment opportunities shall arise after the project.

ENVIRONMENT COST BENEFIT ANALYSIS

The environment cost benefit analysis is not recommended during scoping stage. Hence the same was not carried out.

10 ENVIRONMENT MANAGEMENT PLAN

An Environment Management Plan (EMP) is a site-specific plan developed to ensure that the project is implemented in an environmentally sustainable manner where all contractors and subcontractors, including consultants understand the potential environment risks arising from the proposed expansion project and take appropriate actions to properly manage that risk. EMP also ensures that the project implementation is carried out in accordance with the design and the mitigation measures as recommended in the Environment Impact Assessment study to reduce the adverse impacts during the project's life cycle.

The plan outlines existing and potential problems that may adversely impact the environment and recommends corrective measures where required. Also, the plan outlines roles and responsibility of the key personnel and contractors who are charged with the responsibility to manage the proposed project site and its surroundings.

The EMP is generally:

- Prepared in accordance with the approved ToR issued by MoEF &CC/ SEIAA;
- In compliance with the rules & requirements of Tamilnadu Pollution Control Board;
- To ensure that the project facilities are operated in accordance with the design;
- A process that confirms proper operation through supervision and monitoring;
- A system that addresses public complaints during construction and operation of the facility and take appropriate corrective action plans to overcome those unwanted situations;
- A plan that ensures remedial measures is implemented immediately.

The key benefits of the EMP are that it provides the organization with means of managing and improving its environment performance thereby allowing it to contribute to better environment quality. The other benefits include cost control and improved relations with the stakeholders.

10.1 Elements of EMP

EMP includes four major elements;

- ***Commitment & Policy:*** The proposed project management will strive to provide and implement the Environment Management Plan that incorporates all issues related to environment and social components and will comply with the suggestions given by MoEF &CC/ SEIAA.
- ***Planning:*** This includes identification of environment impacts and setting environment objectives. The various potential impacts are discussed under Chapter – 4.
- ***Implementation:*** This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environment control facilities and documentation of measures to be taken.
- ***Measurement & Evaluation:*** This includes monitoring of implementation of the mitigation measures, corrective actions and record keeping.

Appropriate mitigation measures have been recommended to minimize the impact on the environment and social parameters.

10.2 Institutional Arrangements for Environment Protection & Conservation

For the effective implementation of the mitigation measures and consistent functioning of the proposed expansion, an Environment Management System (EMS) has been proposed. The EMS will include the following:

- An Environment Management Cell
- Environment Monitoring Program
- Personnel Training
- Regular Environment Audits and Corrective Action Plan
- Documentation – Standard operating procedures of Environment Management
- Plans and other records

10.2.1 Environment Management Cell

A permanent organizational set up will be formed to ensure the effective implementation of mitigation measures and to conduct environment monitoring. The major duties and responsibilities of Environment Management Cell will be as follows:

- To implement the environment management plan;
- To ensure regular operation and maintenance of pollution control devices;
- To assure regulatory compliance with all relevant rules and regulations;
- To minimize environment impacts of operations by strict adherence to the EMP;
- To initiate environment monitoring as per approved schedule;
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit;
- Maintain documentation of good environment practices and applicable environment laws as ready reference;
- Maintain environment related records;
- Coordination with regulatory agencies, external consultants and monitoring laboratories;
- Maintaining log of public complaints and the action taken;
- To report the non compliances / violations of the environment norms to the board of directors of the company.

10.2.2 Hierarchical Structure of Environment Management Cell

Normal activities of the EMP cell will be supervised by Vice President of the unit who will report to the Managing Directors of the proposed expansion project. The hierarchical structure of Environment Management Cell is given in following **Figure - 10.1.**

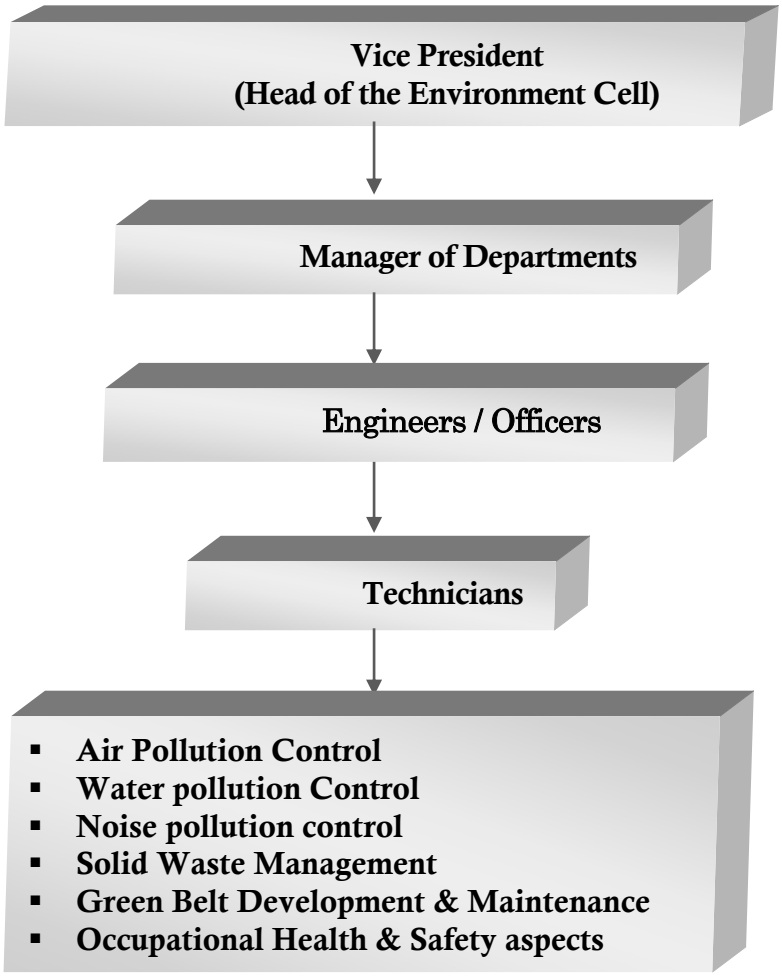


FIGURE 10-1 ENVIRONMENT MANAGEMENT CELL

TABLE 10.1 RECORD KEEPING REQUIREMENTS

Parameter	Particulars
Ambient air quality	Monitoring of air quality parameters
Solid Waste Handling and Disposal	Daily quantity of waste generated, stored, recycled and disposed
Regulatory (Environment) Licenses	Environment Permits / Consents from TNPCB/ MoEF Copy of waste manifests as per requirement
Monitoring and Survey	Records of all monitoring carried out as per the finalized monitoring protocol.
Others	Log book of compliance, Employee's health and safety records, Equipment inspection and calibration records,

	Vehicle maintenance and inspection records, Maintenance of Corporate Social Responsibilities towards the society even after the completion of the project work and during the operation phase

10.3 Implementation Mechanism for Mitigation Measures

The environment management cell will be developed for the proposed expansion plant will ensure the implementation of mitigation measures suggested for the proposed expansion. The details of the implementation mechanism for the mitigation measures have been discussed below:

10.4 Energy Management

The proposed steel plant requires large amounts of energy for their operation. Many industries have reduced operating expenses by focusing on energy efficiency, considering both energy supply and energy consumption. Use of energy conservation measures as part of design and operations, will be part of the Master Planning and the specifications as part of awarding development work to a private contractor.

❖ **Energy Saving Practices**

- Promoting use of Solar Street Lighting System
- Purchase of Energy efficient appliances
- Constant Monitoring of Energy consumption and defining targets for energy conservation
- Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.
- Use of LED / CFL lamps and low voltage lighting.

❖ **Behavioral Change on Consumption**

- Promoting self awareness on energy conservation
- Training staff on methods energy conservation and to be vigilant to such opportunities

❖ **Energy Management**

Some of the energy saving options will be informed to the staffs,

- Switch off lights / fans / ACs that are not needed
- Make maximum use of daylight
- Don't leave lights on in unoccupied areas
- Fit labels on switches so people know which switches operate particular lights
- Use local desk lights if few people are in the building
- Report faulty lighting promptly – a flickering tube uses more electricity and is a contributing factor to 'sick building syndrome'.
- Don't leave any electrical equipment running overnight or at the weekends unless there is a special reason for doing so
- Keep doors and windows closed in air-conditioned areas
- Don't cool for 24 hours a day when occupancy times are less
- Switch off equipment and lighting where possible to reduce heat gains
- Consider installing a run back timer which switches off a split cooling system after a preset time to prevent it running continuously
- Solar energy will be used for streetlight.

10.5 Development of Greenbelt

One of the most effective, economical and useful remedies for control of environment pollution is tree plantation. Plants purify air by assimilating carbon dioxide and releasing oxygen thus keeps check on the vehicular pollution on road and its surroundings. It also helps in soil and water conservation. The main objectives of green belt development are as follows:

- To reduce the impacts of air and dust pollution
- To reduce the impact of vehicular noise caused due to movement of vehicles
- To arrest soil erosion at the embankment slopes
- Beautification of the project corridor by landscaping and turfing with grasses and shrubs Prevention of glare from the headlight of incoming vehicles

While making choice of the plant species for cultivation in green belts, weightage has to be given to the natural factor of bio- climate. For effective removal of pollutants, it is necessary that.

- Plants grow under conditions of adequate nutritional supply (for health and vigour of growth)
- Absence of water stress (to maintain openness of stomatal apertures and form of epidermal structures)
- Well exposed to atmospheric conditions of light and breeze, to maintain free interaction with gases

10.5.1 Design of Green Development

The greenbelt shall be developed all along the boundaries of the plot and the roads. The green belt acts as a sink for pollutants, attenuation of noise levels and improvement in aesthetic quality of the plant. In any greenbelt development, monoculture is not advisable due to its climatic factor and other environment constraints. Greenbelt with varieties of species is preferred to maintain species diversity, rational utilization and for maintaining health of the trees. The greenbelt coverage area for the proposed expansion project is about 33%.

Well-developed greenbelt leads to a favourable micro-climatic to support different micro-organisms in the soil as a result of which soil quality will be improved further. In the proposed expansion greenbelt development will be undertaken in all available areas and also along the roads around plant infrastructure, etc.

Tall and leafy trees like *Azadirachta Indica, Pongamia pinnata, Mimusops elengi*, etc., will be developed in these areas. As far as possible the following guidelines will be considered in greenbelt development. Shrubs and trees will be planted in encircling rows within the plant site. The short trees (5 m height) will be planted in the first two rows and the tall trees (>5 m) in the outer rows around the project site. Planting of trees in each row will be in staggered pattern.

In the front row, shrubs consisting of Albizia sp., Peltophorum, etc will be grown. Since the trunks of the tall trees are generally devoid of foliage, it will be useful to have shrubs in front of the trees so as to give coverage to this portion. Spacing between the trees will be slightly maintained facilitating effective height of greenbelt.

All tolerant plants are not necessarily good for green belts e.g. Xerophytes with sunken stomata can withstand pollution by avoidance but are poor absorbers of pollutants due to low gaseous exchange capacity. Therefore, selection of plants is very important in green belt development for effective removal of suspended particulate matter and for absorption of gases. About 12 various varieties of tress will be planted in the project site. The list & no. of trees proposed in the project site are tabulated in **Table - 10.2**.

TABLE 10.2 GREEN BELT TREES

Scientific Name	Common Name	Numbers
Azardica Indica	Neem	30
Thespesia populnea	Poovarasu	20
Calophyllum inophyllum	Punnai	20
Mimusops elengi	Mahilam	20
Pungamia Pinnata	Pungam	20
Cassia javanika	Kondrai	20
Ficus glomerata	Athi	20
Muntingia calabura	Sarkarai Palam	20
Albizia lebbeck	Vaagai	20
Aegle marmelos	Vilvam	20
Cassia roxbtrghii	Sengondrai	20
Syzygium cumini	Naval	20

10.6 Rain Water Harvesting System

The rainwater will create surface run-off from the proposed expansion facility during monsoon season. The run-off will be of two types i.e., run-off from the open surface area of the plant site and run-off from the built-up area of the plant.

The run-off from the building area of the plant facilities will be routed through a carefully designed piping network and collected in the rain water collection sump and the excess water will be connected along with the open storm water network.

The run-off from the open surface area will be routed directly to the rainwater harvesting structures constructed at suitable locations as per the contours and routed to rain water sump in the project site. For augmenting the ground water resources in the plant area, adequate number of rain-water harvesting pits will be constructed and the internal drains where excess rain water flowing in drain will be diverted to these pits. These structures will facilitate percolation of water into the ground and thus augmenting the groundwater sources. This will result in increase in groundwater tables and to some extent the improvement of ground water quality. The size and the locations of rainwater harvesting pits will be decided during detailed engineering of the project.

Run off from the proposed project site is calculated using rational formula:

$Q = C * I * A$

Where,

Q - Run-off in m^3/hr C - Coefficient of Run-off

I - Max intensity of Rainfall in m/hr A - Catchment Area (m^2)

Run-off co-efficient (C)

- Roof - 0.9
- Hard paved area - 0.8
- Green belt area - 0.3

Intensity of Rainfall (I) - 30.8 mm/hr or 0.03 m/hr

Catchment area (A)

- Roof Area - 12400 Sq.m
- Hard paved area - 6000 Sq.m
- Green belt & open area - 15900 Sq.m

If the rain continues for one hour the total run off expected calculated below.

Roof area

Run off (Q) - 0.9 x 0.03 x 12400 = **334.8 m^3/hr**

Hard paved area

Run off (Q) - 0.8 x 0.03 x 6000 = **144 m^3/hr**

Green belt & open area

Run off (Q) - 0.3 x 0.03 x 15900 = **143.1 m^3/hr**

Hence, total volume of rain water run-off will be about **621.9 m^3/hr**.

Rain harvesting system

Keeping in mind the importance of water and its scarcity it is proposed to conserve water by rainwater harvesting by which the subsoil water condition / moisture content is maintained / improved to a great extent. Also, it is proposed to harness rainwater from the roof area by collecting the same in a rainwater collection tank of suitable capacity and reused for gardening / domestic purposes with the provision of a water treatment plant. Rain water harvesting sumps having capacity of about 550 m^3 will be provided to store the rain water.

Normally, the rain water harvest pit of suitable size is proposed to be constructed. The rain water harvest pit consists of 10 Nos of 9" dia borehole for depth as per site condition. Boreholes are made with casing pipes in position, and then filled up with ¾" – 1" dia riverside pebble and then casing pipe is removed. The pit outer wall is constructed in brick masonry on PCC bed of 1:4:8 ratio. The first layer for 18" thick is filled with pebble of size

1" – 3". The second layer for 18" thick is filled with coarse sand. The third layer for 18" thick is filled with activated charcoal. The fourth layer for 18" thick is filled with course soil. The fifth layer for 18" thick in filled with riverside pebble, of ¾" - 1". Finally, the top of rain harvest pit is covered with RCC precast slab with perforation of (min) 50 mm dia in strip of size 2'0' wide, to allow entry of surface / ground level rainwater.

10.7 Expenditure on Environment Management

The total estimate cost of the expansion project is about Rs. 196.712 crores. It is proposed to invest about Rs. 100 Lakhs on pollution Control, Treatment, Green belt development, Monitoring systems and others. The break-up of the investment is given in **Table - 10.3.**

TABLE 10.3 EXPENDITURE ON ENVIRONMENT MATTERS

S. No.	Description	Capital Cost (Rs. In lakhs)	Operational Cost per annum (Rs. In lakhs)
1	Air Pollution Control measures	38	5
2	Water Pollution Control	14	2.0
3	Solid Waste Management	7	2.0
4	Noise Pollution Control	6	2.0
5	Environment Monitoring	-	3.0
6	Occupational Health & Safety	6	2.0
7	Rainwater harvesting	2	1
8	Green belt Development	8	2.0
Total		**81**	**19**

10.8 Corporate Environment Responsibility (CER) Activities

ARS Steels & Alloys International Private Limited will implement the CER as per the provisions provided in the Office Memorandum of Ministry of Environment, Forest & Climate Change (MoEF&CC) issued vide letter No. F. No. 22-65/2017-IA.III dated 30.09.2020 and 20.10.2020. An amount of Rs. 46 lakhs will be spent towards Corporate Environment Responsibility (CER) and the allocated amount for CER will be effectively utilized for the development activities. The list of activities proposed along with budget allocated for the same is given in **Table – 10.4**.

TABLE 10.4 PROPOSED CER ACTIVITIES

EXISTING CER:

Sr. No.	CSR Activity	Capital Cost (Rs. In Lakhs)	Recurring Cost Per Annum (Rs. In Lakhs)
Environment			
1	Improvement of nearby pond	2.6	0.8
Health Care			
1	Providing potable water supply and sanitation for nearby Govt. School	5.6	1.4
Rural Development			
1	Improvement of Infrastructure facility in nearby village	5.0	1.0
2	Provision of educational kits and accessories to nearby Govt. school	1.55	0.5
Total		**14.75**	**3.70**

PROPOSED CER:

S. No	CER Activity	Capital cost Allocation (in lakhs)
1.	As per SEAC Recommendation	46
Total Cost Allocation		**46**

11 SUMMARY & CONCLUSIONS

This chapter presents the justification for implementation of the project, summary of anticipated impacts and mitigation measures and conclusions.

11.1 Justification for Implementation of the Project

The proposed project will have marginal adverse impacts on the local environment. However, with the implementation of the adequate pollution control and environment management measures, the minor impacts due to construction and operation of the proposed project plan will be mitigated.

There will not be any displacement of population due to the proposed project. The entire land area of 4.51 ha has been owned by SICPOT and the proponent has made lease agreement with SIPCOT. The proposed project will provide direct employment to about 350 persons and indirect employment to 400 persons. Apart from the employment and business opportunities for the local people, they will also be benefited in the areas such as education, health care and infrastructure facilities. The Government of Tamilnadu will be benefited in terms of taxes and duties, the railways, ports and industries authorities, etc. will be benefited indirectly.

Thus, this project will lead to overall development of the region in particular and in the state in general. This project will also generate indirect employment to a considerable number of families, who will render their services for the employees of the project. Thus, in view of considerable benefits from the project without any major adverse environment impact, the proposed project is most advantageous to the region as well as to the state.

11.2 Summary of Anticipated Environment Impacts and Mitigation Measures

The summary of anticipated adverse environment impacts due to the proposed project and mitigation measures is given in **Tabe-11.1**.

TABLE 11.1 ANTICIPATED ADVERSE ENVIRONMENT IMPACTS AND MITIGATION MEASURES

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
Constructional Impact				
Water Quality	Increase in suspended solids due to soil run-off during heavy precipitation	Loose soil at construction site	During monsoon season run off from construction site will be routed to a temporary sedimentation tank for settlement of suspended solids.	---
Air Quality	Increase in dust and NO_2 concentration	Leveling activity and Vehicular movement	Sprinkling of water in the construction area and unpaved roads. Proper maintenance of vehicles will be done.	The impact will be low, as the main approach road is tarred.
Noise	Increase in noise level	Construction equipment	Equipment will be kept in good condition to keep the noise level within 85-dB (A).	Workers will be provided with necessary protective equipment *e.g.* ear plug.
Terrestrial Ecology	Depression of plant growth	Dust emission from construction	Landscaping and extensive plantation will be done.	Plantation will be done in consultation with the local forest department.
Operational Impact				
Air Quality	Increase in PM, SO_2 and NO_2 levels in ambient air.	Stack emissions and material handling	Adequate APC measures like Bag filter system will be provided to reduce the emissions from induction furnaces / electrical arc furnace. Adequate stack height will be	The resultant air quality will confirm to the stipulated standards.

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
			provided for the proper dispersion of gaseous pollutants. Motorable roads in the plant area will be paved to reduce dust emission. Plantation programs will be undertaken around the plant area. Dust suppression measures will be implemented material handling area.	Particulate emission from the proposed furnaces stack will be kept below 150 mg/Nm^3.
Noise	Increase in noise levels in the plant area.	Equipment in main plant and auxiliaries	Equipment will be designed to conform to noise levels prescribed by regulatory agencies. Providing acoustic enclosure as source control. Provision of green belt and plantation would further help in attenuating noise.	Employees working in high noise areas would be provided earplugs as protective device.
Water Quality	Deterioration of surface water quality.	Discharge from domestic usages.	Adequate capacity of Sewage Treatment Plant is proposed for treatment of sewage. Elevated Solar Evaporation Pan of adequate are will be provided to dispose the effluent.	---
Solid waste	Furnace slag, dust from APC	Furnaces, Rolling	All sort of solid waste will be	Efforts will be made to utilize

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
	measures, Scraps & Fly Ash	and APC measures	disposed suitably.	the solid waste to the extent possible.
Ecology				
a. Terrestrial	Impact on plant species	Emissions from stack	Emission will be controlled as well as dispersed through appropriate design.	As ambient air quality will be within limits, no active injury to the vegetation is expected.
b. Aquatic	Impact on aquatic life of the water bodies	Domestic Sewage	The domestic wastewater will be provided with adequate treatment facilities	As the sewage water will be treated properly no significant impact on aquatic life is expected.
Demography and Socio-economics	Strain on existing amenities like housing, water sources and sanitation, medical and infrastructure facilities.	Influx of people due to proposed employees as well as contractor employees/ labourers.	Most the worker requirement will be fulfilled by local people. No significant impact is envisaged	Overall socio-economic status of the area is expected to improve.

11.3 Conclusions

The proposed expansion project will have marginal impacts on the local environment. However, development of this project has certain beneficial impact / effects in terms of providing the employment opportunities that the same will create during the course of its constructional phase as well as during operational phase of the project.

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed project will be beneficial to the society and will help reduce the demand supply gap of steel products and will contribute to the economic development of the region in particular and state in general.

12 DISCLOSURE OF CONSULTANTS

This chapter presents the details the environment consultants engaged, their background and the brief description of the key personnel involved in the project.

12.1 Introduction

Ecotech Labs Pvt. Ltd. offers environmental consultancy & Laboratory services for various residential, commercial & industrial development projects. It is one of the leading solution providers in the field of environmental consultancy comprising of Impact assessment studies, laboratory services & all statutory clearances. Ecotech team has a decadal experience in the field of environmental technical consultancy and have successfully obtained all required statutory clearances from State Level Impact Assessment Authority (SEIAA), Pollution Control Boards in the region of South India & also from Ministry of Environment & Forest (MoEF). The completion of tasks in record time is the key feature of Ecotech. A team of Civil, Architecture & Mechanical Engineering, Environmental Sciences & Engineering, Biotechnology, Chemistry, Microbiology and Socio-Economics apart from environmental media sampling and monitoring experts and management experts, strive hard to serve the clients with up to mark and best services.

Ecotech also provide STP/ETP/WTP project consultancy on turn-key basis apart from Operation and Maintenance of these projects on annual contract basis. Also, having MoEF approved environmental laboratory, Ecotech provide laboratory services for monitoring and analysis of various environmental media like air, water, waste water, stack, noise and meteorological data to its clients all over India and abroad. Copy of the NABET accreditation certificate is shown in **Figure – 12.1.**

भारतीय गुणवत्ता परिषद
QUALITY COUNCIL OF INDIA
QCI Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Eco Tech Labs Pvt Ltd., Chennai

48, 2nd main road, Ram Nagar South Extension, Pallikaranai, Chennai-600100, Tamil Nadu

*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.	Thermal power plants	4	1 (d)	A
3.	Metallurgical industries-Ferrous only	8	3 (a)	B
4.	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
5.	Airports	29	7 (a)	A
6.	Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
7.	Building and construction projects	38	8 (a)	B
8.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated March 07, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3202 dated Apr. 23, 2024. The accreditation needs to be renewed before the expiry date by Eco Tech Labs Pvt. Ltd., Chennai following due process of assessment.

Issue Date
Apr. 23, 2024

Valid up to
Apr. 10, 2025

Mr. Ajay Kumar Jha
Sr. Director - NABET

Certificate No.
NABET/EIA/22-25/SA 0222

Prof (Dr) Varinder S Kanwar
CEO - NABET

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

FIGURE 12-1 NABET ACCREDITATION CERTIFICATE

12.2 Study Team

The multidisciplinary team included expertise in Environment Impact Assessment, Air pollution & Control measures, Noise Control measures, Ecology and bio-diversity, Land use, Geology, Environment Chemistry and Socio-Economic planner.

TABLE 12.1 EIA TEAM

SN	Name of the expert	Area of functional Expert (NABET Accredited)
1	Mr. R. Rajendran	EIA Coordinator
2	Mrs. K. Vijayalakshmi	Air Pollution
3	Dr. A. Dhamodharan	Water Pollution
4	Dr. A. Dhamodharan, Mrs. K. Amudha	Solid Hazardous Waste
5	Dr. A. Dhamodharan	Ecology and Biodiversity
6	Mr. S. Pandian	Socio Economic
7	Dr. T. P. Natesan, Mr. P. Gopinath	Land Use

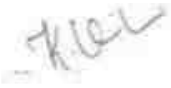
Functional area experts and assistance to FAE involved in the EIA study for "EIA Report for proposed expansion of Steel plant by M/s. ARS Steels & Alloy International Private Limited at Plot No. E 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District are shown in **Table-12.2.**

TABLE 12.2 EIA COORDINATOR AND FUNCTIONAL AREA EXPERTS INVOLVED IN THE EIA

S. No.	Functional areas	Name of the experts	Involvement (period and task)	Signature and date

1	AP	Mrs. K. Vijayalakshmi	1. Selection of Baseline Monitoring stations based on the wind direction 2. Interpretation of Baseline data by comparing it with standards prescribed by CPCB against the type of area 3. Identification of sources of air pollution and suggesting mitigation measures to minimize impact ***Period: June 2024– Till now***	
2	WP	Dr. A. Dhamodharan	1. Selection of baseline Monitoring Locations for Ground water analysis and also identifying nearest surface water to be studied. 2. Interpretation of baseline data collected 3. Identification of impacts based on the baseline study conducted and also to the ground water and nearby surface water due to the proposed project 4. Preparation of suitable and appropriate mitigation plan. ***Period: June 2024– Till now***	
3	SHW	Dr. A. Dhamodharan	1. Identification of nature of solid waste generated 2. Categorization of the generated waste and estimating the quantity of waste to be generated based on the per capita basis. Identification of impacts of SHW on Environment 3. Suggesting suitable mitigation measures by recommending appropriate disposal method for each category of waste generated 4. Top soil and refuse management ***Period: June 2024– Till now***	
4	SE	Mr. S. Pandian	1.Primary data collection through the census questionnaire 2.Obtaining Secondary data from authenticated sources and incorporating the same in EIA report. 3.Impact assessment & proposing suitable mitigation plan 4.CSR budget allocation by discussing with the local body and allotting the same for need based activity. ***Period: June 2024– Till now***	
5	EB	Dr. A.	1. Primary data collection through field survey and sheet observation for ecology and biodiversity	

		Dhamodharan	2. Secondary Collection through various authenticated sources 3. Prediction of anticipated impacts and suggesting appropriate mitigation measures. ***Period: June 2024– Till now***	
6	HG	Dr. T. P. Natesan	1. Study of existing surface drainage arrangements in the core and buffer zone, impact due to mining on these drainage courses and suggestion of mitigative measures 2. Determination of groundwater use pattern, development of rainwater harvesting program. Storm water management through garland drainage system. ***Period: June 2024– Till now***	
7	GEO	Dr. T. P. Natesan	1. Field survey for assessing regional and local geology, aquifer distribution, Determination of groundwater use pattern, development of rainwater harvesting program. ***Period: June 2024– Till now***	
8	SC	Dr. A. Dhamodharan	1. Interpretation of baseline report 2. Identification of possible impacts on soil, prediction of soil conservation and suggesting suitable mitigation measures. ***Period: June 2024– Till now***	
9	AQ	Mrs. K. Vijayalakshmi Mr. P. Gopinath	1. Collection of Meteorological data for the baseline study period 2. Plotting wind rose plot and thereby selecting the monitoring locations based on the wind pattern 3. Estimation of sources of air emissions and air quality modeling is done 4. Interpretation of the results obtained 5. Identification of the impacts and suggesting suitable mitigation measures. ***Period: June 2024– Till now***	

10	NV	Mrs. K. Vijayalakshmi	1. Selection of monitoring locations 2. Interpretation of baseline data 3. Prediction of impacts due to noise pollution and suggestion of appropriate mitigation measures ***Period: June 2024– Till now***	
11	LU	Dr. T. P. Natesan Mr. P. Gopinath	1. Collection of Remote sensing satellite data to study the land use pattern. 2. Primary field survey and limited field verification for land categorization in the study area 3. Preparation of Land use map using Satellite data for 10km radius around the project site. ***Period: June 2024– Till now***	
12	RH	Mrs. K. Vijayalakshmi	1. Identification of the risk 2. Interpreting consequence contours 3. Suggesting risk mitigation measures ***Period: June 2024– Till now***	

12.3 Laboratory for Analysis

NAME OF LABORATORY	SCOPE OF SERVICES	ACCREDITATION STATUS
M/s. ECOTECH LABS PVT LTD	**Monitoring and Analysis of:** • Ambient Air Monitoring • Ground Water (Analysis) • Surface Water (Analysis) • Soil quality (Analysis) • Noise monitoring	Accredited by NABL Valid up to 09.06.2026

SPECIFIC TERMS OF REFERENCE FOR

(METALLURGICAL INDUSTRIES (FERROUS AND NON-FERROUS))

1. SEAC CONDITIONS - SITE SPECIFIC:

S.NO		CONDITIONS	COMPLIANCE
1.1	1	PP should either purchase or produce green power to cover minimum of 75% of its annual power consumption and submit an affidavit containing the road map for achieving the above target within a period of 3 years.	We appreciate the committee's continued focus on promoting renewable energy consumption. In line with the requirements, we are submitting this affidavit outlining ARS Steels' current initiatives and roadmap towards achieving the 75% renewable energy target. Till date, ARS Steels has made significant investments in renewable energy procurement through group captive agreements. We have entered into Power Purchase Agreements (PPAs) with the following entities: - Davlaipurm Renewables for 4.0 crore units - Cleantech Solar for 6.11 crore units - Torrent Power for 9.40 crore units This totals 19.51 crore units of renewable energy annually. Our total investment in securing this renewable power amounts to approximately Rs. 40.0 crores. Out of 19.51 crore units procured from renewable energy 15.51 crore units will be sourced from solar energy and 4.0 crore units from wind energy. Following our planned expansion, our total annual energy consumption is estimated to be around 40.0 crore units. With the PPAs already executed, we will be consuming 19.51 crore units of renewable energy, representing 50% of our total electricity consumption post-expansion. While this demonstrates a substantial commitment to green energy, there are challenges in further increasing this share. **Challenges in Renewable Energy Utilization** - Solar energy availability: Solar power is primarily available from 7 AM to 5 PM, covering about 40% of daily energy consumption, which limits its availability for evening peak periods. - Wind energy intermittency: Wind power is predominantly available during peak seasons, particularly from June to September, covering

<table>
<tr><td></td><td></td><td></td><td>just four months of the year. Beyond this, wind generation decreases significantly, and excess energy produced during peak seasons often cannot be efficiently utilized.
- Regulatory challenges: Existing regulations complicate the use of renewable energy, particularly when balancing solar generation across peak consumption periods.
Despite these hurdles, ARS Steels remains committed to maximizing renewable energy usage. We are actively exploring innovative strategies to increase our green power consumption and are determined to work towards achieving the 75% renewable energy target, contingent on favourable regulatory support and practical feasibility.

The affidavit of Renewable Energy Roadmap is attached as Annexure XVII.</td></tr>
<tr><td></td><td>2</td><td>The PP should furnish an affidavit stating that the NBWL clearance issued for the existing project is applicable for this expansion project as well.</td><td>We have obtained the NBWL clearance for expansion project and attached as Annexure XII.</td></tr>
<tr><td></td><td>3</td><td>Composition, type and quantity of alloys used in the process and disposal of wastes.</td><td>The details of the alloys used in the process is mentioned in the raw material of Draft EIA report, Chapter 2, Table 2.2</td></tr>
<tr><td></td><td>4</td><td>Source and quantity of virgin scrap and recycled scrap and its toxicity details.</td><td><table>
<tr><th>S. No.</th><th>Raw Material</th><th>Requirement (Tons/Annum)</th></tr>
<tr><td>1</td><td>Cold Rolled Cuttings</td><td>261940</td></tr>
<tr><td>2</td><td>Non Tin Plated</td><td>77705</td></tr>
<tr><td>3</td><td>Sponge Iron</td><td>10653</td></tr>
<tr><td>4</td><td>Turning and Boring</td><td>72691</td></tr>
<tr><td>5</td><td>MS Scrap</td><td>203035</td></tr>
<tr><td></td><td>Total</td><td>626650</td></tr>
</table></td></tr>
<tr><td></td><td>5</td><td>Justification for reduction in the quantity of sewage generated and non - requirement of ETP along with the TNPCB RoA reports of the existing facility shall be furnished.</td><td>The quantity of sewage generated mentioned in existing EC was not calculated as per NBC water requirement. Now we have calculated water requirement as per NBC and hence the sewage generated got reduced.</td></tr>
</table>

			We have removed the reheating furnace from the site, hence the scrubber also removed. Hence there is no ETP required in the project site.
	6	Recent energy audit report of the existing facility.	Energy Audit carried out and attached as Annexure XIII.
	7	The PP shall furnish the video graph of the entire plant operations.	Agreed to comply.
	8	DFO letter stating the proximity details of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.	We have made request to DFO for Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site and we will submit the same before final EIA report.
	9	The PP shall furnish the details of arrangement made for permanent water supply from competent authority.	We have obtained water letter from SIPCOT and attached the same as Annexure VII.
	10	Efficiency study/report of the existing furnace through reputed institution.	The adequacy report for has been done by Anna University and attached as Annexure XII.
	11	The PP shall discuss the best available technology available in this field and action plan for implementing the same.	We have already adopted for best technology in India for all our equipments.
	12	The PP shall furnish action plan for harnessing 50% solar energy or shall purchase 75% renewable energy to meet the energy requirement.	We appreciate the committee's emphasis on harnessing solar energy and increasing renewable energy usage. In alignment with this goal, we would like to provide the following information regarding our renewable energy procurement efforts: **1.Renewable Energy Procurement:** ARS Steels has entered into long-term Power Purchase Agreements (PPAs) to procure a total of 19.51 crore units of renewable energy per annum. **2.Solar Energy Contribution:** Out of the 19.51 crore units of renewable energy, 6.11 crore units and 9.40 crore units, totalling 15.51 crore units, are sourced from solar energy. Balance 4.0 crore units from wind generation. Our total investment in securing this renewable power amounts to approximately Rs. 40.0 crores. Following our planned expansion, our total annual energy consumption is estimated to be around 40.0 crore units. With the PPAs already

			executed, we will be consuming 19.51 crore units of renewable energy, representing 50% of our total electricity consumption post-expansion. While this demonstrates a substantial commitment to green energy, there are challenges in further increasing this share. **Challenges in Renewable Energy Utilization** - Solar energy availability: Solar power is primarily available from 7 AM to 5 PM, covering about 40% of daily energy consumption, which limits its availability for evening peak periods. - Wind energy intermittency: Wind power is predominantly available during peak seasons, particularly from June to September, covering just four months of the year. Beyond this, wind generation decreases significantly, and excess energy produced during peak seasons often cannot be efficiently utilized. - Regulatory challenges: Existing regulations complicate the use of renewable energy, particularly when balancing solar generation across peak consumption periods. Despite these hurdles, ARS Steels remains committed to maximizing renewable energy usage. We are actively exploring innovative strategies to increase our green power consumption and are determined to work towards achieving the 75% renewable energy target, contingent on favourable regulatory support and practical feasibility
	13	The PP shall furnish the road map for achieving 100% green energy in 2030.	The affidavit of Renewable Energy Roadmap is attached as Annexure XVII.
	14	The PP shall furnish the action plan for 100% use of Electric Vehicles within next five years.	We will try to explore the possibilities of using 100% Electric vehicles in the next five years.
	15	The PP shall furnish the action plan for the implementing the CER activities as committed.	The CER activity is given in Chapter 8, Table 10.4.
	16	The PP shall study in detail various operational measures to reduce the specific energy consumption in induction furnaces.	The details of induction furnace and its energy measures is discussed in Chapter 2, Section 2.7.1

	17	The proponent shall furnish details on the idling period provided.	There will not be idling provided as we have two crucibles for each induction furnace.
	18	The proponent shall furnish details on measures adopted for better and efficient operation of melting & charging.	Details on measures adopted for better and efficient operation of melting & charging is discussed in Chapter 2, Section 2.6.3.1.
	19	The proponent shall furnish details on the control measures adopted during heat finishing and tapping.	Detail about various measures that could be adopted during finishing and tapping of a heat are incorporated in Chapter 7, Section 7.5.
	20	The proponent shall study in detail about operational control measures to Minimize and control the refractory wall wearing.	Detail about operational control measures to Minimize and control the refractory wall wearing are incorporated in Chapter 7, Section 7.6
	21	The proponent shall explore the possibilities of utilizing State – of – the – art technology with best global practice.	State – of – the – art technology is discussed in chapter 7, section 7.7.
	22	The proponent shall explore the possibilities of utilizing the treated wastewater instead of fresh water.	We will utilize the entire treated wastewater to a maximum extent as possible.
	23	The proponent must increase the Solar and Wind Energy sources and must explore the possibilities of achieving Net Zero energy consumption.	We are grateful for the committee's recommendations to increase solar and wind energy sources and explore the possibility of achieving net-zero energy consumption. ARS Steels is committed to sustainable growth and has already made considerable efforts to integrate renewable energy into our operations. **1. Substantial Equity Investment:** ARS Steels has made a significant equity investment of ₹39.0 crores in group captive renewable energy power plants. With this investment, we have secured long-term Power Purchase Agreements (PPAs) for 19.51 crore units of renewable energy annually. Achieving net-zero energy consumption, however, would require additional substantial capital expenditure, which needs to be evaluated in line with operational feasibility. **2. Solar Energy Availability:** A large portion of our renewable energy comes from solar power. However, solar energy is available primarily during daylight hours, typically from 7 AM to 5 PM, covering only 10 hours a day, which accounts for approximately 40% of our

			daily energy needs. This intermittency limits its ability to meet our 24-hour operational requirements. **3. Wind Energy Seasonality:** Wind energy, another key renewable source, is predominantly available during peak seasons, particularly from June to September, which covers just four months of the year. During this period, wind generation is higher, but the excess energy produced often cannot be consumed efficiently. For the remaining eight months of the year, wind generation is significantly lower, further complicating its role in achieving net-zero energy consumption. **4. Regulatory challenges:** Existing regulations complicate the use of renewable energy, particularly when balancing solar generation across peak consumption periods. **5. Commitment to Renewable Energy Expansion:** Despite these challenges, we are committed to increasing the share of renewable energy in our operations as much as possible. We will continue to explore all feasible options to maximize our use of solar and wind power and enhance our overall sustainability efforts. While achieving net-zero energy consumption is challenging given the constraints of renewable energy intermittency and regulatory frameworks, we remain dedicated to adopting as much renewable energy as possible in our journey toward more sustainable operations.
	24	The proponent shall submit the copy of the consent to operate, and the latest renewal consent order obtained from the TNPCB.	The latest CTO from TNPCB has been attached as Annexure VI.
	25	The proponent shall submit the compliance report from TNPCB for the conditions imposed in the consent order issued by the TNPCB.	We have requested compliance report to TNPCB, and the acknowledgement has been attached as Annexure XIV.
	26	The Environmental pollution control measures taken to deal with Air pollution, effluent generation and slag generation should be discussed in detail.	The anticipated impacts and mitigation measure due to air pollution is given in Chapter 4, Section 4.3.6.

	27	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 the 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.	We have obtained adequacy report from Anna University for existing air pollution control measures and attached as Annexure XII.
	28	The proponent shall submit the video and photograph of the operational details with particular reference to points of pollution in the existing plant.	The photos of the operational plant have been attached as Annexure XV.
	29	Material balance and Water balance shall be furnished in accordance with MoEF&CC guidelines.	Material balance and Water balance is discussed in Chapter 2, Section 2.4.2 and 2.4.5.
	30	A detailed report on Solid waste & hazardous waste management shall be furnished.	Solid waste management, hazardous waste is discussed in Chapter 2, section 2.7.3.
	31	Report on AAQ survey and proposed air pollution prevention and control measures shall be furnished in the EIA report.	➢ AAQ results are discussed in chapter 3, Section 3.3. ➢ Air quality impact and mitigation measures are discussed in Chapter 4, Section 4.3.6.
	32	The project proponent shall do the stoichiometric analysis of all the involved reactions to assess the possible emission of air pollutants in addition to the criteria pollutants, from the proposed project.	Not applicable, no chemical process involved in this project.
	33	Adequacy report for ETP &STP for the proposed project obtained from any reputed Government institution such as IIT, Anna University, NIT shall be furnished.	We are in the process of obtaining STP adequacy report from Anna University and we will submit before final EIA report.
	34	Land use classification shall be obtained from the DTCP for the Survey Numbers of this project. Further, the project proponent shall	The land is classified in Industrial Zone. The project is located on SIPCOT land.

		submit the planning permission obtained from the DTCP, if any.	
	35	The proponent shall conduct the EIA study and submit the EIA report for the entire campus along with layout and necessary documents such as "A" register and village map.	The EIA report is prepared, and the land documents, A register and Village Map is attached as annexure IV.
	36	Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.	Noted: Public hearing points will be incorporated in final EIA report.
	37	The Public hearing advertisement shall be published in one major National daily and one most circulated Tamil daily.	Noted and will be complied.
	38	The PP shall produce/display the EIA report, executive summary and other related information with respect to public hearing in Tamil.	Noted and will be complied.
	39	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purposes involved in the project.	The project is located on SIPCOT land. Hence, forest clearance is not required.
	40	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.	We have obtained the NBWL clearance for expansion project and attached as Annexure XI.
	41	The project proponent shall explore the possibilities of treating and utilizing the trade effluent and sewage within the premises to achieve Zero liquid discharge.	We will utilize the treated sewage for greenbelt gardening within the premises. We will not generate any trade effluent generated from our project site.
	42	The layout plan shall be furnished for the greenbelt area earmarked with GPS coordinates by the project proponent on the periphery of the site and the same shall be submitted for	The greenbelt plan is attached in an Annexure II.

		CMDA/DTCP approval. The green belt width should be at least 3m wide all along the boundaries of the project site. The green belt area should be not less than l5 % of the total land area of the project.	
	43	As the plant operation involves sensitive processing, the medical officer and the supporting staff involved in the health center activities shall be trained in occupational health surveillance (OHS) aspects through outsourced training from the experts available in the field of OHS for ensuring the health standard of persons employed.	The occupational health and safety is discussed in chapter 7, Section 7.3.
	44	The proposal for Roof Top solar panel shall be included in the EIA Report.	We acknowledge SEIAA's recommendation to include a proposal for rooftop solar panels in the Environmental Impact Assessment (EIA) Report. We would like to provide a rationale as to why rooftop solar panels are not a viable solution for steel plants and rolling mills, supported by key facts: **1. Structural Limitations:** The roofs of steel plants and rolling mills are typically designed with heavy-duty roofing structures to accommodate high-temperature processes and industrial operations. Installing solar panels on these roofs would require substantial structural modifications, increasing costs and potentially causing disruptions to our production processes. Additionally, the available rooftop space is insufficient to generate a significant percentage of the electricity required to power our energy-intensive operations **2. Dust and Heat:** Steel manufacturing generates high amounts of dust, fumes, and heat, which would significantly reduce the efficiency and lifespan of rooftop solar panels. Dust accumulation on the panels can drastically reduce their energy output, making rooftop installations less

			effective in such industrial environments. Continuous cleaning and maintenance would also be resource-intensive and impractical. **3. High Energy Demand Incompatibility:** The energy demand of Induction Furnaces and Rolling Mills in steel plants is exceptionally high and operates 24/7. Solar energy generation from rooftop panels, however, is intermittent and dependent on daylight hours, leading to limited and unreliable power generation. In our case, the electricity generated from rooftop solar would only contribute a small fraction of the total energy required, making it an impractical solution for meeting our energy needs. **4. Off-Site Renewable Energy as a Preferred Solution:** Given the limitations of rooftop solar for our facility, our strategy focuses on purchasing renewable energy from off-site sources. These long-term PPAs enable us to secure reliable and sufficient renewable power to meet our operational demands, while also aligning with our commitment to reducing carbon emissions and contributing to the nation's renewable energy goals. We trust that these technical and operational considerations provide clarity on why rooftop solar panels are not a viable solution for our facility, and we kindly request SEIAA's understanding in recognizing our proactive approach to renewable energy procurement.
	45	As per the MoEF&CC Office Memorandum F. No. 22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall furnish the detailed EMP.	We have furnished EMP in Chapter 10, table 10.3.

2. **SEIAA SPECIFIC CONDITIONS:**

S.NO	CONDITIONS	COMPLIANCE
1	The PP shall carryout additional study on energy conservation, energy management and energy reduction.	The energy audit study has been conducted and attached as Annexure XIII.

2	The PP shall study the impact of hazardous and other wastes generated from the process.	Solid waste management, hazardous waste is discussed in Chapter 2, section 2.7.3.
3	The PP shall study the impact of carbon dioxide emission and particulate matter.	The impact of carbon dioxide emission and particulate matter is included in air quality and given in Chapter 4, Section 4.4.2.
4	To study the impact of Soil and Water.	Impact of soil and water is given in Chapter 4, Section 4.3.5 and 4.3.7.
5	To detail the proposed innovative good housekeeping practices.	Innovative good housekeeping practices has been given in Chapter 7, Section 7.8.
6	The PP shall carryout detailed LCA study for the products to be manufactured.	Life Cycle Assessment (LCA) has been attached as annexure X.
7	The PP shall study the impact of the proposed activity on human health and temperature rise.	The impact and mitigation due to temperature rise and climate change is discussed in Chapter 4, Section 4.5.
8	Details of production process along with flow chart.	Details on production process along with flow chart is given in Chapter 2, Figure 2.6 and 2.7.

A	**STANDARD TERMS OF REFERENCE (TOR)**	
1	**Executive Summary**	Enclosed as separate item in EIA report.
2	**Introduction**	
I	Details of the EIA Consultant including NABET accreditation.	EIA Consultant & NABET Accreditation details are given in Figure-12.1 of Chapter 12, Page no - 171.
ii	Information about the project proponent.	Project proponent details are given in Section 1.2.2 of Chapter - 1, Page no: 2.
iii	Importance and benefits of the project.	Importance and benefits of the project are given in Section 1.3.4 of Chapter - 1, Page no: 7.
3	**Project Description**	
I	Cost of project and time of completion.	Cost of project – Rs. 196.712 crores Completion of project - December 2025
ii	Products with capacities for the proposed project.	Production capacity details are given in Section 1.3.2 of Chapter – 1, Page no: 2.
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 expansion of existing Steel Rolling Mill from 2,50,000 TPA to 5,70,000 TPA and existing Steel Melting Shop from 2,88,000 TPA to 6,00,000 TPA. We are going to expans the product capcity in the same existing land.
Iv	List of raw materials required and their source along with mode of transportation.	Raw material details are provided in Section 2.4.2 of Chapter – 2, Page no: 15.
V	Other chemicals and materials required with quantities and storage capacities	Other Chemical & material requirement details are provided in Section - 2.4.2 & Table-2.2 & 2.3 of Chapter – 2, Page no: 15 & 16.
Vi	Details of Emission, effluents, hazardous	Emission, waste generation details are

	waste generation and their management.	provided in table- 2.8, Chapter – 2, Page no: 36
Vii	Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	Water, power requirement with source and approval status, water balance, manpower requirement details are provided Section - 2.4.3 – 2.4.5 of Chapter – 2, Page –16-20. Water balance diagram is given in Figure – 2.4 & 2.5 - of Chapter – 2, Page no: 19 & 20.
viii	Process description along with major equipments and machineries, process flow sheet (quantitative) from raw material to products to be provided	Process description is covered under Section 2.6 & 2.7 of Chapter – 2, Page no: 21 to 37.
ix	Hazard identification and details of proposed safety systems.	Hazard identification details are covered under Section - 7.1.2 of Chapter – 7, Page no: 118.
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 existing operation of the project from SPCB shall be attached with the EIA-EMP report.	The Environmental Clearance and Consent to Operate copy has been attached as Annexure VI. The CCR request copy has been attached as Annexure XIV.
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.	We have obtained EC from SEIAA and CTO from TNPCB. The EC and CTO copy is attached as Annexure VI.
4	**Site Details**	
i	Location of the project site covering village, Taluka/Tehsil, District and State, justification for selecting the site, whether	Location details of the project site is provided in Section – 2.3 of Chapter -2, Page no: 12. No alternate sites are considered.

	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).	A topo sheet of the study area provided in Figure - 1.3 of Chapter -1, Page no: 6.
iii	Details w.r.t. option analysis for selection of site.	Alternate site consideration details are covered in Chapter -5, Page no: 110-111.
iv	Co-ordinates (lat-long) of all four corners of the site.	The co-ordinates of all four corners of the site are given in Table-1.1 & Figure -1.2 of Chapter - 1, Page no: 3 & 5.
v	Google map-Earth downloaded of the project site.	The Google Earth Map of the project site is given in Figure- 1.2 of Chapter-1, Page no: 5.
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.	Layout map showing proposed unit indicating the storage area, plant area, greenbelt area, utilities etc. are given in Figure -2.1 of Chapter – 2, Page no: 14.
vii	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.	Photographs of the existing plant site are enclosed in **Annexure XV**.
viii	Land use 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)	The land use breakup of the total project site is detailed in Section-2.4.1 & Table-2.1 of Chapter -2, Page no– 13.
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.	The project is located within SIPCOT land. The SIPCOT mainly consists of industries such as Manchu Toughend Glass Pvt Ltd, Anjan Drug Private Limited, Precision Hydraulics Private Limited, Greaves Cotton Limited, Mabel Engineers Private Limited, Danblock Brakes India Pvt Ltd, Mitsuba India Private Limited, Automotive Coaches & Components Ltd.
x	Geological features and Geo-hydrological status of the study area shall be included.	The Geological features and Geo-hydrological status of the study area is detailed Section-3.9 of Chapter-3, Page no: 71
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	The drainage detail of the study area is given in Section – 3.9.5 & Figure-3.8 of Chapter-3, Page no – 75.

	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)	
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.	Land already under possession of proponent. The land ownership document is enclosed as **Annexure IV.**
xiii	R&R details in respect of land in line with state Government policy	Not Applicable.
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)	Not Applicable as no forest land is proposed to use.
ii	Land use 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)	Not Applicable as no forest land is propose to use.
iii	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.	Not Applicable as no forest land is propose to use.
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	The Pulicat Sanctuary is located at distance of 7.8 km from project site. We obtained NBWL clearance for Pulicat Sanctuary and attached as Annexure XI.
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.	There is no Schedule 1 fauna found 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	The Pulicat Sanctuary is located at distance of 7.8 km from project site. We obtained NBWL clearance for Pulicat Sanctuary and attached as Annexure XI.
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.	The site specific micro-meteorological data is provided in Section-3.2 of Chapter -3, Page no– 38-41.
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 forests.	AAQ locations, parameters & results are detailed in Section-3.3 of Chapter-3, Page no – 41-47.
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.	Raw data of all AAQ measurement for 12 weeks of all stations are enclosed as **Annexure XVI**.
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.	Two (2) surface water samples were collected as grab samples and analysed for various parameters to compare with the standards for drinking water as per IS: 10500:2012. The details of Surface water quality have been given in Table-3.10 of chapter - 3, page no:58-59.
v	Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details.	The site does not fall near to polluted stretch of river.
vi	Ground water monitoring at minimum at 8 locations shall be included.	The ground water monitoring details are given in Section-3.5 of Chapter-3, Page no– 51. The details of Ground water quality have been given in Table-3.9 of chapter-3, page no: 53 to 59.
vii	Noise levels monitoring at 8 locations within the study area.	The noise level monitoring details are given in Section-3.4, Table-3.6 of Chapter 3, Page no – 50.
viii	Soil Characteristic as per CPCB guidelines.	The soil characteristics are detailed in Section - 3.6 of Chapter-3, Page no–60 to 65.
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.	The traffic circulation details are given in Section-3.8 of Chapter-3, Page no – 71-75.
x	Detailed description of flora and fauna	The flora & fauna of the study area is detailed in Section-3.7 of Chapter-3, Page no: 65-71.

	(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.	The socio-economic status of the study area is given in Section - 3.11 of Chapter-3, Page no: 81-84.
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 plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	The air quality modelling details are given Section-4.4.2 of Chapter-4, Page no: 93-101.
ii	Water Quality modelling - in case of discharge in water body	Not Applicable as no wastewater is proposed to discharge into 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 railcum road transport or conveyor-cum-rail transport shall be examined.	The impact of proposed transport on surrounding environment is given in Section-4.4.6 of Chapter-4, Page no: 104.
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 wastewater treatment details are provided in Section-2.7.2 of Chapter-2, Page no: 36. No trade effluent is generating in the plant.
v	Details of stack emission and action plan for	The stack emission details are given in Section-

	control of emissions to meet standards.	2.7.1, Table-2.7 of Chapter – 2, Page no: 33.
vi	Measures for fugitive emission control	The fugitive emission control measures are detailed in sub section -4.4.2. of Chapter - 4 Page no: 93.
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.	Hazardous waste agreement has been attached as Annexure XV.
viii	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	The fly ash management details are given in Section- 2.7.3, Table-2.8 of Chapter - 2, Page no: 36.
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.	The greenbelt area details are given in section-10.5, Table-10.2 of Chapter - 10, Page no: 158-160.
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 freshwater and reduce the water requirement from other sources.	The Rainwater harvesting details are given in Section-10.6 of Chapter-10, Page no– 161-163.
xi	Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	The Environmental pollution control measures cost details are given Section-10.7, Table-10.3 of Chapter- 10, Page no:163.
xii	Action plan for post-project environmental monitoring shall be submitted.	The environmental monitoring program is detailed in Chapter-6, Page no: 112.
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.	The Disaster Management Plan details are given Section-7.2 of Chapter-7, Page no: 123.
8	**Occupational health**	

i	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers	Plan on occupational health & safety details are covered in Section -7.3.1 of Chapter -7, Page no: 139.
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.	The health status of workers is covered in Section – 7.3.1 of Chapter - 7, Page no:139.
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,	The Occupational & Safety Hazards details are covered in Section – 7.3.1 of Chapter - 7, Page no: 139.
iv	Annual report of heath status of workers with special reference to Occupational Health and Safety.	The Occupational & Safety Hazards details are covered in Section-7.3.1 of Chapter - 7, Page no: 139.
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.	Detail of Environmental management cell has been in Figure-10.1 of Chapter -10, Page no: 156.
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.	Hierarchical Structure to deals with Environmental issues is detailed in Figure-10.1 of Chapter-10, Page no: 156.
iv	Does the company have system of reporting	We have formed Environment management

	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	cell to report non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders and the details of EMP cell has been included in Chapter 10.
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.	Details about infrastructure facilities to be provided to the labor force are covered in Section – 2.4.6 of Chapter -2, Page no: 21.
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.	Details about CER are provided in Section – 10.8, Table-10.4 of Chapter – 10, Page no: 163.
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.	No litigation pending against the project.
13	A tabular chart with index for point wise compliance of above TOR.	TOR Compliance Report is enclosed.
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).	Process flow diagram is provided in Section-2.6 , Figure- 2.6 & 2.7 of Chapter -2, Page no: 24 & 26. Mass balancing chart is given in Figure 2.2 & 2.3, Page No.15
2	Details on blast furnace / open hearth furnace / basic oxygen furnace / ladle refining, casting and rolling plants etc.	Detail about proposed furnace is provided in Section – 2.6.1 of Chapter -2, Page no: 22.
3	Details on installation / activation of opacity meters with recording with proper calibration system.	Noted and will be complied

4	Details on toxic metals including mercury, arsenic and fluoride emissions	Not envisaged as it is re-melting of MS scrap and sponge iron.
5	Details on stack height requirement for integrated steel	Not Applicable as it is not an integrated steel plant
6	Details on ash disposal and management - Non-ferrous metal	Not Applicable
7	Complete process flow diagram describing production of lead/zinc/copper/ aluminium, etc.	Not Applicable
8	Raw materials substitution or elimination	Not Applicable.
9	Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	Not Applicable
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	Not Applicable
11	Details on solvent recycling	Not Applicable
12	Details on precious metals recovery	Not Applicable
13	Details on composition, generation and utilization of waste/fuel gases from coke oven plant and their utilization.	Not Applicable
14	Details on toxic metal content in the waste material and its composition and end use (particularly of slag).	Slag disposal details has been given in section-2.7.3, Table-2.8 of Chapter-2, page no:36.
15	Trace metals Mercury, arsenic and fluoride emissions in the raw material.	No trace metals emissions in the raw material.
16	Trace metals in waste material especially slag.	Slag disposal details has been given in section-2.7.3,Table-2.8 of Chapter-2, page no:36.
17	Plan for trace metal recovery	Not Applicable
18	Trace metals in water	Trace metals in water is BDL only. The details are given section-3.5.2, Table-3.9 & 3.10 of Chapter-3, Page no: 53-57

File No: 10905
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), TAMIL NADU)
***

Dated **04/07/2024**

To,

N Prabu
ARS STEELS AND ALLOY INTERNATIONAL PRIVATE LIMITED
ARS Steels & Alloy International Pvt Ltd, Plot No. 38-52, B1S, B1 Part, SIPCOT Industrial complex, Gummidipoondi , THIRUVALLUR, TAMIL NADU, , 601201
arssaipl.ec@gmail.com

Subject: Grant of Terms of Reference with Public Hearing under the provision of the EIA Notification 2006 as amended-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference with Public Hearing under the provision of the EIA Notification 2006-regarding in respect of project of the Proposed Expansion of Existing Steel Melting Plant located at Plot no E-39-52, B-1/S, B1 part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu by **M/s. ARS Steels & Alloy International Private Limited** submitted to Ministry vide proposal number SIA/TN/IND1/472044/2024 dated 12/06/2024.

Ref:

1. Online Application No. SIA/TN/IND1/472044/2024 dated 07.05.2024.
2. Your application for Terms of Reference dated: 28.05.2024

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO24B1010TN5601831N
(ii) File No.	10905
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	3(a) Metallurgical Industries (ferrous and non ferrous),3(a) Metallurgical Industries (ferrous and non ferrous)
(vii) Name of Project	Proposed Expansion of Steel Melting plant by M/s. ARS Steels & Alloy International Private Limited
(viii) Name of Company/Organization	ARS STEELS AND ALLOY INTERNATIONAL PRIVATE LIMITED

(ix) Location of Project (District, State)	THIRUVALLUR, TAMIL NADU
(x) Issuing Authority	SEIAA
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by (SEIAA) Appraisal Committee of SEIAA in the meeting held on 13/06/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B,] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

5. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects and public hearing issues and compliance thereto furnished by the Project Proponent, recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).

6. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to grant Terms of Reference for instant proposal of Thiru.N Prabu under the provisions of EIA Notification, 2006 and as amended thereof.

7. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

8. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.

9. This issues with the approval of the Competent Authority.

10. The **TORs with Public Hearing** prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August 2017.

Copy To

1. The Principal Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Additional Chief Secretary to Government, Industries, Investment Promotion & Commerce Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
3. The Chairman, Central Pollution Control Board, Parivesh Bhavan,
CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
4. The Chairperson, Tamil Nadu Pollution Control Board,
76, Mount Salai, Guindy, Chennai - 600 032.
5. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
6. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC,
Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
7. The District Collector, Thiruvallur District.
8. Stock File.

Annexure 1

1. Seac Conditions - Site Specific

S. No	Terms of Reference
1.1	1. The project proponent, **M/s. ARS Steels & Alloy International Private Limited** has applied seeking Terms of reference for EIA study proposes expansion of existing Steel Melting Plant located at Plot no B-1/S, 39-52, B1/S part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. 2. The project activity is covered under Schedule No. (3a) (Metallurgical Industries- Ferrous & Non-Ferrous) of EIA notification, 2006 and its subsequent amendments. 3. Pulicat Bird Sanctuary is located at a distance of 6.48 km (NE). NBWL Clearance obtained vide Lr.No.F.No.WL-6/33-2024-WL dated 28.02.2024 4. Existing EC Lr. No. SEIAA-TN/6443/EC/3(a)/2024 Dated:17.04.2024 5. The project proponent has proposed expansion of existing Steel Melting Plant from **2,88,000 TPA to 6,00,000 TPA of MS Billets** and **2,50,000 TPA to 5,70,000 TPA of TMT Bars**. Based on the presentation made by the proponent and the documents furnished, the **SEAC decided to prescribe ToR for the preparation of detailed EIA report along with Public Hearing.** The Detailed EIA shall include Standard ToR prescribed by MoEF&CC for Metallurgical Industries (**Annexure III**) along with the following additional ToR: **2. PP should either purchase or produce green power to cover minimum of 75% of its annual power consumption and submit an affidavit containing the road map for achieving the above target within a period of 3 years.** **3. The PP should furnish an affidavit stating that the NBWL clearance issued for the existing project is applicable for this expansion project as well.** **4. Composition, type and quantity of alloys used in the process and disposal of wastes.** **5. Source and quantity of virgin scrap and recycled scrap and its toxicity details.** **6. Justification for reduction in the quantity of sewage generated and non -requirement of ETP along with the TNPCB RoA reports of the existing facility shall be furnished.** **7. Recent energy audit report of the existing facility.** 8. The PP shall furnish the video graph of the entire plant operations. 9. DFO letter stating the proximity details of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site. 10. The PP shall furnish the details of arrangement made for permanent water supply from competent authority. 11. Efficiency study/report of the existing furnace through reputed institution. 12. The PP shall discuss the best available technology available in this field and action plan for implementing the same. 13. The PP shall furnish action plan for harnessing 50% solar energy or shall purchase 75% renewable energy to meet the energy requirement. 14. The PP shall furnish the road map for achieving 100% green energy in 2030. 15. The PP shall furnish the action plan for 100% use of Electric Vehicles within next five years. 16. The PP shall furnish the action plan for the implementing the CER activities as committed. 17. The PP shall study in detail various operational measures to reduce the specific energy consumption in induction furnaces. 18. The proponent shall furnish details on the idling period provided.

S. No	Terms of Reference
	19. The proponent shall furnish details on measures adopted for better and efficient operation of melting & charging. 20. The proponent shall furnish details on the control measures adopted during heat finishing and tapping. 21. The proponent shall study in detail about operational control measures to Minimize and control the refractory wall wearing. 22. The proponent shall explore the possibilities of utilizing state of the art technology with best global practice. 23. The proponent shall explore the possibilities of utilizing the treated wastewater instead of fresh water. 24. The proponent must increase the Solar and Wind Energy sources and must explore the possibilities of achieving Net Zero energy consumption. 25. The proponent shall submit the copy of the consent to operate and the latest renewal consent order obtained from the TNPCB. 26. The proponent shall submit the compliance report from TNPCB for the conditions imposed in the consent order issued by the TNPCB. 27. The Environmental pollution control measures taken to deal with Air pollution, effluent generation and slag generation should be discussed in detail. 28. 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 the 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. 29. The proponent shall submit the video and photograph of the operational details with particular reference to points of pollution in the existing plant. 30. Material balance and Water balance shall be furnished in accordance with MoEF&CC guidelines. 31. A detailed report on Solid waste & hazardous waste management shall be furnished. 32. Report on AAQ survey and proposed air pollution prevention and control measures shall be furnished in the EIA report. 33. The project proponent shall do the stoichiometric analysis of all the involved reactions to assess the possible emission of air pollutants in addition to the criteria pollutants, from the proposed project. 34. **Adequacy report for ETP &STP for the proposed project obtained from any reputed Government institution such as IIT, Anna University, NIT shall be furnished**. 35. Land use classification shall be obtained from the DTCP for the Survey Numbers of this project. Further, the project proponent shall submit the planning permission obtained from the DTCP, if any. 36. The proponent shall conduct the EIA study and submit the EIA report for the entire campus along with layout and necessary documents such as “A” register and village map. 37. Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly. 38. The Public hearing advertisement shall be published in one major National daily and one most circulated Tamil daily.

S. No	Terms of Reference
	39. The PP shall produce/display the EIA report, executive summary and other related information with respect to public hearing in Tamil. 40. The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purposes involved in the project. 41. The project proponent shall obtain clearance from the National Board for Wildlife, if applicable. 42. The project proponent shall explore the possibilities of treating and utilizing the trade effluent and sewage within the premises to achieve Zero liquid discharge. 43. The layout plan shall be furnished for the greenbelt area earmarked with GPS coordinates by the project proponent on the periphery of the site and the same shall be submitted for CMDA/DTCP approval. The green belt width should be at least 3m wide all along the boundaries of the project site. The green belt area should be not less than l5 % of the total land area of the project. 44. As the plant operation involves sensitive processing, the medical officer and the supporting staff involved in the health center activities shall be trained in occupational health surveillance (OHS) aspects through outsourced training from the experts available in the field of OHS for ensuring the health standard of persons employed. 45. The proposal for Roof Top solar panel shall be included in the EIA Report. 46. As per the MoEF&CC Office Memorandum F. No. 22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall furnish the detailed EMP.

2. Seiaa Specific Conditions:

S. No	Terms of Reference
2.1	After detailed discussions, the SEIAA accepted the recommendation of SEAC and decided to grant **Terms of Reference (ToR) with Public Hearing** based on studies, assessments and records to be produced as sought by the SEAC and SEIAA, for undertaking the Environment Impact Assessment Study and preparation of Environment Management Plan subject to the following conditions and that recommended by SEAC & SEIAA 1. The PP shall carryout additional study on energy conservation, energy management and energy reduction. 2. The PP shall study the impact of hazardous and other wastes generated from the process. 3. The PP shall study the impact of carbon dioxide emission and particulate matter. 4. To study the impact of Soil and Water. 5. To detail the proposed innovative good housekeeping practices. 6. The PP shall carryout detailed LCA study for the products to be manufactured. 7. 7. The PP shall study the impact of the proposed activity on human health and temperature rise. 8. Details of production process along with flow chart.

Standard Terms of Reference for Industrial Projects - 1

1. Preliminary Requirements

S. No	Terms of Reference
1.1	EIA/EMP report cover page shall consists of project title with location, applicable schedule of the EIA Notification, 2006, ToR letter No. with date, study period along with EIA consultant & laboratory details with QCI/NABET/NABL accreditation certificate detail.

S. No	Terms of Reference
1.2	Besides, following points shall be compiled as per QCI/NABET norms: a. Disclaimer by the EIA consultant. b. Declaration by the Functional Area Experts contributed to the EIA study and declaration by the head of the accredited consultant organization/authorized person. c. Undertaking by the project proponent owning the contents (information and data) of the EIA/EMP report. d. Undertaking by the EIA consultant regarding compliance of ToR issued by MoEF&CC. e. Consultant shall submit the Plagiarism Certificate for the EIA/EMP Report.

2. Executive Summary

S. No	Terms of Reference
2.1	Table of Contents of the EIA report including list of tables/figures/annexures/abbreviations/symbols/notations.
2.2	Point wise compliance to the ToR issued by MoEF&CC.

2.1 Introduction

S. No	Terms of Reference
2.1.1	Name of the project along with applicable schedule and category as per EIA, 2006.
2.1.2	Location and accessibility

2.2 Project Description

S. No	Terms of Reference
2.2.1	Resource requirements (Land; water; fuel; manpower)
2.2.2	Operational activity
2.2.3	Key pollution concerns

2.3 Baseline Environment Studies

S. No	Terms of Reference
2.3.1	Ambient air quality
2.3.2	Ambient Noise quality
2.3.3	Traffic study
2.3.4	Surface water quality
2.3.5	Ground water quality
2.3.6	Soil quality

S. No	Terms of Reference
2.3.7	Biological Environment
2.3.8	Land use
2.3.9	Socio-economic environment

2.4 Anticipated Impacts

S. No	Terms of Reference
2.4.1	Impact on ambient air quality
2.4.2	Impact on ambient noise quality
2.4.3	Impact on road and traffic
2.4.4	Impact on surface water resource and quality
2.4.5	Impact on ground water resource and quality
2.4.6	Impact on terrestrial and aquatic habitat
2.4.7	Impact on socio-economic environment

2.5 Alternative Analysis

S. No	Terms of Reference
2.5.1	No Data Found

2.6 Environmental Monitoring Program

S. No	Terms of Reference
2.6.1	Ambient air, noise, water and soil quality
2.6.2	Noise quality management plan
2.6.3	Emission and discharge from the plant
2.6.4	Green Belt
2.6.5	Social Parameters

2.7 Additional Studies

S. No	Terms of Reference
2.7.1	Risk assessment

S. No	Terms of Reference
2.7.2	Public consultation
2.7.3	Action plan to address the issues raised during public consultation as per MoEF&CC O.M. dated 30/09/2020

2.8 Project Benefits

S. No	Terms of Reference
2.8.1	No Data Found

2.9 Environment Management Plan

S. No	Terms of Reference
2.9.1	Air quality management plan
2.9.2	Noise quality management plan
2.9.3	Solid and hazardous waste management plan
2.9.4	Effluent management plan
2.9.5	Storm water management plan
2.9.6	Occupational health and safety management plan
2.9.7	Green belt development plan
2.9.8	Socio-economic management plan
2.9.9	Project cost and EMP implementation budget.

3. Introduction

S. No	Terms of Reference
3.1	Background about the project
3.2	Need of the project
3.3	Purpose of the EIA study
3.4	Scope of the EIA study

4. Project Description

4.1 Site Details

S. No	Terms of Reference
4.1.1	Location of the project site covering village, Taluka/Tehsil, District and State.
4.1.2	Site accessibility
4.1.3	A digital toposheet in pdf or shape file compatible to google earth of the study area of radius of 10km and site location preferably on 1:50,000 scale. (including all eco-sensitive areas and environmentally sensitive places).
4.1.4	Latest High-resolution satellite image data having 1 m - 5 m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100 m all around the project location.
4.1.5	Environment settings of the site and its surrounding along with map.
4.1.6	A list of major industries with name, products and distance from plant site within study area (10km radius) and the location of the industries shall be depicted in the study area map.
4.1.7	In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.
4.1.8	In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.
4.1.9	In case of canal/ nala/ seasonal drain and any other water body passing through project site, the PP shall submit the suitable steps /conservation plan/mitigation measures along with contouring, Run -off calculations, disposal etc. A robust and full proof Drainage Conservation scheme to protect the natural drainage/water bodies and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be provided in the report.
4.1.10	Type of land, land use of the project site needs to be submitted.
4.1.11	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.
4.1.12	Project proponent shall prepare Engineering layout plan showing all internal roads minimum 6 m width and 9 m turning radius for smooth traffic flow inside including fire tender as per NBC. Road network shall connect all service areas in layout. This drawing shall include area statement showing plot area, area under roads, parking, green belt with calculations and % with respect to plot area of project site and proper indexing. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.
4.1.13	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including Rain Water Harvesting details with calculations mentioning about GW recharge along with relevant

S. No	Terms of Reference
	drawing.
4.1.14	A detailed report covering all aspects of Fire Safety Management and Fire Emergency Plan shall be submitted.
4.1.15	Details of drone survey for the site, needs to be included in report and presented before the SEAC during appraisal of the project.

4.2 Forest And Wildlife Related Issues (If Applicable)

S. No	Terms of Reference
4.2.1	Status of Forest Clearance for the use of forest land shall be submitted.
4.2.2	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10 km radius of national park/sanctuary wherein final ESZ notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.
4.2.3	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.
4.2.4	Wildlife Conservation Plan duly authenticated by the Competent Authority of the State Government for conservation of Schedule I fauna along with budget and action plan, if any exists in the study area.

4.3 Salient Features Of The Project

S. No	Terms of Reference
4.3.1	Products with capacities in Tons per Annum for the proposed project.
4.3.2	If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.
4.3.3	Site preparatory activities.
4.3.4	List of raw materials required and their source along with mode of transportation.
4.3.5	Other than raw materials, other chemicals and materials required with quantities and storage capacities.
4.3.6	Manufacturing process details along with process flow diagram of proposed units.
4.3.7	Consolidated materials and energy balance for the project.
4.3.8	Total requirement of surface/ ground water and power with their respective sources, status of

S. No	Terms of Reference
	approval.
4.3.9	Water balance diagram
4.3.10	Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.
4.3.11	Man-power requirement.
4.3.12	Cost of project and scheduled time of completion.
4.3.13	In case of expansion projects, project proponent shall submit structural stability certificate showing whether existing structure withstand for proposed expansion activity.
4.3.14	Brief on present status of compliance (Expansion/modernization proposals) a. Cumulative Environment Impact Assessment for the existing as well as the proposed expansion/modernization shall be carried out. b. Cumulative Impact Assessment need to be carried out by greenfield projects considering the nearby industries. c. In case of ground water drawl for the existing unit, action plan for phasing out of ground water abstraction in next two years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source. d. Copy of all the Environment Clearance(s) including Amendments/validity of extension/transfer of EC, there to obtained for the project from MoEF&CC/SEIAA shall be attached as Annexures. A Certified Compliance Report (CCR) of the Integrated Regional Office of the Ministry of Environment, Forest and Climate Change/ or concerned authority as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022 on the status of compliance of conditions stipulated in all the existing environment clearances including amendments shall be provided. A Certified Compliance Report (CCR) issued by the concerned Authority shall be valid for a period of one year from the date of inspection. e. In case the existing project has not obtained Environment Clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. A proper justification needs to be submitted along with documentary proof. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 1994 or 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of CTO from the Regional Office of the SPCB shall be submitted, as per OM No. IA3-22/10/2022-IA.III [E 1772581], dated 8th June, 2022. CCR on CTO conditions issued by the concerned SPCBs/PCCs shall be valid for a period of one year from the date of inspection of the project.

5. Description Of The Environment

S. No	Terms of Reference
5.1	Study period
5.2	Approach and methodology for data collection as furnished below **Attributes** | **Sampling** Network | Frequency | **Remarks** Air Environment Micro-Meteorological | Minimum 1 site | hourly continuous | IS 5182 Part 1-20

S. No	Terms of Reference			
	• Wind speed (Hourly) • Wind direction • Dry bulb temperature • Wet bulb temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental • Lapse Rate	in the project impact area		• Site specific primary data is essential • Secondary data from IMD, New Delhi • CPCB guidelines to be considered.
	Pollutants • PM10 • SO2 • NOx • CO • HC • Other parameters relevant to the project and topography of the area	At least 8-12 locations	As per National Ambient Air Quality Standards,CPCB Notification.	• Sampling as per CPCB guidelines • Collection of AAQ data (except in monsoon season) • Locations of various stations for different parameters should be related to the characteristic properties of the parameters. • The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16/11/2009 and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests, • Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM Notification of 16/11/2009 along with min., max., average and 98% values for each of the AAQ parameters from data

S. No	Terms of Reference
	of all AAQ stations should be provided as an annexure to the EIA Report. Noise Hourly equivalent noise levels — At least 8-12 locations — s per CPCB norms Water Parameters for water quality • pH, temp, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity • Total nitrogen, total phosphorus, DO, BOD, COD, Phenol • Heavy metals • Total coliforms, faecal coliforms • Phyto plankton • Zoo plankton — Samples for water quality should be collected and analyzed as per: • IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents • Standard methods for examination of water and wastewater analysis published by American Public Health Association For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen Demand • Free NH4 • Boron • Sodium Absorption Ratio • ElectricalConductivity — Surface water quality of the nearest River (60m upstream and downstream) and other surface water bodies • Yield of water sources to be measured during critical season • Standard methodology for collection of surface water (BIS standards) For Ground Water — Ground water monitoring data should be collected at minimum of 8 locations (from existing wells /tube wells/existing current records) from the study area and shall be included. Traffic Study Type of vehicles — Land Environment

S. No	Terms of Reference	
	• Frequency of vehicles for transportation of materials • Additional traffic due to proposed project Soil • Particle size distribution • Texture • pH • Electrical conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR • Permeability Water holding capacity • Porosity Land use/Landscape • Location code • Total project area • Topography • Drainage (natural) Cultivated, forest,plantations, water bodies, roads and settlements Biological Environment 1. Aquatic • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zoo plankton and benthos • Fisheries Diversity indices • Trophic levels	Soil samples be collected as per BIS specifications • 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. Indicator species which indicate ecological and environment degradation should be identified and included to clearly state whether the proposed project would result in to any adverse effect on any species. • Samples to collect from upstream and downstream of discharge point, nearby tributaries at downstream, and also from dug wells close to activity site. • For forest studies, direction of wind should be considered while

S. No	Terms of Reference
	• Rare and endangered species • Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ) selecting forests. • Secondary data to collect from Government offices, NGOs, published literature. 2. Terrestrial • Vegetation-species list, economic importance, forest produce,medicinal value • Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered species • Sanctuaries / National park / Biosphere reserve • Migratory routes socio-economic Demographic structure • Infrastructure resource base • Economic resource base • Health status:Morbidity pattern • Cultural and aesthetic attributes. • Education Socio-economic survey is based on proportionate, stratified and random sampling method. • Primary data collection through questionnaire • Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies Approach and methodology for data collection as furnished below **Attributes** / **Sampling** (Network, Frequency) / **Remarks** Air Environment Micro-Meteorological • Wind speed (Hourly) — Minimum 1 site in the project impact area — hourly continuous — IS 5182 Part 1-20 • Site specific primary data

S. No	Terms of Reference			
	• Wind direction • Dry bulb temperature • Wet bulb temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental • Lapse Rate			is essential • Secondary data from IMD, New Delhi • CPCB guidelines to be considered.
	Pollutants • PM10 • SO2 • NOx • CO • HC • Other parameters relevant to the project and topography of the area	At least 8-12 locations	As per National Ambient Air Quality Standards,CPCB Notification.	• Sampling as per CPCB guidelines • Collection of AAQ data (except in monsoon season) • Locations of various stations for different parameters should be related to the characteristic properties of the parameters. • The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16/11/2009 and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests, • Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM Notification of 16/11/2009 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

S. No	Terms of Reference
	annexure to the EIA Report. Noise Hourly equivalent noise levels — At least 8-12 locations — s per CPCB norms Water Parameters for water quality • pH, temp, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity • Total nitrogen, total phosphorus, DO, BOD, COD, Phenol • Heavy metals • Total coliforms, faecal coliforms • Phyto plankton • Zoo plankton Samples for water quality should be collected and analyzed as per: • IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents • Standard methods for examination of water and wastewater analysis published by American Public Health Association For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen Demand • Free NH4 • Boron • Sodium Absorption Ratio • ElectricalConductivity Surface water quality of the nearest River (60m upstream and downstream) and other surface water bodies • Yield of water sources to be measured during critical season • Standard methodology for collection of surface water (BIS standards) For Ground Water Ground water monitoring data should be collected at minimum of 8 locations (from existing wells /tube wells/existing current records) from the study area and shall be included. Traffic Study Type of vehicles • Frequency of vehicles for transportation of materials — Land Environment

S. No	Terms of Reference	
	• Additional traffic due to proposed project Soil • Particle size distribution • Texture • pH • Electrical conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR • Permeability Water holding capacity • Porosity Land use/Landscape • Location code • Total project area • Topography • Drainage (natural) Cultivated, forest,plantations, water bodies, roads and settlements Biological Environment 1. Aquatic • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zoo plankton and benthos • Fisheries Diversity indices • Trophic levels • Rare and endangered species	Soil samples be collected as per BIS specifications • 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. Indicator species which indicate ecological and environment degradation should be identified and included to clearly state whether the proposed project would result in to any adverse effect on any species. • Samples to collect from upstream and downstream of discharge point, nearby tributaries at downstream, and also from dug wells close to activity site. • For forest studies, direction of wind should be considered while selecting forests. • Secondary data to collect from Government offices, NGOs,

S. No	Terms of Reference
	• Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ) published literature. 2. Terrestrial • Vegetation-species list, economic importance, forest produce,medicinal value • Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered species • Sanctuaries / National park / Biosphere reserve • Migratory routes socio-economic Demographic structure • Infrastructure resource base • Economic resource base • Health status:Morbidity pattern • Cultural and aesthetic attributes. • Education Socio-economic survey is based on proportionate, stratified and random sampling method. • Primary data collection through questionnaire • Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies
5.3	Interpretation of each environment attribute shall be enumerated and summarized as given below: • Ambient air quality • Ambient Noise quality • Surface water quality • Ground water quality • Soil quality • Biological Environment • Land use • Socio-economic environment
5.4	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.

6. Anticipated Environment Impacts And Mitigation Measures (In Case Of Expansion, Cumulative Impact

Assessment Shall Be Carried Out)

S. No	Terms of Reference
6.1	Identification of potential impacts in the form of a matrix for the construction and operation phase for all the environment components **Activity** **Environment** **Ecological** **Socio-economic** Construction phase Operation phase
6.2	Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase • Details of stack emissions from the existing as well as proposed activity. • Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any along with wind rose map for respective period • Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.
6.3	Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.4	Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.5	Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.6	Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.7	Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.8	Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.9	Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.10	Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase
6.11	Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact) a. Construction phase b. Operation phase

7. Analysis Of Alternatives (Technology & Site)

S. No	Terms of Reference
7.1	No project scenario
7.2	Site alternative
7.3	Technical and social concerns
7.4	Conclusion

8. Environmental Monitoring Program

S. No	Terms of Reference
8.1	Details of the Environment Management Cell
8.2	Performance monitoring schedule for all pollution control devices shall be furnished.
8.3	Corporate Environment Policy a. 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. b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environment or forest norms / conditions? If so, it may be detailed in the EIA. c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given.Page 9 of 10 d. Does the company have system of reporting of non compliances / violations of environment 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
8.4	Action plan for post-project environment monitoring matrix: **Activity Aspect Monitoring Parameter Location Frequency Responsibility** Construction phase Operation phase

9. Additional Studies

S. No	Terms of Reference
9.1	Project proponent shall submit a study report on Decarbonisation program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage after offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments should be measurable and monitorable with defined time frames.

S. No	Terms of Reference
9.2	Details of adoption/ implementation status/plan to achieve the goal of Glasgow COP26 Climate Submit with regard to enhance the non-fossil energy, use of renewable energy, minimization of net carbon emission and carbon intensity with long-term target of "net Zero" emission.
9.3	Implementation status/measures adopted for avoiding the generation of single used plastic waste.
9.4	In cases the project is located in Critically and Severely Polluted Areas, additional mitigation measures adopted and detailed action plan to be submitted in the EIA/EMP Report as per MoEF&CC O.M. No. 22-23/2028-IA.III dated 31/10/2019 and MoEF&CC O.M. No. 22-23/2028-IA.III dated 5/07/2022 has to be submitted.
9.5	Public consultation details (Entire proceedings as separate annexure along with authenticated English Translation of Public Consultation proceedings).
9.6	As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration. In this regard, time bound action plan as per the MoEF&CC Office Memorandum dated 30/09/2020 shall be submitted.
9.7	Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020 **S.No** / **Physical activity and action plan** (Name of the Activity / Physical Targets) / **Year of implementation (Budget in INR)** (1st / 2nd / 3rd) / **Total Expenditure (Rs. in Crores)**
9.8	Risk assessment • Methodology • Hazard identification • Frequency analysis • Consequence analysis • Risk assessment outcome
9.9	Emergency response and preparedness plan

10. Project Benefits

S. No	Terms of Reference
10.1	Environment benefits
10.2	Social infrastructure
10.3	Employment and business opportunity

S. No	Terms of Reference
10.4	Other tangible benefits

11. Environment Cost Benefit Analysis

S. No	Terms of Reference
11.1	Net present value
11.2	Internal rate of return
11.3	Benefit cost ratio
11.4	Cost effectiveness analysis

12. Environment Management Plan (Construction And Operation Phase)

S. No	Terms of Reference
12.1	Air quality management plan
12.2	Noise quality management plan
12.3	Action plan for hazardous waste management
12.4	Action plan for solid waste management
12.5	Action plan for e-waste management.
12.6	Action plan for plastic waste management, considering the Plastic Waste Management Rules 2016.
12.7	Action plan for construction and demolition waste management.
12.8	Effluent management plan
12.9	Storm water management plan
12.10	Rain water harvesting plan
12.11	Plan for maximum usage of waste water/treated water in the Unit
12.12	Occupational health and safety management plan
12.13	Green belt development plan: An action plan for Green Belt development consisting of 3 tiers of plantations of native species all along the periphery of the project of adequate width shall be raised in 33% of total area with a tree density shall not less than 2500 per ha within a time frame of one year shall be submitted. Survival rate of green belt shall be monitored on periodic basis to ensure that survival rate not be less than 80 %.

S. No	Terms of Reference
12.14	Socio-economic management plan
12.15	Wildlife conservation plan (In case of presence of schedule I species)
12.16	Total capital cost and recurring cost/annum for environment pollution control measures shall be included.
12.17	Explore possibilities for recycling and reusing of treated water in the unit to reduce the freshwater demand and waste disposal.
12.18	An Action Plan for improving the house-keeping activities in the raw material handling area need to be submitted
12.19	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.
12.20	Action plan to limit the dust emission from all the stacks below 30 mg/Nm3 shall be furnished.
12.21	Action plan for fugitive emission control in the plant premises shall be provided.

13. Conclusion Of The Eia Study

S. No	Terms of Reference
13.1	No Data Found

14. In Addition To The Above, 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.

S. No	Terms of Reference
14.1	No Data Found

15. Air Cooled Condensors Shall Be Used In The Power Plant.

S. No	Terms of Reference
15.1	No Data Found

16. Details Of Dry Ash Handling System Along With Supplementary Coal Handling System Shall Be Submitted.

S. No	Terms of Reference
16.1	No Data Found

17. Plan For Transportation Of Coal Shall Be Submitted.

S. No	Terms of Reference
17.1	No Data Found

18. Plan Along With Technical Details Of Scr Shall Be Submitted.

S. No	Terms of Reference
18.1	No Data Found

19. In Case Of Expansion Project, Status Of Ash Utilization Of Previous Years (Up To 5 Years), Action Plan For 100% Ash Utilization Along With Timeline Need To Be Submitted

S. No	Terms of Reference
19.1	No Data Found

Standard Terms of Reference for (Metallurgical Industries (ferrous and non ferrous))

1.

S. No	Terms of Reference
1.1	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.
1.2	Plan for the implementation of the recommendations made for the proposed Unit in the Corporate Responsibility for Environmental Protection (CREP) guidelines.
1.3	Plan for solid wastes utilization.
1.4	Plan for utilization of energy in off gases (coke oven, blast furnace)
1.5	System of coke quenching adopted with full justification.
1.6	Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials.
1.7	Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
1.8	Details on toxic content using Toxicity Characteristic Leaching Procedure (TCLP), composition and end use of slag.
1.9	100 % dolo char generated in the plant shall be used to generate power.
1.10	Fourth Hole fume extraction system shall be provided for SAF.WHR system shall be installed to

S. No	Terms of Reference
	recover sensible heat from flue gases of EAF. Provision for installation of jigging and briquetting plant to utilise the fines generated in the process.
1.11	No tailing pond is permitted for Iron ore slimes. Dewatering and filtration system shall be provided.
1.12	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.
1.13	Action plan for developing connecting and internal road in terms of MSA as per IRC guidelines shall be submitted.
1.14	Action plan to limit the particulate matter emission from all the stacks below 30 mg/Nm3 shall be furnished.
1.15	Action plan for 100 % solid waste utilization shall be submitted.
1.16	PM (PM10 and P2.5) present in the ambient air must be analysed for source analysis – natural dust/RSPM generated from plant operations (trace elements) of PM10 to be carried over.
1.17	Iron ore/coal linkage documents along with the status of environment clearance of iron ore and coal mines, if applicable.
1.18	Quantum of production of coal and iron ore from coal & iron ore mines and the projects they cater to. Mode of transportation to the plant and its impact, if applicable.
1.19	Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials, if applicable.

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
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 existing 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 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 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 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 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.

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 heath 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.

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.

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
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 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.

In addition to the above, the following shall be furnished: -

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, 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, population,

with in 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be 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-fauna 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

The following general points shall be noted:

All documents shall be properly indexed, page numbered. Period/date of data collection shall be clearly indicated.

1. Authenticated English translation of all material provided in Regional languages.
2. The letter/application for EC shall quote the SEIAA. File No. and also attach a copy of the letter.
3. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report.
4. Certificate of Accreditation issued by the QCI to the environmental consultant shall be included.
5. The prescribed TORs would be valid for a period of Three years for submission of the EIA/EMP reports, as per the O.M. No. J- 11013/41/2006-IA. II(I) dated 22.08.2014. As per the Ministry of Environment, Forest and Climate Change Impact Assessment Division, Government of India, Circular Memo No. J-11013/41/2006-Ia-II (I) (Part) dated 7th November, 2015.
6. After preparing the draft EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned issues, 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 / EMP shall be submitted to the SEIAA – Tamil Nadu for obtaining Environmental Clearance.

7. The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
8. The TORs prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August 2017.

The receipt of this letter may be acknowledged.

ARS STEELS & ALLOYS INTERNATIONAL PVT LTD

B-1/S,SIPCOT INDUSTRIAL COMPLEX, & 39-52 EPIP AREA, GUMMIDIPOONDI- 601201.

North

W E

S

DRAWING PATH	D:\ROSE\2024\APRIL\ GUMMUDIPOONDI 20-04-2024 (SYS-7)
SIZE	A0
JOB NO	ATM/990/2024
REV NO	0

NOTE:-

1. All Dimensions Are In Meters.
2. Surveyed On 20th April 2024.
3. BM=10.000m Marked on North side Gate Security Shed Floor Level.
4. Spot Level Interval taken by as per site condation.
5. Grid Interval 50m.

LEGEND:-

SYMBOL	DESCRIPTION
	SITE BOUNDARY LINE
	COMPOUND WALL
	POWER POLE
	ELECTRICAL JUNCTION BOX
	LAMP POST
	MAN HOLE
	BADAM TREE
	MANGO TREE
	OTHER TEE
	COCONUT TREE
	GUAVA TREE
	NEEM TREE
	PEEPAL TREE
	TEAK TREE
	BOTR WELL
	EARTH PIT
	HIGH MAST
	WIRE FENCE
9.808	SPOT LEVEL
9.423	ROAD LEVEL
-1.313	DRAIN LEVEL

SITE AREA DETAILS

DESCRIPTION	SQ.MT	ACRES
TOTAL SITE AREA	57630.439	14.240

SCALE: 1:500 (1CM = 5.0M)

REVISION

SERVICE NO	REV.	DATE	DESCRIPTION	DRAWN	CHD	APPR
	A					
	0	23-4-2024	RAMESH	P.R	S.ROSE PONNAN	

TITLE

TOPOGRAPHICAL SURVEY MAP OF Ars Steels & Alloys International Pvt Ltd B-1/S,SIPCOT INDUSTRIAL COMPLEX, & 39-52 EPIP AREA, GUMMIDIPOONDI- 601201.

SURVEYED BY:

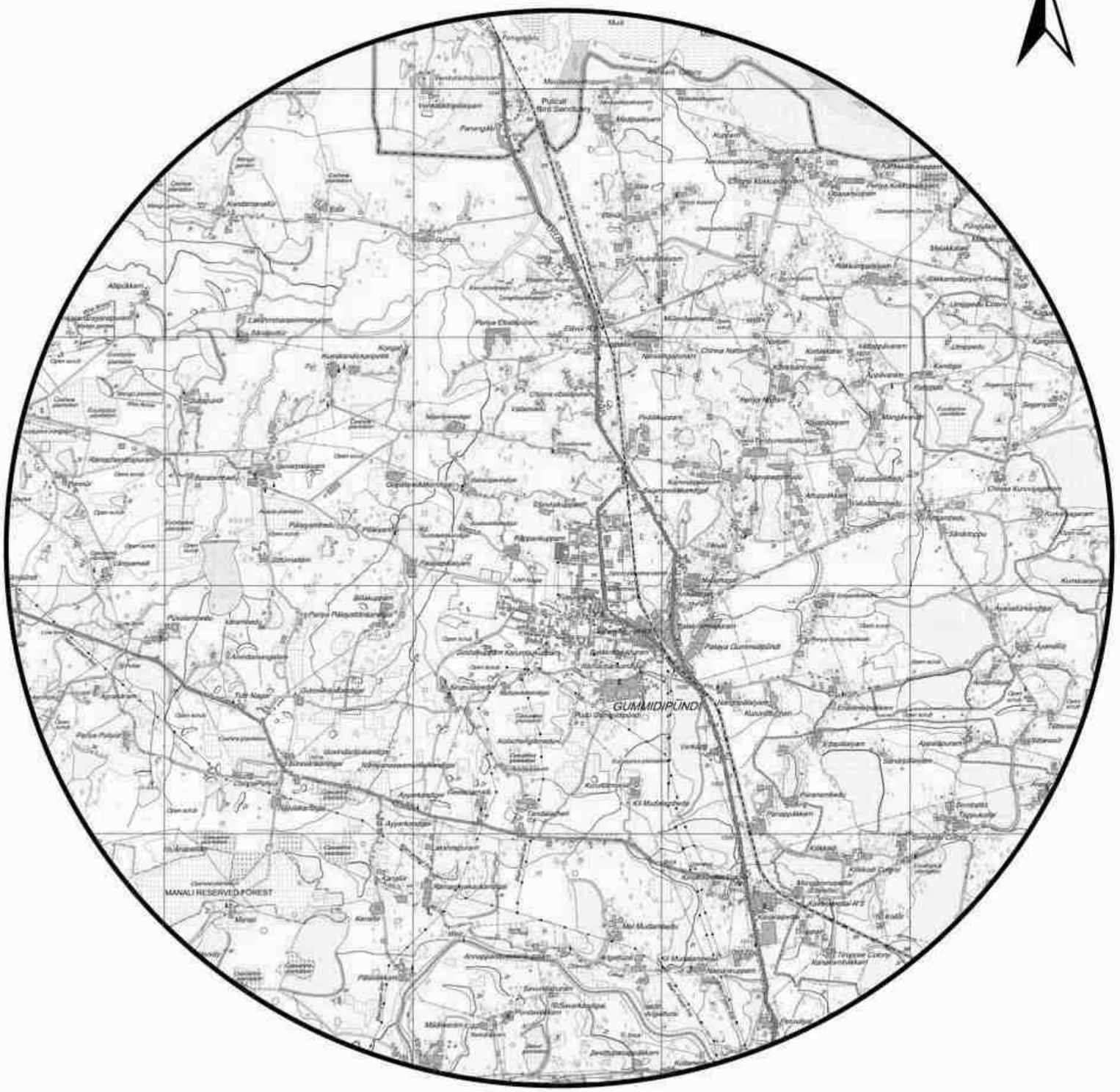
APEX TOPOMAPPERS INDIA L.L.P

TOPOMAPPING AND ENGINEERING SURVEYING

NO:20, West Park Road, First Floor,
Behind Ballesta Temple,
Shanthi Nagar, Chennai 600 092.

Tel : 24516152 / 24516153
Mobile : 9840062432
E-mail : aerose2006@yahoo.com

Toposheet No: 66C/2, 66C/3



4 2 0 4 Kilometers

M/s. ARS Steels & Alloy International Private Limited

10 km Topographic Map

Legend

- Project Site
- 10 km Radius

Data Source: Survey of India Toposheets

STATE INDUSTRIES PROMOTION CORPORATION OF TAMIL NADU LIMITED

(A Government of Tamil Nadu Undertaking)
Regd. Office : No. 19-A, Marshalls Road, Egmore, Post Box No. 7223, Madras-600 008.
Grams : "SIPCOT" Telex : 7736 Phone : 478261

(1)

BY R.P.A.D

Ref.No: ADS/GMP/480/90 Dated: 14.2.1991.

ORDER OF ALLOTMENT OF INDUSTRIAL PLOT.

To
M/s. A.R.S.Metals P.Ltd.,
B4/50 Paschim Vihar
New Delhi.110 063.

Dear Sir(s),

Sub: SIPCOT Industrial Complex- Gummidipoondi
Plot No. A7(d) measuring 2.00 acres plot(s) allottment - orders - issued - Reg.

Ref: Your Application No. -
Dated 19.7.90

We wish to inform you that we have decided to allot to your industry on a "long term lease" for a period of 99 years plot No(s) A7(d) measuring approximately 2.00 acres in SIPCOT Complex, Gummidipoondi for the manufacture of Alloy steel castings only.

The tentative premium payable for the plot No(s) A7(d) with an extent of 2.00 acres allotted to you at Rs. 2,50,000/- per acre is Rs. 5,00,000/- (Rupees five lakhs only)

The actual value of plot(s) will be determined with reference to the actual area to be handed over to you.

3. You have already paid Rs. 2000/- as plot deposit which has been adjusted towards 50% of the premium amounting to Rs. 2,50,000/- and the balance of Rs. 2,48,000/- shall be paid by you within 40 days from the date of this order, failing which;

a) It will be construed that you are not interested to take up the allotment and this order will be treated as cancelled, forfeiting the plot deposit at Rs.1,000/- per acre without any notice.

..2..

(2)

b) In case, on application in writing before the expiry of 40 days mentioned in para 3(a), you are given extension of time under special circumstances beyond 40 days, 50% of initial premium can be paid with an interest at 16.5% per annum from the date of expiry of 40 days to the date of payment of the amount, and in any case not exceeding 90 days in all from the date of order of allotment, otherwise allotment will automatically stand lapsed.

4. On payment of the 50% premium, you will be supplied with the draft lease deed. You should execute the lease deed and arrange for its registration within 40 days from the date of remittance of the 50% premium. If you fail to do so, you have to pay on the balance of 50% of premium, an interest @ 16.5% per annum, from the date of remittance of the first 50% premium, till the date of execution of lease deed or the date of handing over possession of plot(s) whichever is earlier.

5. The possession of plot(s) should be taken over within 30 days from the date of execution of lease deed, failing which the allotment will be cancelled and the total plot deposit of Rs.1,000/- per acre will be forfeited.

6. The balance premium of Rs.2,50,000/- less Rs.100/- i.e. Rs.2,49,900/- is payable in two half yearly instalments, the first instalment falling due on completion of six months from the date of execution of lease deed with interest @ 16.5% per annum. If the entire balance of 50% of premium is paid on or before the date of execution of lease deed, no interest shall be charged. The balance premium of Rs.100/- will be recovered as lease rent at the rate of one rupee per year for 98 years and at two rupees at the 99th year. The lease rent payable for the 1st year shall be paid at the end of the same calendar year in which the Lease Deed was executed. For the subsequent years, the rent shall be paid at the end of each calendar year. The balance 50% of premium on the plot as stated above should be paid even earlier if you have received any term loan on plot cost from the financial institutions at any time during the above said period.

..3..

7. Annual maintenance charges for the common amenities and facilities like sanitary, drainage, amenity buildings, roads, street lighting, gardens, avenue plants, parks etc., will be apportioned to allottees in the Industrial Complex from time to time. Hence you will have to Gummidipoondi pay the maintenance charges at the rate fixed by us annually.

Land revenue and other taxes for the plot(s) allotted to you shall be borne by you.

8. Normal interest at 16.5% per annum on the balance outstanding should be paid from the date of execution of the Lease Deed or from the date of taking over possession of the plot(s) whichever is earlier. Penal interest at 20% per annum will be charged for the period of arrears on all defaulted instalments. Overdue interest outstanding as on 31st March every year will attract penal interest @ 20% per annum, if not paid before 10th April of succeeding year.

9. In the event of the Civil Court or Tribunals ordering enhanced compensation on suits instituted by persons affected in the land acquisition on a later date, the enhanced amount will be apportioned to you in respect of the plot(s) allotted to you. In case, if we are able to make any savings as a result of our appeal, against the Judgement of the Civil Court the actual amount saved less the legal expenses incurred in the appeal will be apportioned on per acre basis" and refunded/adjusted to all the allottees.

10. You are bound by the terms and conditions in force from time to time, in the interest of the growth and development, of the industrial complex as a whole.

11. a) We have to take up many development works, for the benefit of the Industrial Complex as a whole, and provide infrastructures, such as power, water, amenity buildings etc. In these amenities, there would be direct and indirect benefits to the allottees and you have to share the proportionate cost other than the one already included in such amenities, infrastructures.

b) This allotment does not confer any right or guarantee for rendering financial assistance to your project by SIPCOT and you must make your own arrangements for the payment of premium regularly as per this allotment letter.

..4..

12. If, in the opinion of SIPCOT, it is found that the land allotted to you is not put into proper use/found to be in excess of the requirement, SIPCOT shall have the right to cancel or to resume the excess land and you shall be paid only the premium that has actually been paid or the market value of the excess land on the date of resumption, whichever is lower. The premium stated in this clause, does not include the interest and penal interest, if any, paid on the outstanding.

13. a) We also reserve the right to enter the premises of Industrial unit by the Officers/Staff for discharging the official duties and to make use of any piece of land, allotted to you for such essential common purpose like laying of pipe lines, sinking borewells, etc., without causing inconvenience to the operations of your unit to be located in the plot(s) allotted.

b) You should not sublet or transfer whole or any part of the above plot to any person.

14. Please note that you should not sink any well/ borewell or tube well within the site allotted to you and SIPCOT will arrange to supply upto 1000 gallons/~~litres~~ ///// one thousand gallons/~~litres~~ ///// only) of water only a day or at the rate fixed by SIPCOT from time to time. You will also have to execute an agreement for water supply, at the time of taking possession of the plot(s).

15. You have to commence the building constructions, within six months from the date of execution of lease deed, after approval of layout plans and building plans by SIPCOT and local authorities.

16. A strip of not less than 5 metres shall be left open to the sky, within the periphery of the plot on all sides.

..5..

17. All buildings to be constructed should be in conformity with the bye-laws of the local body and regulations in force from time to time as well as any other laws, rules and regulations in force, relating to the construction and use of premises. No construction work shall be commenced until the building plans and elevations are submitted and also the proof of having obstained clearances for the same from the various authorities, like the Directorate of Town & Country Planning, the Local Authority, Public Health Authorities, Inspectorate of Factories, Pollution Control Board, and such other approvals which may be required under any laws, that are in force from time to time.

18. Construction of culverts, etc., should be within the specifications and got approved by us. No construction with katcha and inflammable materials would be permitted in the site allotted to you.

19. You have to make your own arrangements to treat the effluents solid/liquid to the required standards of the Tamil Nadu Pollution Control Board and to regulate duest, smoke gas noice vibrations and prevent fire hazards.

19. a) SIPCOT will permit the units to connect the collecting system of SIPCOT only the treated effluent to the standard of Inland waterways as prescribed by the Pollution Control Board to that effect. Before application for the connection is made, the units should produce such clearance from Pollution Control Board.

b) The allottee should treat the Industrial effluents to relevant ISS Std. as applicable to the area/inland waterway and start construction after obtaining clearance from Tamilnadu Pollution Control Board.

20. Failure to comply with any of the above condition will result in cancellation of the allotment and resumption of plot by SIPCOT. On such cancellation, no refund of the premium or rent or part of the premium/rent/interest that has been remitted by you shall be made. Please note that the allotment is subject to satisfactory arrangements being made for the implementation of the project within a reasonable time.

..6..

21. Please note that you have to give your consent agreeing to the above conditions to our allotment by passing a resolution in your Board or signed by partners/ proprietor, if it is a Partnership/Proprietory concern. After the execution of lease deed and water supply agreement, arrangement will be made to handover possession of plot to you.

22. Kindly acknowledge receipt of this letter and confirm your acceptance of all the above terms and conditions of allotment of plot(s) by returning one copy of this letter duly signed by you in each page immediately.

Yours faithfully,

For CHAIRMAN AND MANAGING DIRECTOR.

COPY To:

The Project Officer
SIPCOT Project Office
SIPCOT Industrial Complex
Gummidipoondi.

- He is requested to prepare the Plot Sketch for plot now allotted and to send it to this Office quickly and also to take necessary other follow-up action.

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*

STATE INDUSTRIES PROMOTION CORPORATION OF TAMILNADU LTD.
19-A, Rukmani Lakshmipathy Road, Egmore, Chennai – 600 008.
Phone : 044-28554787 Fax : 044-28513978/28513979/28513980
E-mail:sipcot@md3.vsnl.net.in Website : www.sipcot.com

REF.NO. D-I/GMP/EPIP/2/2004 DATED:23. 9.2004

// BY R.P.A.D //

ALLOTMENT ORDER FOR PLOTS

M/s. A.R.S. Metals (P) Ltd.,
New No.163/1, 1st Floor,
Broadway (Prakasam Salai),
Chennai - 600 108.

Dear Sir(s),

Sub: SIPCOT - Export Promotion Industrial Park at Gummidipoondi - Allotment of plot(s) - Orders Issued.

Ref : Your application dated 9.9.2004

.....

1. The following plots in SIPCOT Export Promotion Industrial Park at Gummidipoondi are allotted on lease for a period of ninety nine years for setting up an industrial unit for the manufacture of Tor & TMT Bars, Square girder, Channel Angles etc.

i. Plot(s) No.(s).	:	**39 to 52**
ii. Total extent (in acres)	:	11.94 acres
iii. Amount payable per acre	:	Rs.9.00 lakhs
a. Towards plot deposit	:	Rs.1.53 lakhs/acre
b. Towards development charges	:	Rs.7.47 lakhs/acre
iv. Total amount payable (for entire extent)	:	**Rs.1,07,46,000/-**
Less: Initial Deposit	:	70,000/-
Balance amount payable	:	**Rs.1,06,76,000/-**

2.a. The extent mentioned above is subject to such modification as may be necessary with reference to the measurements made at the time of handing over the site. The total amount payable will also stand accordingly modified.

b. The plot deposit alone will be refunded on the expiry of the period of lease and SIPCOT shall not pay any interest thereon.

c. The amount remitted towards development charges and any additional development charges incurred by SIPCOT and collected from you during the lease period will be adjusted towards the expenditure incurred and/or to be incurred for the development of Industrial Park/Complex/Growth Centre including its infrastructural facilities.

d. On surrender of a plot by an allottee, the plot deposit may be refunded in full after forfeiting the initial deposit and processing fee. The development charges may be refunded after forfeiting an amount of 5% per year or part thereof for the number of years the plot was held by the allottee, subject to a minimum deduction of 15%. No compensation for improvement or for the building or for other structures erected in the plot will be made.

3. The allottee shall comply with the conditions stipulated in col. (2) of the table within the period prescribed in col.(3) as under:

S.No. (1)	Conditions (2)	Time Limit (3)
i.	Communicate your acceptance of this allotment order in the duplicate copy of this allotment order.	Within 30 days from the date of this order. In case it is not received by SIPCOT within 30 days from the date of this allotment order, the allotment shall stand automatically cancelled and initial deposit paid for the extent allotted and processing fee shall be forfeited.

ii.	Pay 100% of the amount payable towards the plot deposit and development charges less initial deposit already paid	Within 90 days from the date of this order failing which the allotment shall stand automatically cancelled and the initial deposit paid for the extent allotted and processing fee shall be forfeited.
iii.	Execute the lease deed in the prescribed format with the concerned Project Officer and register the same.	Within 30 days from the date of payment of plot cost.
iv.	Payment of capital cost on water supply system	Within 30 days from the date of execution of lease deed.
v.	Take over the possession of the plot from the Project Officer concerned.	Within 30 days from the date of execution of lease deed.
vi.	Execute water supply agreement.	At the time of taking over possession of the land / on payment of Rs...Nil towards water supply cost for the quantity of water committed by SIPCOT.
vii.	Payment of annual lease rent of Re.1 for the 98 years and Rs.2/- for the 99th year.	Within 90 days from the date of this order failing which the allotment shall stand automatically cancelled and the initial deposit paid for the extent allotted and processing fee shall stand forfeited.
viii.	Implementation of the project / commercial production.	Within 30 months from the date of this order. Failure will entail cancellation of allotment and forfeiture of initial deposit and development charges paid towards the extent allotted.

4.a. The plot deposit and the development charges prescribed in Sl. No. 1 is only tentative. SIPCOT reserves the right to revise the amount payable for plot as fixed in Sl. No. 1 above in the event of SIPCOT having to pay enhanced compensation if awarded by the Court of law for the lands acquired or in case of escalation in development cost or for any other reason and such revised amount shall be paid by the allottee. The allottee shall also pay the cost of trees, wells, structures, existing in the allotted plot as fixed by SIPCOT in addition to the plot deposit and development charges and this amount is not refundable at any time for any reason.

4.b. Since providing of infrastructural facilities by SIPCOT is an ongoing scheme for the overall development of the Industrial Park/Growth Centre/Complex and expenses thereon would be incurred during various periods till its completion, the allottee shall not have any claim over the development charges paid to SIPCOT.

5. Annual maintenance charges for the common amenities and facilities like roads, street lighting, sanitation, drainage, sewerage, common buildings, gardens, avenue plants, parks etc., will from time to time be apportioned among the allottees in the Industrial Park/Growth Centre/Complex in which the above plot is situated. The allottee shall pay the same without demur within the period prescribed. Non payment on the due date will automatically attract interest at the rate of 15.5% per annum or such other rate as may be prescribed from time to time.

6. If, in the opinion of SIPCOT, it is found that the land allotted to the allottee is not put to use for the purpose for which it was allotted or is in excess of the allottee's actual requirements, SIPCOT shall, at any time, have the right to cancel the allotment in respect of such land or excess land, as the case may be, and resume the same under TNPPE Act. In that event, the plot cost paid by the allottee will be suitably adjusted and refund if any, will be made as per condition No.2(d). Interest, enhanced interest, if any already paid, will not be refunded. No compensation will be paid for improvement or for the buildings or other structures etc. erected on the plot.

7. a. Officers and staff of SIPCOT or any other person authorised by SIPCOT shall have the right to enter the land allotted to the allottee or the buildings constructed therein for the purpose of inspection with prior intimation.

7.b. The allottee shall not dump debris or any harmful or harmless waste materials within SIPCOT premises.

8. The plot is allotted on the specific condition that without implementing the project, the allottee shall not assign, sub-let, transfer or part with their interest in the allotted plot either in whole or in part except with the prior written consent of SIPCOT. In the event of the allottee seeking approval for change in constitution, or change in the management or control or amalgamation, with any other company or transfer of interest to any third party either in whole or in part, SIPCOT shall grant approval provided, the allottee or any person authorised by the allottee agrees to pay the cost determined by SIPCOT and the cost determined by SIPCOT shall be final and binding on the allottee or any person authorised by the allottee.

9. The allottee has to obtain No objection letter from SIPCOT to mortgage the lease hold rights of the allotted plot for availing financial assistance after getting sanction letter from Bank / Financial Institution and the same will be considered subject to conditions as applicable.

10. a) The allottee shall not sink any well / bore well / tube well within the plot leased to them. In case of short supply from SIPCOT sources the allottee can apply for permission which can be considered subject to the conditions as applicable.

10 (b) If any such open / bore well exists already in the plot allotted, it shall be under the custody of SIPCOT.

11. SIPCOT will, subject to availability, supply upto 50,000 litres of water per day at the rate fixed by SIPCOT from time to time.

12.a. SIPCOT shall have the right to lay pipe lines, sink bore wells or put up any facilities for common use within a strip of 5 meters left open all sides within the periphery of the plot on the plot allotted to the company / firm without payment of any compensation or rental etc., to the company / firm.

b. The building plan and the plans for all structures shall be got approved by the Project Officer concerned for the limited purpose of ensuring that a strip of not less than 5 metres is left open to the sky within the periphery of the plot on all the sides.

c. The provision of any culvert across common drains must be got approved from the Project Officer concerned of / SIPCOT.

d. Sewer lines and water line should be designed in such a way that they should be connected to the common lines of SIPCOT which will serve the plot.

e. The allottee shall make necessary arrangements to implement rain water harvesting system and also drain the rain water from their plot into the common road drain provided by SIPCOT. The natural courses in the plot shall be realigned suitably to the satisfaction of SIPCOT at your own cost.

13. All buildings to be constructed shall be in conformity with the bye-laws of the local body and regulations in force from time to time as well as any other laws, rules and regulations in force relating to the construction and use of premises. However, as per the G.O.Ms.No.169, Industries (MIE.2) dated 12.9.96, the allottee can start construction immediately after submitting the necessary application for building plan approval to the appropriate authorities provided a certificate from a Chartered Architect or a Civil Engineer registered with the concerned local body is enclosed conforming that the plan is not violating any rules or regulations, including the zone regulations under the Town and Country Planning Act, 1971. This permission is subject to the undertaking that the portion of the building will be demolished, if it is found that the building violates any rules and regulations. The allottee should obtain clearances from Public Health Authorities, Inspectorate of Factories, Pollution Control Board and such other agencies whose clearances may be required under any law or procedure in force from time to time.

14. The company / firm shall treat all the effluents to relevant norms as prescribed by PCB and as applicable to the area/Inland waterways and commence production only after obtaining clearance from the Tamil Nadu Pollution Control Board.

15. The allottee will have to make proper arrangements to treat the effluents solid/liquid/ to the required standards of the Tamil Nadu Pollution Control Board and to regulate dust, smoke, gas, noise, vibrations and prevent fire hazards and comply with the statutory regulations in this regard.

16. SIPCOT will permit the units to connect only the treated effluents conforming to the norms as prescribed by the Pollution Control Board to the collecting system of SIPCOT. The allottee shall produce the consent from Tamilnadu Pollution Control Board before the application for the connection is made.

17. The allotment order is issued to the company consisting of the following Directors:

i. Thiru Ashwani Kumar

ii. Thiru P. Deepak Bhatia

iii. Thiru Sanjay Gupta

The constitution of the Board of Directors of Private Limited company shall not be changed without prior approval of SIPCOT. For a Public Limited Company, as and when the constitution of the Board of Directors (professionals) gets changed, the same shall be informed to SIPCOT and acknowledgement obtained within 90 days.

However any change of Directors causing change of ownership or management shall be made only with prior approval of SIPCOT.

18. a. Any change in the name of the company /firm shall be informed to SIPCOT and acknowledgement to be obtained.

b. Any change in the address of the Registered Office or Administrative Office of the allottee shall be intimated to SIPCOT immediately and acknowledgement obtained.

19. Failure to comply with any of the conditions of this allotment order shall result in cancellation of allotment, resumption of the plot and disconnection of water supply by SIPCOT. On such cancellation plot deposit, development charges, additional development charges incurred and collected if any, Lease rent or interest thereon already paid by the allottee shall not be refunded nor shall any compensation in whatever form be payable to the allottee.

20. The allottee shall not draw water from their own Borewell/Tubewell sunk in private lands adjacent to SIPCOT Industrial Complex/Park/Growth Centre through pipeline unauthorisedly trespassing into SIPCOT premises. If at anytime, such trespass is found by SIPCOT, water supply will be disconnected besides severing the trespassed water line.

21. The company should export one third of their annual production for five years.

22. The company shall give a legal undertaking to export not less than 33% of their total production in value terms before execution of Lease deed.

23. On expiry of the lease period of ninety nine years the lease may be renewed for a further period of ninety nine years on such terms and conditions as may be mutually agreed to.

Yours faithfully,

S. Manoharan.

For CHAIRMAN & MANAGING DIRECTOR.

Copy to:

The Project Officer,
SIPCOT Export Promotion Industrial Park,
Gummidipoondi.

The Development Commissioner,
Madras Export Processing Zone,
Tambaram,
Chennai 600 045.

2. Marketing Dept.

PROPOSED EXPANSION PROJECT COST ESTIMATION				
Sl No.	Description	No's	Cost Rs. in Lakhs	Amt Rs. In Lakhs
	FURNACE DIVISION			
1	Induction Furnace 25 tons	2	400	800
2	Furnace Transformer	2	100	200
3	6/11 CCM	1	300	300
4	Auxiliary Transformer	1	25	25
5	EOT Crane 65/15 ton	2	100	200
6	EOT Crane 15 ton	6	50	300
7	Pollution Control Equipment	1	250	250
8	Shed (100 m X 22m)	1	200	200
9	Electrical beakers		150	150
10	Scrap Processing Equipments		200	200
11	Material Handling Equipments		50	50
	TOTAL			**2675**
	ROLLING MILL DIVISION			
1	Crop & Cobble Shear- 500 mm (CCS #2)	1		212
2	Spare Cassatte for 600mm Housingless Stand	1		488
3	380 CRS 2-HI Conventional Mill Stand, cast Steel, IS 1030 Gr.230 460, for Spherical Bearing No.24044CK30C3W33, Barrel Length 700 mm (Without Bearing, Rolls, Guides & Base Plates)	2		260
4	C.I. Base Plates for Mill Stands	4		65
5	Cardon Shaft & coupling Heads for Pinion Side & Roll Side	4		214
6	Reduction Gear Box CRS cum 380mm 2-HI Pinion Stand 350 kW, 0-500-1200 RPM	2		447
7	Fabricated Base frame for Reduction Gear Box cum pinion Stands	2		33
8	Geared Coupling	1		21
9	Base Frame for Motor	1		28
10	Chocks for Spherical Bearing of 24044CK30C 3W33 of 380 CRS,2-HI, Mill Stand	8		114
11	Coupling Head for Roll End	2		29
	TOTAL			**1912**
GRAND TOTAL				**4587**

Date: 29.04.2024

For ARS STEELS & ALLOY INTERNATIONAL PVT. LTD.

Authorised Signatory

ENVIRONMENTAL CLEARANCE

PARIVESH

(Pro-Active and Responsive Facilitation by Interactive, and Virtuous Environmental Single-Window Hub)

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority(SEIAA), Tamil Nadu)

To,

The Deputydirector

ARS STEELS AND ALLOY INTERNATIONAL PRIVATE LIMITED

ARS Steels and Alloy International Pvt Ltd, D-109, LBR Complex, 2nd Floor, Chintamani, Anna nagar east, Chennai -600102

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the SEIAA vide proposal number SIA/TN/IND/59690/2017 dated 06 Jan 2021. The particulars of the environmental clearance granted to the project are as below.

1.	**EC Identification No.**	**EC24B008TN147742**
2.	**File No.**	6443/2017
3.	**Project Type**	Expansion
4.	**Category**	B1
5.	**Project/Activity including Schedule No.**	3(a) Metallurgical industries (ferrous & non ferrous)
6.	**Name of Project**	Proposed Expansion of Steel Melting Plant from 1,42,000 TPA to 2,88,000 TPA of MS Billets and 2,50,000 TPA of TMT Bars
7.	**Name of Company/Organization**	ARS STEELS AND ALLOY INTERNATIONAL PRIVATE LIMITED
8.	**Location of Project**	Tamil Nadu
9.	**TOR Date**	08 Jun 2018

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 17/04/2024

(e-signed)
A R Rahul Nadh IAS
Member Secretary
SEIAA - (Tamil Nadu)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH.Please quote identification number in all future correspondence.

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सत्यमेव जयते

THIRU. A.R. RAHUL NADH, I.A.S.
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY-TAMILNADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai - 600 015.
Phone No. 044-24359973
Fax No. 044-24359975

ENVIRONMENTAL CLEARANCE (EC)

Letter No. SEIAA-TN/F.No.6443/EC/3(a)/ /2024 dated: .03.2024

To

M/s. ARS Steels and Alloy International Private Limited
D-109, 2nd Floor LBR Complex
Chinthamani Anna Nagar East
Chennai-600 102

Sir,

Sub: SEIAA-TN – Environmental Clearance – Proposed Expansion of Steel Melting Plant located at Plot No. B-1/S, 39-52.B1/S part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu – Category - "B1" and Schedule 3(a) – "Metallurgical Industries (Ferrous & Non-Ferrous)" under the EIA Notification, 2006 as amended – Issued – Regarding.

Ref:

1. ToR issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/2017/3 (a)/ ARS/ToR-494/2018 dated: 08.06.2018.
2. Amendment ToR-I issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/ 2017/3 (a)/ARS/A/ToR-494/2018 dated: 17.06.2019.
3. Amendment ToR-II issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/ 2017/3 (a)/ARS/B/ToR-494/2018 dated: 19.08.2019.
4. Amendment to ToR was issued by SEIAA-TN vide Lr. No. SEIAA-TN/F. No. 6443/2017/3(a)/ARS/B/ToR-494/2018dated: 21.11.2019(corrigendum)
5. Public hearing was conducted on 27.11.2020.
6. Online Proposal No. SIA/TN/MIN/59690/2021 dated 06.01.2021.

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7. EIA Submitted on 17.02.2021.
8. Minutes of the 242th SEAC meeting held on 03.02.2022.
9. Minutes of the 485th SEIAA meeting held on 15.02.2022.
10. Minutes of the 276th SEAC meeting held on 21.05.2022.
11. Minutes of the 521st SEIAA meeting held on 17.06.2022.
12. Minutes of the 284th SEAC meeting held on 10.06.2022.
13. Minutes of the 529th SEIAA meeting held on 06.07.2022.
14. Minutes of the 306th SEAC meeting held on 25.08.2022.
15. Minutes of the 551st SEIAA meeting held on 17.09.2022.
16. Minutes of the 450th SEAC meeting held on 08.03.2024.
17. Minutes of the 708th SEAC meeting held on 02.04.2024.

******

This has reference to your application under reference 6th & 7th cited, wherein you have submitted proposal for obtaining Environmental Clearance for the Expansion of Steel Melting Plant from 1,42,000 TPA to 2,88,000 TPA of MS Billets and 2,50,000 TPA of TMT Bars located at Plot No. B-1/S, 39-52,B1/S part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur DistrictDistrict, Tamil Nadu – Category - "B1" and Schedule 3(a) – "Metallurgical Industries (Ferrous & Non-Ferrous)" under the EIA Notification, 2006 as amended.

Salient features of the Expansion project:

S. No	Description	Details
1	Name of the Project	Proposed Expansion of Steel Melting Plant from 1,42,000 TPA to 2,88,000 TPA of MS Billets and 2,50,000 TPA of TMT Bars
2	Location	SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.
3	Type of Project	As per the Environmental Impact Assessment Notification dated 14th September 2006 and its subsequent amendments, the proposed

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		expansion project falls under the **Schedule No. 3(a) [Metallurgical Industries-Ferrous and Non-ferrous]**.
4	Total Area	4.51 Hectare
5	Cost of Project (INR)	Rs. 590 Lakh
6	Brief description of the project	**M/s. ARS Steels & Alloy International Pvt. Ltd** proposes to increase their manufacturing capacity of Steel melting plant. The industry is situated at Plot No. 39-52, B-1/S, B1 Part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu. The existing plant has been operating in SIPCOT leased land area 4.51 ha (11.14 acres) which features furnace, billet and rolling mill divisions. The furnace division comprises of 2 nos. of 8 MT induction furnace to produce 41,400 TPA of MS Ingots and the billet division houses 1 x 25 MT induction furnace which produces 1,00,800 TPA of MS Billets. The rolling mill division comprises 1 x 25 TPH reheating furnace to produce 2,50,000 TPA of TMT bars. The environmental clearance for the exiting plant was obtained vide letter No. **SEIAA-TN/EC/3(a)/ 008/ F-129/ 2009 Dated: 03.08.2009.**
6a	Process Description:	• Various grades of scrap such as super melting scrap, bazaar melting scrap, commercial scrap, sponge iron etc., are melted in electrically operated induction furnace and will be poured into the billets using a Continuous Casting Machine (CCM). • Then the billets are used to the desired finishing section in the hot condition by way of passing the material between a pair of grooved rolls and providing suitable drafts at various stages. • The whole operation is conducted at a particular temperature range and within a limited time span. • The stages of rolling operation are comprised of heating of feed stock to rollable temperature, rolling the feeding stock in different mill stands, cropping the hot bar during the process of rolling

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		between mill stands as applicable and subsequently finishing in form of hot rolled deformed bar in straight length. • The hot bar coming out of the last pass is then conveyed through a TMT line and collected in a cool bed after shearing. The bars at almost ambient temperature are sheared to commercial length, stored and kept ready for dispatch.
7	Raw materials	**Details of raw material requirement:**

Sr. No	Raw material	Quantity (TPA)		Source of raw materials	Mode of transport
		Existing	After Expansion		
Steel Melting Plant					
1.	MS scrap	150687.3	--	Singapore, USA, South Africa, Andhra Pradesh and Tamil Nadu	Shipping cum road
2.	Virgin scrap	--	282412	Singapore, USA, South Africa, Andhra Pradesh and Tamil Nadu	Shipping cum road
3.	Sponge iron	8072.7	15102	Tamil Nadu, Andhra Pradesh	Closed Truck via road

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					and Karnataka	
		4.	Ferro alloys	2694	4531	Tamil Nadu, Andhra Pradesh and Karnataka	Closed Truck via road
		Steel Rolling Mill					
		1.	MS Billets	269000	269000	In-plant production	Direct Hot Rolling Technology & Cranes

8	Main Products:	**Sr. No**	**Main Products**	**Existing Quantity (TPA)**	**After Expansion Quantity (TPA)**
		Billet division			
		1	MS Ingots	41,400	-
		2	MS billets	1,00,800	2,88,000
		Rolling mill			
		1	TMT bars	2,50,000	2,50,000
9	Public hearing details	The public hearing meeting for the Proposed Expansion of Steel Melting Plant from 1,42,000 TPA to 2,88,000 TPA of MS Billets and 2,50,000 TPA to of Rolled Steel Products by M/s. ARS Steels and Alloy International Pvt.Ltd was held on 27.11.2020 at L.V Thirumana Mahal Gummidipoondi, Tiruvallur District as per Environmental Impact Assessment Notification dated 14th September 2006.			

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<table>
<tr><td>10</td><td>EIA report submitted on</td><td>06 Jan 2021</td></tr>
<tr><td>11</td><td>a) Water requirement</td><td>The one-time water requirement after the proposed expansion is 75.25 KLD and the daily fresh water requirement will be 40.75 KLD.</td></tr>
<tr><td></td><td>b) Source of water</td><td>SIPCOT Water supply</td></tr>
<tr><td>12</td><td>Sewage generation, & treatment</td><td>After expansion, the generated sewage (20.25 KLD) will be treated in proposed STP of 30 KLD.</td></tr>
<tr><td></td><td>Mode of disposal of Sewage</td><td>The treated sewage effluent of 20.25 KLD will used to greenbelt development activities.</td></tr>
<tr><td>13</td><td>Trade Effluent generation, & treatment</td><td>Blow down- 34.50 kLD
Scrubber bleed-0.38 kLD</td></tr>
<tr><td></td><td>Mode of disposal of Trade Effluent</td><td>Blow down -Treated in recirculation tank and recycled back to process
Scrubber bleed- Solar Evaporation Pan</td></tr>
<tr><td>14</td><td>Quantity of Solid Waste generated per day (in Kg) and mode of treatment and disposal of Solid Waste</td><td>Solid waste generation details are:
<table>
<tr><th>Sr. No</th><th>Solid waste</th><th>HWM Categ.</th><th>Quantity (TPA)</th><th>Treatment or Disposal</th></tr>
<tr><td>I</td><td colspan="4">Existing</td></tr>
<tr><td>1</td><td colspan="4">Furnace division – Non hazardous</td></tr>
<tr><td>A</td><td>Furnace slag</td><td>-</td><td>2,251.5</td><td>Given to contractors</td></tr>
<tr><td>B</td><td>Runner & riser</td><td>-</td><td>1,378.5</td><td>Re-melted in induction furnace</td></tr>
<tr><td>C</td><td>Domestic waste</td><td>-</td><td>3.60</td><td>Will be collected by civic bodies</td></tr>
<tr><td>2</td><td colspan="4">Billet division– Non – hazardous</td></tr>
<tr><td>A</td><td>Furnace slag</td><td>-</td><td>6,864.0</td><td>Given to contractors</td></tr>
<tr><td>B</td><td>Returnable</td><td>-</td><td>8,119.68</td><td>Re-melted in induction furnace</td></tr>
</table></td></tr>
</table>

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C	CCM Scale	-	582.12	Given to contractors
D	STP Sludge	-	3.67	Treated, dried and used as manure
E	Domestic waste	-	18.0	Will be collected by civic bodies
3	***Rolling Mill division – Non hazardous***			
I	End Cuttings	-	7,500	Re-melted in steel melting furnace
J	Mill scale	-	5,100	Re-melted in steel melting furnace
K	Misrolls	-	6,400	Re-melted in steel melting furnace
L	Ash	-	1470	Given to flyash brick manufactures
II	**After Expansion**			
1	***Billet division – Non –hazardous***			
A	Furnace slag	-	6,041.0	Given to contractors
B	Returnables	-	6,313.0	Re-melted in induction furnace
C	CCM Scale	-	1,510.0	Given to contractors
D	STP Sludge	-	4.41	Treated, dried and used as manure
E	Domestic waste		21.60	Will be collected by civic bodies
2	***Rolling Mill division – Non hazardous***			
I	End Cuttings	-	7,500	Re-melted in steel melting furnace
J	Mill scale	-	5,100	Re-melted in steel melting furnace

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		K	Misrolls	-	6.400	Re-melted in steel melting furnace
		L	Ash	-	73.5	Given to flyash brick manufactures

15 Hazardous waste management

Hazardous waste generation details are:

Sr. No	Solid waste	HWM Categ.	Quantity (TPA)	Treatment or Disposal
I	**Existing**			
1	***Furnace division – Hazardous***			
A	Solar evaporation residue	37.3	0.24	Collected and transported to CTSDF, Gummidipoondi
B	Spent oil	5.1	0.38	Re-used in parts of cooling bed
2	***Billet division– Hazardous***			
A	Solar evaporation residue	37.3	0.58	Collected and transported to CTSDF, Gummidipoondi
B	Spent oil	5.1	0.38	Re-used in parts of cooling bed
II	**After Expansion**			
2	***Billet division– Hazardous***			
A	Solar Pan residue	37.3	1.8	Collected and transported to CTSDF, Gummidipoondi
B	Oil bearing cotton waste	33.2	0.3	
C	Spent oil	5.1	0.96	Re-used as Lubricants

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<table>
<tr><td>16</td><td>Power requirement</td><td>After the proposed expansion the power requirement will be increased to 26.5 MW which shall be met from TANGEDCO grid (16.0 MW) and ARS Energy Pvt. Ltd (10.5 MW).
To meet the emergency power requirement during the grid failure, existing diesel generators with the capacity of 500 KVA & 750 KVA shall be used for the lighting purpose.</td></tr>
<tr><td>17</td><td>Fuel requirement</td><td>After the proposed expansion the coal requirement is 1050 TPA and diesel consumption rate for DG-Set 1x500 KVA & 1x750 KVA is taken to be 160 Lit/h. & 240 Lit/hr respectively.</td></tr>
<tr><td>18</td><td>APC measures</td><td>Particulate Matter (PM), Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_x) will be the major pollutants from the proposed expansion. 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.
<table>
<tr><th>Sr.No</th><th>Description</th><th>Stack-1</th><th>Stack-2</th><th>Stack-3</th></tr>
<tr><td>1.</td><td>Emission Source</td><td>Induction furnace 1 x 25 MT, Induction furnace 1 x 25 MT and Reheating furnace 1 x 25TPH</td><td>DG set 1 x 500 KVA</td><td>DG Set 1 x 750 KVA</td></tr>
<tr><td>2</td><td>Material of Construction</td><td>MS</td><td>MS</td><td>MS</td></tr>
<tr><td>3</td><td>Stack Height (m)</td><td>34</td><td>6</td><td>18</td></tr>
<tr><td>4</td><td>Diameter (m)</td><td>1.2</td><td>0.25</td><td>0.25</td></tr>
</table>
</td></tr>
</table>

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		5	Pollution control measures	Wet scrubber followed by common stack	Acoustic enclosures followed by stack	Acoustic enclosures followed by stack	
19	Details of man power	The manpower in the existing plant is 200 Nos. It will be increased up to 250 after the proposed expansion which includes manager, admin staffs, supervisor and workers.					
20	Details of Green Belt Area	The existing plant has been developed with greenbelt area of 1.52 ha (33.7% of the total area). The area has been provided with native species in consultation with the horticulturist. Further, in proposed expansion, the same 1.52 ha has been allocated for greenbelt development which (33.7% of the total area) fulfilling the greenbelt norms of CPCB					
21	Provision for rain water harvesting	The run-off from terraces, roads, paved area & greenbelt & vacant area will be diverted through storm water network to individual percolation pits (84 Nos) proposed along the project periphery and the rain water will be re-charged into underground aquifers.					
22	EMP Cost (INR)	Capital Cost: Rs. 59 Lakh Recurring Cost: Rs. 12.5 Lakh/Annum					
23	CER activity	Capital Cost: Rs. 14.75 Lakh Recurring Cost: Rs. 3.70 Lakh/Annum as accepted by the PP					
24	Conservation plan for Pulicat Bird Sanctuary.	Rs. 8 lakhs to be remitted to the DFO concerned, within one year from the date of issue of EC.					

AFFIDAVIT

I, **N. PRABU**, son of Natarajan, aged 52 years, Deputy Director ARS Steels & Alloy International Pvt. Ltd., D-109, 2nd and 3rd Floor, LBR Complex, Anna Nagar East, Chennai – 600 102, do hereby solemnly affirm and sincerely state as follows:-

MEMBER SECRETARY
SEIAA-TN

We have submitted Impact Mitigation & Wildlife Conservation Plan for 2 years. In the plan, we have proposed to extend our CER activities to Pulicat Bird Sanctuary in consultation with officers and authorities. The conservation and allied activities proposed in the Conservation Plan is as below.

Sl. No	Particulars	1st Year (Rs. In Lakhs)	2nd Year (Rs. In Lakhs)	Total (Rs. In Lakhs)
1	Eco Development Work	2.00	2.00	4.00
2	Conflict of Protection Measures	1.00	1.00	2.00
	Total	**3.00**	**3.00**	**6.00**

HUMAN WILDLIFE CONFLICT SCENARIO IN AND AROUND PULICAT SANCTUARY

To strengthen the activity of patrol it is highly essential to support with additional fuel/rational for staff. This activity is proposed as follows:-

Sl. No	Particulars	1st Year (Rs. In Lakhs)	2nd Year (Rs. In Lakhs)	Total (Rs. In Lakhs)
1	Boat Patrol (Fuel/Rational)	1.00	1.00	2.00
	Total	**1.00**	1.00	**2.00**

The above facts are true and correct to the best of my knowledge, belief and information.

This affidavit is required to be produced before the concerned authorities in proof of the above facts.

Appraisal by SEAC:-

Proposed Expansion of Existing Steel Melting Plant located at Plot no B-1/S, 39-52, B1/S part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu by M/s. ARS Steels & Alloy International Private Limited - For Environmental Clearance. (SIA/TN/MIN/59690/2021 dated 06.01.2021)

The proposal was earlier placed for appraisal in 242nd meeting of SEAC held on 03.02.2022 and 276th meeting of SEAC held on 21.05.2022. The project proponent made a detailed presentation. The details of the project furnished by the proponent are available on the PARIVESH web portal (parivesh.nic.in).

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The SEAC noted the following:

1. The project proponent proposes expansion of existing Steel Melting Plant located at Plot no B-1/S, 39-52, B1/S part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.
2. The project activity is covered under Schedule No. (3a) (Metallurgical Industries- Ferrous & Non-Ferrous) of EIA notification, 2006 and its subsequent amendments.
3. Existing EC SEIAA-TN/EC/3(a)/008/F-129/2009 Dated: 03.08.2009.
4. ToR was issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/2017/3 (a)/ ARS/ToR-494/2018 dated: 08.06.2018 for the proposed expansion from 1,42,200 TPA (MS INGOTS of 41,400 TPA, MS BILLETS of 1,00,800 TPA) to 2,88,000 TPA of MS BILLETS and 2,50,000 TPA of TMT BARS.
5. Amendment to ToR was issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/ 2017/3 (a)/ARS/A/ToR-494/2018 dated: 17.06.2019 for capacity enhancement billet production from 2,46,960 TPA to 2,88,000 TPA
6. Amendment to ToR was issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/ 2017/3 (a)/ARS/B/ToR-494/2018 dated: 19.08.2019 for inclusion of Rolling Mill
7. Amendment to ToR was issued by SEIAA-TN vide Lr.No.SEIAA-TN/F.No.6443/ 2017/3 (a)/ARS/B/ToR-494/2018 dated: 21.11.2019(corrigendum)
8. Public hearing was conducted on 27.11.2020.

The SEAC further noted that,

- The proponent, M/s. ARS Steels & Alloy Private Limited is operating their existing steel melting plant at Plot No. 39-52, B-1/S, B1 part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District.
- The existing industry comprises a furnace, billet and rolling mill division in a SIPCOT leasehold area of 4.51 ha (11.14 acres).
- Proposed expansion of steel melting plant is from 1,42,000 TPA to 2,88,000 TPA of MS billets and 2,50,000 TPA of TMT bars.
- The environmental clearance for the exiting plant was obtained in the year 2009 from State Level Environmental Impact Assessment Authority, Tamil Nadu.
- The consents for the unit have been obtained from TNPCB and renewed up to 2024.

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- The industry has proposed expansion for a steel melting plant within existing leasehold land hence no additional land would be required.
- The industry boundaries don't fall within 5 km from protected areas notified under Wildlife (Protection) Act, 1972, Critically polluted areas as defined by CPCB, Eco-sensitive areas and Interstate boundaries.
- The production capacity of the steel melting plant after expansion would be 2,88,000 TPA of MS Billets and 2,50,000 TPA of TMT bars.
- The current expansion activity aims to utilize the power generated in its sister concern ARS Energy Pvt. Ltd to meet the demands of the industry.
- The total cost for the proposed expansion is INR. 5.9 Crores.

Based on the presentation and documents furnished by the project proponent, SEAC decided to obtain the following details.

1. Pulicat Eco-sensitive Zone is located at a distance of 6.48 km, N, the project proponent shall obtain a No objection certificate from Wild Life Warden, Chennai.
2. The project proponent shall submit certified compliance report for the EC obtained earlier.
3. 4 Nos of Ambient air quality monitoring (AAQM) stations shall be set up as per statutory requirement. The locations of ambient air quality monitoring stations shall be decided in consultation with the Tamil Nadu Pollution Control Board and it shall be ensured that maximum numbers of stations to be installed in the up wind direction and same shall be connected to CARE AIR centre in TNPCB for online monitoring.
4. The proponent shall furnish revised CER as per OM dated 13.09.2020 & 20.10.2020.
5. The proponent shall furnish a certificate from a senior official of SIPCOT, not below the rank of GM on the distance between the proposed site and the nearest inter-State boundary.
6. The proponent shall furnish an adequacy report on the efficiency of the revamped APC measures by either IIT, Madras or Anna University.

On receipt of the above details, the proposal was placed in the 284th meeting of SEAC held on 10.6.2022. The project proponent made presentation along with above said details. Based on the presentation, SEAC noted that Pulicat Bird Sanctuary is located at a distance of 6.48 km from the project site and the ESZ is yet to be notified for the Pulicat Bird Sanctuary. The project proponent has not obtained NBWL clearance. Therefore, SEAC decided to direct the project proponent to obtain NBWL clearance. Subsequently the subject was placed in the 306th meeting of SEAC held on

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25.08.2022. SEAC noted that the project proponent has still not obtained the aforesaid NBWL clearance and hence the Committee directed the Proponent to submit the NBWL clearance and decided that on receipt of same, the subject shall be placed before the Committee for appraisal. Now the PP has obtained NBWL Clearance vide F.No.WL-6/33-2024-WL dated 28.02.2024 and hence the subject was taken up for discussion in this 450th meeting of SEAC held on 08.03.2024. The SEAC noted that,

Comparison between the Existing Plant and the Proposed Expansion:

S. No.	Description	Existing	After expansion
1	Plant area	4.51 ha (11.14 acres) , No additional land required for expansion	
2	Land use	Industrial Land use Zone (SIPCOT, Gummidipoondi)	
3	Power requirement	14.5 MW from TANGEDCO	16.0 MW from TANGEDCO 10.5 MW from ARS Energy Pvt. Ltd **Total: 26.5 MW**
4	**Production capacity**	MS Ingots-41,400 TPA MS Billets-1,00,800 TPA TMT Bars-2,50,000 TPA	**(No Ingots will be produced)** MS Billets-2,88,000 TPA TMT bars-2,50,000 TPA
5	Melting furnace	Induction furnace (2X8 MT, 1x25 MT) Reheating furnace 1X25 TPH	Induction furnace (2X25 MT) Reheating furnace 1X25 TPH **(2x8 MT Furnaces will be replaced by 1x 25 MT)**
6	DG Sets	1 x500 KVA, 1 x 750 KVA (No additional DG Sets Proposed)	
7	Water requirement	55.5 KLD (sourced from SIPCOT water supply)	One Time: 75.25 KLD Fresh /Makeup water: 40.75 KLD (Sourced from SIPCOT Water supply)

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8	Man power requirement	200 nos.	250 nos.
9	Fuel requirement	Coal: 21000 TPA Diesel - 160 lit/hr, 240 lit/hr	Coal: 1050 TPA Diesel - 160 lit/hr, 240 lit/hr **(With the adoption of Direct Hot Charging Technology, coal consumption will be reduced by 95%)**
10	Wastewater treatment facility	STP of capacity 20 KLD	STP of capacity 30 KLD (Existing 20 KLD STP will be dismantled)

Land use break-up:

Sl. No	Land use	Existing		After expansion	
		ha	%	ha	%
1	Factory shed area	0.97	21.5	1.02	22.6
2	Scrap yard	0.66	14.6	0.68	15.1
3	Product storage area	0.32	7.1	0.32	7.1
4	Solid waste storage area	0.3	6.7	0.3	6.7
5	Greenbelt development	1.52	33.7	1.52	33.7
6	Road	0.60	13.3	0.60	13.3
7	Open space area	0.14	3.10	0.07	1.5
	Total	4.51	100	4.51	100
Land use: Industrial land use (SIPCOT industrial Estate Complex)					

Water requirement:

Sl. No	**Particulars**	**Quantity in KLD**	
		Existing	**After Expansion**
1	Machinery Cooling	35.16	52.58
2	Scrubber make-up	0.34	0.42
3	Domestic requirement	20.00	22.25

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	Total	55.5	75.25
One time water requirement: 75.25 KLD			Treated water from process: 34.5 KLD
Daily make up Water: 40.75 KLD The treated water from process will be used for cooling process and other plant activities. The treated water from the STP will be used for greenbelt development			

Effluent Generation and Treatment:

Sr. No	Particulars	Quantity in KLD	
		Existing	After Expansion
1	Sewage	15.20	20.25
2	Trade Effluent		
	a. Blowdown	24.18	34.50
	b. Scrubber bleed	0.30	0.38
After expansion, the existing 20 kLD STP will be de-commissioned and STP of 30 kLD will be installed to treat the sewage generation.			
Blow down		Treated in recirculation tank and recycled back to process	
Scrubber bleed		Solar Evaporation Pan	

- 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 domestic sewage (20.25 KLD) generated from the proposed expansion will be treated in the proposed Sewage Treatment Plant of 30 KLD capacity.
- The treated water of 20.25 KLD from the STP will be reused for green belt development.
- The wastewater from the cooling processes is treated in the cooling pond followed by cooling tank and will be recirculated again for the processes.
- The scrubber effluent of 0.38 KLD will be treated in the existing solar evaporation pan.
- **No wastewater will be discharged outside the plant premise.**

Material Balance:

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Steel Melting Plant				
Input/Raw materials			**Output products / Wastes**	
Virgin scrap	2,82,412		MS Billets	2,88,000
Sponge iron	15,102		Furnace slag	6,041
Ferro alloys	4,531		Returnables	6,313
			CCM scale	1,510
			Miscellaneous Loss	181
Total	3,02,045		Total	3,02,045
Steel Rolling Mill				
Input/Raw materials			**Output products / Wastes**	
MS Billets (In plant Production)	2,88,000		TMT Bars	2,50,000
			End Cuttings	7,500
			Mill Scale	5,100
			Mis rolls	6,400
			Billets sold as separate in Market	19,000
Total	2,88,000		Total	2,88,000

Based on the presentation made and documents furnished by the project proponent, SEAC decided **to recommend the proposal for the grant of Environmental Clearance for this proposed expansion project** subject to the following specific conditions, in addition to normal conditions stipulated by MoEF &CC:

1. The proponent shall not utilize Bazaar scraps, painting scraps, turning & boring scrap etc as raw material.
2. The PP obtained adequacy report on the existing APC measures provided in the unit from the reputed Government institution such as IIT, Anna University, NIT shall be furnished.
3. The PP shall replace the worn out/damaged APC measures before obtaining CTE(Expansion) from TNPCB.
4. The PP shall adhere to the procedures during charging and operation of Melting for better and efficient operation of induction furnaces as mentioned in Comprehensive Industry Document on Electric Arc & Induction Furnace issued by CPCB.
5. The proponent shall adopt best practices available during finishing and tapping of heat.

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6. The proponent shall adhere the possibilities to Change from mains frequency to medium frequency furnaces as mentioned in Comprehensive Industry Document on Electric Arc & Induction Furnace issued by CPCB.
7. The generated sewage shall be treated through STP and treated water shall be utilized for the green belt development.
8. The proponent shall continuously operate the sewage treatment plant so as to achieve the standards of treated sewage prescribed by CPCB/TNPCB.
9. No waste water will be discharged outside the plant boundary during normal operation.
10. No untreated effluent shall be recycled/reused for the process.
11. Water consumption should not exceed as per the CREP standard prescribed for the steel plants. Additional water, if any, required for the plant project operations should be met form rainwater stored in rainwater harvesting structures.
12. Rainwater harvesting scheme should be prepared so that the rainwater can be collected, re-used and may be used for ground water recharge. The concrete drains should be de-silted and regular supervision of the areas should be carried out so that blocking of drains may be avoided for quick discharge of rainwater. Efforts should further be made to use maximum water from the rain water harvesting sources. If needed, capacity of the reservoir should be enhanced to meet the maximum water requirement.
13. All the effluents should be treated and reused for dust suppression/green belt development. No effluent should be discharged and 'zero' discharge should be adopted.
14. All the roads shall be tarred and water sprinkling shall be ensured to control dust emissions from all the vulnerable sources like raw material handling and storage areas. All the material transfer points, discharge points and raw material storage area shall be completely covered. Dust extraction system shall be provided to storage, transfer points and material handling areas. Monitoring of fugitive emission in the work zone environment shall be carried out regularly as per the CPCB guidelines.
15. The proponent shall provide, operate and maintain the air pollution control measures to all the furnaces and process emissions and utility emissions so as to achieve the air emission standards prescribed by the CPCB/MoEF&CC and same shall be connected to the CARE AIR centre of TNPCB for online monitoring.

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16. The project proponent should install 24x7 Air and Water monitoring devices to monitor air emission and effluent discharge, as provided by CPCB and submit report to Ministry and its Regional Office.
17. Ambient air quality monitoring (AAQM) stations shall be set up as per statutory requirement. The locations of ambient air quality monitoring stations shall be decided in consultation with the Tamil Nadu Pollution Control Board and it shall be ensured that maximum numbers of stations to be installed in the up wind direction and same shall be connected to CARE AIR centre in TNPCB for online monitoring.
18. Measures should be taken to reduce PM levels in the ambient air. Stack of adequate height & diameter with continuous stack monitoring facilities for all the stacks should be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), bag house, bag filters etc. should be provided to keep the emission levels below 50mg/Nm3 and installing energy efficient technologies in the Plant
19. On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks should be provided and sufficient air pollution control devices.
20. Gaseous emission levels including secondary fugitive emissions from all the sources should be controlled within the latest permissible limits issued by the Ministry.
21. Dust suppression system and bag filters should be installed to control the fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points.
22. The Project proponent shall provide adequate safety and ventilation arrangements in the furnace area.
23. Wherever required, the plant should be designed to meet the heavy metal standards stipulated by MoEFCC under EP Act 1986.
24. All the solid wastes like slag and SEP residue shall be stored separately at designated place only. Solar Evaporation Pan residue shall be disposed off in accordance with the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules. 2016 as amended.
25. Full utilization of fly ash should be ensured as per Fly Ash Notification, 2021 and its subsequent amendments. All the fly ash should be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding should be submitted to the Ministry's Regional Office at Chennai.
26. Hazardous materials required during construction phase and in plant operations should be stored properly as per the regulations and reused/recycled as per the E(P)Act Rules.

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27. Vehicles and construction machinery are properly maintained to minimize the exhaust emission as well as noise generation to meet prescribed standards.
28. Proper housekeeping shall be ensured and all the raw materials and products shall be stored at designated places.
29. A separate Cell with adequate technically competent staff should be appointed to operate the Environmental Control measures who should report directly to the top Executive of the plant premises.
30. The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc., on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed CPCB/MoEF&CC.
31. The Proponent shall provide and maintain the green belt in at least 33% of the total plot area as per the CPCB Guidelines and the proponent shall develop more Green belt continuously.
32. The commitment made by the PP for plantation of the green belt should be expedited. Three rows of green belt, 12 - 15 meters wide, all along the periphery of the plant should be planted.
33. The Proponent shall furnish an undertaking that they will abide by the conditions by the conditions / recommendations mentioned in the EMP report furnished by them.
34. Risk and Disaster Management Plan along with the mitigation measures should be prepared and implemented.
35. All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants should be implemented.
36. **The project proponent shall ensure strict compliance of all the conditions stipulated in the NBWL clearance issued for the project.**
37. All the commitments made to the public during public hearing/public consultation should be satisfactorily implemented and adequate budget provision should be made accordingly.
38. All the permanent workers should be covered under ESI Scheme. The company should have the provision for treatment of its workers at the local Nursing Homes & Hospitals in case of emergency. Annual Medical Check-up on some medical parameters like Blood test, Chest X-Ray, Eye test, Audiometry, Spirometry etc. should be conducted amongst the employees of the Company.

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Standard EC Conditions for Induction/ Electric Arc Furnace & Rolling Mills

I. Statutory compliance:

i. The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.

ii. The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.

iii. The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (incase of the presence of schedule-I species in the study area)

iv. The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State pollution Control Board/ Committee.

v. The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.

vi. The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.

II. Air quality monitoring and preservation

i. The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 vide G.S.R 277 (E) dated 31st March 2012 (applicable to IF/EAF) as amended from time to time; S.O. 3305 (E) dated 7th December 2015(Thermal Power Plants) as amended from time to time) and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.

ii. The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through laboratories recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.

iii. The project proponent shall install system carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released

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(e.g. PM_{10} and $PM_{2.5}$ in reference to PM emission, and SO_2 and NOx in reference to SO_2 and NOx emissions) within and outside the plant area (at least at four locations one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions. (case to case basis small plants: Manual; Large plants: Continuous)

iv. The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality / fugitive emissions to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.

v. Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources.

vi. The project proponent shall provide leakage detection and mechanised bag cleaning facilities for better maintenance of bags.

vii. Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, roofs, regularly.

viii. Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/ agglomeration.

ix. The project proponent shall use leak proof trucks/dumpers carrying coal and other raw materials and cover them with tarpaulin.

x. The project proponent shall provide covered sheds for raw materials like scrap and sponge iron, lump ore, coke, coal, etc.

xi. The project proponent shall provide primary and secondary fume extraction system at all melting furnaces.

xii. Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.

III. Water quality monitoring and preservation

i. The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 vide G.S.R 277 (E) dated 31st March 2012 (applicable to IF/EAF) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plants) as amended from time to time) and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories. (case to case basis small plants: Manual; Large plants: Continuous)

ii. The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.

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iii. The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.

iv. Adhere to 'Zero Liquid Discharge'.

v. Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.

vi. The project proponent shall provide the ETP for effluents of rolling mills to meet the standards prescribed in G.S.R 277 (E) 31st March 2012 (applicable to IF/EAF) as amended from time to time.

vii. Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off

viii. The project proponent shall practice rainwater harvesting to maximum possible extent.

ix. The project proponent shall make efforts to minimise water consumption in the steel plant complex by segregation of used water, practicing cascade use and by recycling treated water.

IV. Noise monitoring and prevention

i. Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.

ii. The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.

V. Energy Conservation measures

i. The project proponent shall provide waste heat recovery system (pre-heating of combustion air) at the flue gases of reheating furnaces.

ii. Practice hot charging of slabs and billets/blooms as far as possible.

iii. Ensure installation of regenerative type burners on all reheating furnaces.

iv. Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly.

v. Provide the project proponent for LED lights in their offices and residential areas.

VI. Waste management

i. Used refractories shall be recycled as far as possible.

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ii. Oily scum and metallic sludge recovered from rolling mills ETP shall be mixed, dried, and briquetted and reused melting Furnaces

iii. 100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.

iv. The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.

v. Kitchen waste shall be composted or converted to biogas for further use.*(to be decided on case to case basis depending on type and size of plant)*

VII. Green Belt

i. Green belt shall be developed in an area equal to 33% of the plant area with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant

ii. The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.

VIII. Public hearing and Human health issues

i. Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.

ii. The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.

iii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

iv. Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

IX. Corporate Environment Responsibility

i. The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 1st May 2018, as applicable, regarding Corporate Environment Responsibility.

ii. The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms / conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest / wildlife norms / conditions and / or

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shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.

iii. A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.

iv. Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.

v. Self environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.

vi. All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the plants shall be implemented.

X. Miscellaneous

i. The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.

ii. The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.

iii. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.

iv. The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO_2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.

v. The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.

vi. The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.

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vii. The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.

i. The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.

ii. The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.

viii. No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).

ix. Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.

x. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

xi. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.

xii. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.

xiii. The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.

xiv. Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

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SEIAA Remarks & Recommendation:

Proposed Expansion of Existing Steel Melting Plant located at Plot no B-1/S, 39-52, B1/S part, SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu by M/s. ARS Steels & Alloy International Private Limited - For Environmental Clearance.

The subject was placed in this 708th meeting of SEIAA held on 02.04.2024. The **SEIAA noted** that the subject was placed in the 450th meeting of SEAC held on 08.03.2024 and the SEAC has furnished its recommendations for the grant of Environmental Clearance to the project subject to the conditions stated therein.

The Authority after detailed discussion accepted the recommendation of SEAC and decided to issue Environmental Clearance subject to following conditions and that stated vide **Annexure 'C'.**

1. The PP shall furnish fresh water supply commitment letter and disposal of excess treated water from the local body /TWAD before obtaining CTE.
2. The company shall have a well laid down environmental policy duly approved by the Board of Directors before obtaining CTE.
3. The proponent shall deploy cost-effective technology to reduce GHG emissions.
4. The proponent shall adopt strategies to develop carbon-neutral or zero-carbon building during production and maintance.
5. The proponent shall adopt strategies to reduce emissions during operation (operational phase and building materials).
6. The proponent shall adopt strategies to decarbonize the building / industrial activities.
7. The proponent shall adopt strategies to maintain the health of the inhabitants.
8. The proponent shall adopt strategies to reduce electricity demand and consumption.
9. The proponent shall provide provisions for automated energy efficiency.
10. The proponent shall provide provisions for controlled ventilation and lighting systems.
11. The proponent shall adopt strategies to reduce temperature due to the activities.
12. The proponent shall adopt methodologies to effectively implement the Solid Waste Management Rules, 2016, E-Waste (Management) Rules, 2016, Plastic Waste Management Rules, 2016 as amended, Bio-Medical Waste Management Rules, 2016 as amended, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended, Construction and Demolition Waste Management Rules, 2016, & Batteries (Management and Handling) Rules, 2002.

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13. The proponent shall provide solar panels and contribute to the grid from the solar panel as proposed.
14. The proponent shall adopt methodology to control thermal environment and other shocks in the building / industrial activities.
15. The proponent shall adopt strategies to reduce anthropogenic GHGs such as CO_2, CH_4, nitrous oxide, etc., resulting from human activities.
16. The database record of environmental conditions of all the events from pre-construction, construction and post-construction should be maintained in digitized format.
17. There should not be any impact due to the modification of the habitat on critically endangered species, biodiversity, etc,.
18. The proponent should develop an emergency response plan in addition to the disaster management plan.
19. The proponent should maintain environmental audits to measure and mitigate environmental concerns.
20. The proponent shall develop building-friendly pest control strategies by using non chemical measures so as to control the pest population thereby not losing beneficial organisms.
21. The proponent shall ensure that the proposed activities in no way result in the spread of invasive species.
22. As per the 'Polluter Pay Principle', the proponent will be held responsible for any environmental damage caused due to the proposed activity including withdrawal of EC and stoppage of work.

Annexure 'C'

Climate Change

1. The proponent shall adopt strategies to decarbonize the building.
2. The proponent shall adopt strategies to reduce emissions during operation (operational phase and building materials).
3. The proponent shall adopt strategies to reduce temperature including the Building Façade.
4. The proponent shall adopt methodology to control thermal environment and other shocks in the building.
5. The proponent shall adopt detailed plan to reduce carbon footprints and also develop strategies for climate proofing and climate mitigation.
6. The proponent shall adopt strategies to ensure the buildings in blocks are not trapping heat to become local urban heat islands.

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7. The proponent shall ensure that the building does not create artificial wind tunnels creating cold water and uncomfortable living conditions resulting in health issues.
8. The activities should in no way cause emission and build-up Green House Gases. All actions to be eco-friendly and support sustainable management of the natural resources within and outside the campus premises.
9. The proponent shall ensure that the buildings should not cause any damage to water environment, air quality and should be carbon neutral building.

Health

10. The proponent shall adopt strategies to maintain the health of the inhabitants.

Energy

11. The proponent shall adopt strategies to reduce electricity demand and consumption.
12. The proponent shall provide provisions for automated energy efficiency.
13. The proponent shall provide provisions for controlled ventilation and lighting systems.
14. The proponent shall provide solar panels and contribute to the grid from the solar panel as proposed.
15. All the construction of Buildings shall be energy efficient and conform to the green building norms. The PP shall ensure that carbon neutral building.
16. The proponent shall provide adequate capacity of DG set (standby) for the proposed STP so as to ensure continuous and efficient operation.

Regulatory Frameworks

17. The proponent shall adopt methodologies to effectively implement the Solid Waste Management Rules, 2016, E-Waste (Management) Rules, 2016, Plastic Waste Management Rules, 2016 as amended, Bio-Medical Waste Management Rules, 2016 as amended, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended, Construction and Demolition Waste Management Rules, 2016, & Batteries (Management and Handling) Rules, 2001.

18. The project proponent shall ensure to provide adequate elevated closed area earmarked for collection, segregation, storage & disposal of wastes generated within the premises as per provisions of Solid Waste Management Rules, 2016, E-Waste (Management) Rules, 2016, Plastic Waste Management Rules, 2016 as amended, Bio-Medical Waste Management Rules, 2016 as amended, Hazardous and Other Wastes (Management and Transboundary Movement)

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Rules, 2016 as amended, Construction and Demolition Waste Management Rules, 2016, & Batteries (Management and Handling) Rules, 2001.

19. The proponent shall provide elevator as per rules CMDA/DTCP.

Database maintenance & audits

20. The database record of environmental conditions of all the events from pre-construction, construction and post-construction should be maintained in digitized format.
21. The proponent should maintain environmental audits to measure and mitigate environmental concerns.

Biodiversity

22. There should not be any impact due to the modification of the habitat on critically endangered species, biodiversity, etc,.
23. The proponent shall ensure that the proposed activities in no way result in the spread of invasive species.
24. The proponent shall adopt sustainability criteria to protect the micro environment from wind turbulences and change in aerodynamics since high rise buildings may stagnate air movements.
25. The proponent shall ensure almost safety for the existing biodiversity, trees, flora & fauna shall not disturb under any circumstances.
26. The proponent shall develop building-friendly pest control strategies by using non chemical measures so as to control the pest population thereby not losing beneficial organisms.
27. The proponent shall adopt strategies to prevent bird hits.

Safety measures

28. The proponent should develop an emergency response plan in addition to the disaster management plan.
29. The proponent shall develop detailed evacuation plan for disabled people and safety evacuation plan in emergencies.
30. All bio-safety standards, hygienic standards and safety norms of working staff and patients to be strictly followed as stipulated in EIA/EMP.
31. The disaster management and disaster mitigation standards to be seriously adhered to avoid any calamities.
32. The proponent shall provide the emergency exit in the buildings.
33. The proponent shall adhere to the provision and norms regard to fire safety prescribed by competent authority.

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Water/Sewage

34. The proponent shall ensure that no treated or untreated sewage shall be let outside the project site & shall find access to nearby water-bodies under any circumstances other than the permitted mode of disposal.
35. The proponent shall provide STP of adequate capacity as committed and shall continuously & efficiently operate STP so as to satisfy the treated sewage discharge standards prescribed by the TNPCB time to time.
36. The proponent shall periodically test the treated sewage the through TNPCB lab /NABL accredited laboratory and submit report to the TNPCB.
37. The proponent shall periodically test the water sample for the general water quality core parameters including fecal coliform within the proposed project site through TNPCB lab /NABL accredited laboratory and submit report to the concerned authorities.
38. The proponent shall ensure that provision should be given for proper utilization of recycled water.
39. The project proponent shall adhere to storm water management plan as committed.

Parking

40. The project proponent shall adhere to provide adequate parking space for visitors of all inmates including clean traffic plan as committed.

Solid waste Management

41. The proponent shall ensure that no form of municipal solid waste shall be disposed outside the proposed project site at any time.
42. The proponent should strictly comply with, Tamil Nadu Government order regarding ban on one time use and throwaway plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986.

EMP

43. The proponent shall ensure that the EIA/EMP and disaster management plan should be adhered strictly.
44. The proponent shall ensure that all activities of EMP shall be completed before obtaining CTO from TNPCB.
45. The proponent shall provide and ensure the green belt plan is implemented as indicated in EMP. Also, the proponent shall explore possibilities to provide sufficient grass lawns.

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Others

46. As per the 'Polluter Pay Principle', the proponent will be held responsible for any environmental damage caused due to the proposed activity including withdrawal of EC and stoppage of work.
47. The project proponent shall adhere to height of the buildings as committed.

Environmental Clearance along with the conditions containing four parts namely

Part - A – Common conditions applicable for Pre-construction, Construction and Operational Phases

Part - B – Specific Conditions – Pre construction phase

Part - C – Specific Conditions – Construction phase

Part - D – Specific Conditions – Operational Phase/Post constructional Phase / Entire life of the project.

Validity:

The SEIAA hereby accords Environmental Clearance to the above project under the provisions of EIA Notification dated 14th September, 2006 as amended, with validity for Seven years from the date of issue of EC, subject to the compliance of the terms and conditions stipulated below:

(A) Statutory compliance

i. The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.

ii. The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.

iii. The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (incase of the presence of schedule-I species in the study area)

iv. The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention &

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Control of Pollution) Act, 1974 from the concerned State pollution Control Board/ Committee.

v. The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.

vi. The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989

(B) Air quality monitoring and preservation:

i. The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.

ii. The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986.

iii. The project proponent shall install system to carryout Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM10 and PM25 in reference to PM emission, and SO2and NOx in reference to SO2 and NOx emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120 each), covering upwind and downwind directions.

iv. To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. Sulphur content should not exceed 0.5% in the coal for use in coal fired boilers to control particulate emissions within permissible limits (as applicable). The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines.

v. Storage of raw materials, coal etc shall be either stored in silos or in covered areas to prevent dust pollution and other fugitive emissions.

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vi. National Emission Standards for Organic Chemicals Manufacturing Industry issued by the Ministry vide G.S.R. 608(E) dated 21st July, 2010 and amended from time to time shall be followed.

vii. The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 shall be complied with

(C) Water quality monitoring and preservation:

i. The project proponent shall provide online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the premises (applicable in case of the projects achieving ZLD)

ii. As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises (applicable in case of the projects achieving the ZLD).

iii. The effluent discharge shall conform to the standards prescribed under the Environment (Protection) Rules, 1986, or as specified by the State Pollution Control Board while granting Consent under the Air/Water Act, whichever is more stringent.

iv. Total fresh water requirement shall not exceed the proposed quantity or as specified by the Committee. Prior permission shall be obtained from the concerned regulatory authority/CGWA in this regard.

v. Process effluent/any wastewater shall not be allowed to mix with storm water. The storm water from the premises shall be collected and discharged through a separate conveyance system.

vi. The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and utilize the same for different industrial operations within the plant.

vii. The DG sets shall be equipped with suitable pollution control devices and the adequate stack height so that the emissions are in conformity with the extant regulations and the guidelines in this regard.

(D) Noise monitoring and prevention:

i. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.

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ii. The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation.

iii. The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time

(E) Safety, Public hearing and Human health issues:

i. Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.

ii. The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire fighting system shall be as per the norms.

iii. The PP shall provide Personal Protection Equipment (PPE) as per the norms of Factory Act.

iv. Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.

v. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

vi. Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

vii. There shall be adequate space inside the plant premises earmarked for parking of vehicles for raw materials and finished products, and no parking to be allowed outside on public places

(F) Corporate Environment Responsibility:

i. The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 1stMay 2018, as applicable, regarding Corporate Environment Responsibility.

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ii. The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest /wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest / wildlife norms / conditions and / or shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.

iii. A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.

iv. Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other 5 purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.

v. Self environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.

(G) Waste management:

i. Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm and the solvent transfer through pumps.

ii. Process organic residue and spent carbon, if any, shall be sent to cement industries. ETP sludge, process inorganic & evaporation salt shall be disposed off to the TSDF.

iii. The company shall undertake waste minimization measures as below:-

a. Metering and control of quantities of active ingredients to minimize waste.

b. Reuse of by-products from the process as raw materials or as raw material substitutes in other processes.

c. Use of automated filling to minimize spillage.

d. Use of Close Feed system into batch reactors.

e. Venting equipment through vapour recovery system.

f. Use of high pressure hoses for equipment clearing to reduce wastewater generation

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Air Environment

1. Stack emission levels should be stringent than the existing standards in terms of the identified critical pollutants.
2. CEMS may be installed in all large/medium red category industries (air polluting) and connected to SPCB and CPCB server.
3. Effective fugitive emission control measures should be imposed in the process, transportation, packing etc.
4. Transportation of materials by rail/ conveyor belt, wherever feasible.
5. Encourage use of cleaner fuels (pet coke/ furnace oil/ LSHS may be avoided).
6. Best Available Technology may be used. For example; usage of EAF/SAF/ IF in place of Cupola furnace. Usage of Supercritical technology in place of sub-critical technology.
7. Increase of green belt cover by 40% of the total land area beyond the permissible requirement of 33%, wherever feasible.
8. Stipulation of greenbelt outside the project premises such as avenue plantation, plantation in vacant areas, social forestry, etc.
9. Assessment of carrying capacity of transportation load on roads inside the industrial premises.

Water Environment

1. Reuse/recycle of treated wastewater, wherever feasible.
2. Continuous monitoring of effluent quality/quantity in large and medium Red Category Industries (water polluting).
3. A detailed water harvesting plan may be submitted by the project proponent
4. Zero liquid discharge wherever techno - economically feasible.

Land Environment

1. Increase of green belt cover by 40% of the total land area beyond the permissible requirement of 33%, wherever, feasible for new projects.
2. Stipulation of greenbelt outside the project premises such as avenue plantation, plantation in vacant areas, social forestry, etc.
3. Dumping of waste (fly ash, slag, red mud, etc.) may be permitted only at designated locations approved by SPCBs/ PCCs.

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4. More stringent norms for management of hazardous waste. The waste generated should be preferably utilized in co processing.
5. Monitoring of compliance of EC conditions may be submitted with third party audit every year.
6. The % of the CER may be at least 1.5 times the slabs given in the OM dated 01.05.2018 for SPA and 2 times for CPA in case of Environmental Clearance.

(H) SPECIFIC CONDITIONS:

(i) It is mandatory for the project proponent to furnish to the SEIAA, Half yearly compliance report in hard and soft copies on 1st June and 1st December of each calendar year in respect of the conditions stipulated in the prior Environmental clearance issued.

(ii) "Consent for Establishment" shall be obtained from Tamil Nadu Pollution Control Board and a copy of the same shall be furnished to the SEIAA, Tamil Nadu before start of project construction activity at the site.

(iii) "Consent to Operate" should be obtained from the Tamil Nadu pollution Control Board before the start of the operation of the project and copy shall be submitted to the SEIAA-TN.

(iv) The implementation of Environmental Management Plan in regard to treatment and disposal of sewage & Effluent, Solid waste Management, Hazardous - Waste Management, and CSR Activities should be carried out, as proposed and committed. Regular monitoring should be carried out during operation phases.

(v) The residue collected from the evaporator shall be documented by maintaining proper register and it should be made available at the time of inspection.

(vi) Adequate dust extraction system such as Ducting with dust extracting arrangement wherever required shall be established to achieve Occupational –health standards and ambient air quality standards.

(vii) The proponent shall carryout best housekeeping practices as spillage management for handling and maintenance of raw materials and products inside the unit premises.

(viii) Nature of chemicals Handled, the Do and Don'ts shall be displayed at all vital locations as laid down in MSDS.

(ix) The proponent shall ensure that the quantity of Hazardous Waste handed over to the TSDF shall match with the quantity generated.

(x) The proponent shall provide a separate closed area earmarked for storing solid waste including Hazardous Waste as proposed.

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(xi) The proponent shall dispose Hazardous Waste generated as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. Spent oil from D.G sets should be stored in HDPE drums in an isolated covered facility and disposed off through TNPCB registered recyclers.

(xii) The Plastic wastes shall be segregated and disposed as per the provisions of Plastic Waste (Management & Handling) Rules 2016.

(xiii) The e - waste generated should be collected and disposed to a nearby authorized e-waste centre as per e waste (Management & Handling), Rules 2016 as amended.

(xiv) The Municipal solid waste generated shall be collected, segregated and disposed as per Solid Waste Management Rules, 2016.

(xv) The industry shall conduct air sampling at least once in six months for the general core parameters (PM_{10}, $PM_{2.5}$, SO_x, NO_x) through TNPCB/NABL Accredited Laboratory and maintain records of the same and it should be made available at the time of inspection.

(xvi) Regular monitoring on the air quality, water quality and noise on the selected locations in and around the project site as mentioned in the EMP report for creating base line data shall be continued and records shall be maintained.

(xvii) A separate environment and safety management cell with qualified staff shall be set up before establishment of the facility and shall be retained throughout the lifetime of the industry, for implementation of the stipulated environmental safeguards.

(xviii) The Green belt area already developed within the project area shall be properly maintained.

(xix) The green belt of 5-10 m width shall be developed in more than 33% of the total project area, mainly along the plant periphery, in downward wind direction, and along road sides etc. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department.

(xx) The industry shall promote tree plantation to neutralize their carbon foot print. The industry shall engage regularly in afforestation programme.

(xxi) The proponent shall ensure effective risk management strategy regarding confined space management to avoid risk while handling raw materials, products in the process area and storage.

(xxii) The energy sources for lighting purposes shall preferably be LED based.

(xxiii) The industry shall conduct air sampling at least twice in a week (104 times in a year), as stipulated under EP Act 1986.

(xxiv) Risk cum disaster management plan should be in placed in the industry premises at all time.

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(xxv) Water conservation scheme including rain water harvesting measures to augment ground water resources shall be implemented so as to collect and reuse the entire rainwater harvested as a supplement to fresh water.

(xxvi) The natural drainage pattern in the project area shall be maintained and storm water drain along the boundary and appropriate places shall be provided considering the Catchment area and maximum intensity of rainfall to collect runoff water/rain water for proper disposal to avoid flooding around the premises.

(xxvii) The Environmental Clearance is issued without prejudice to any order that may be passed by the Hon'ble NGT/ Honb'le High Court of Madras.

(xxviii) All the assurances given in EIA and EMP shall be adhered strictly.

(xxix) Detail study shall be carried out by engaging accredited agencies / reputed institutions for Risk management and detailed Disaster management plan prepared for compliance.

(xxx) Sufficient funds should be provided for Disaster management.

(xxxi) The Project Proponent shall provide disinfection by UV system for the sewage treatment plant for treating the sewage before applying on land for gardening.

(xxxii) The project proponent shall provide sufficient ventilation (air circulation) in the hazardous waste storage yard where the hazardous waste like spent carbon, Chemical sludge, used or spent oil are being kept.

(xxxiii) The Project Proponent shall carry out safety audit in the different operating zones of the plant at least once in a year and the same shall be considered as base for reviewing the unsafe conditions during the plant safety meeting.

(xxxiv) The Project Proponent shall prepare a code of practice for safe operation for educating the safety standards to the work force deployed in the plant through appropriate training by the concerned experts.

(xxxv) As the plant operation involves the sensitive processing, the medical officer and the supporting staff involved in the health centre activities shall be trained in occupational health surveillance (OHS) aspects through the outsourced training from the experts available in the field of OHS for ensuring the health standard of persons employed.

(xxxvi) The Activity of the industry should not impact on agricultural, irrigation system and mangroves surrounding the area.

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(xxxvii) The EMP cost and operation and maintenance cost shall be deposited in a nationalized bank by opening separate account and the head wise expenses statement shall be submitted to TNPCB with a copy to SEIAA annually.

(xxxviii) There should be no threat to Bio diversity due to the operation of the industry.

(xxxix) The flora & fauna present in and around the project site should be get affected due to the activity as reported.

(xl) The Project Proponent has to provide rain water harvesting collection tank capacity with Recharging pit in order to recover and reuse the rain water during normal rains.

(xli) The operation of the activity should not impact on the soil, micro flora & Fauna present in and around the project site.

(xlii) The project proponent shall carry out risk assessment process for all the operations involved in the plant and a suitable risk management plan showing the contours of sensitive zones should be prepared.

(xliii) The project proponent shall take up better housekeeping measures including scraps disposal and up keeping the machineries, pipes, etc.

(xliv) The proponent should continuously monitor the VOC and ensure that VOC levels are within permissible limits.

(I) GENERAL CONDITIONS:-

i. This Environmental Clearance shall not be cited to relax any other rules applicable to this project.

ii. **The Project Proponent should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the Environmental Clearance informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with TNPCB.**

iii. **A copy of the Environmental Clearance shall be sent by the project proponent to concerned local body and local NGO, if any from whom suggestions/representatives, if any were received while processing the proposal.**

iv. The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO_2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.

v. The Environmental Clearance shall also be put on the website of the company.

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vi. No expansion or modernization in the project shall be carried out without prior approval of the SEIAA-TN. In case of any deviations or alterations in the project proposal from those submitted to this Authority for clearance, a fresh reference shall be made to the SEIAA-TN to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.

vii. All the environmental protection measures and safeguards as recommended in the EIA report shall be complied with.

viii. The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.

ix. The implementation of the project vis-à-vis environmental action plans shall be monitored by the Regional office of MoEF& CC at Chennai, TNPCB and CPCB. A six monthly compliance status report shall be submitted to monitoring agencies regularly.

x. Data on ambient air, stack and fugitive emissions shall be regularly submitted online to the Regional office of MoEF & CC, GOI, at Chennai, TNPCB and Central Pollution Control Board as well as hard copy once in six months and display data on RSPM, SO_2 and NOx outside the premises at the appropriate place for the general public.

xi. Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

xii. Proper house-keeping and cleanliness must be maintained within and outside the plant.

xiii. Occupational health surveillance programme shall be undertaken as regular exercise for all the employees, especially for those engaged in handling hazardous substances. The first aid facilities in the occupational health centre shall be strengthened and the medical records of each employee should be maintained separately.

xiv. The overall noise levels in and around the plant area shall be kept well within the standards prescribed for by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75dBA (day time) and 70 dBA (night time).

xv. A separate Environmental Management Cell equipped with full fledged laboratory facilities to carry out the various Environmental Management and Monitoring functions shall be set up under the control of a Senior Executive.

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xvi. The requisite amount earmarked towards capital cost and recurring cost/annum for implementing pollution control measures shall be used judiciously to implement the Environment Management Plan as furnished in the EIA report. The funds so provided shall not be diverted for any other purposes.

xvii. The project proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF & CC, GOI at Chennai, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; RSPM, SO_2, NOx (ambient levels as well as stack emissions) or critical sector parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

xviii. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.

xix. Environmental Clearance is being issued without prejudice to the action initiated under Environment (Protection) Act, 1986 or any court case pending or any other court order shall prevail.

xx. The SEIAA, TN may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

xxi. The SEIAA/SEAC or any Competent Authority may suitably add any further condition(s) on receiving reports from the project authority. The above condition shall be monitored by the Regional Office of MoEF located at Chennai.

xxii. The SEIAA, TN may revoke or suspend the Environmental clearance, if implementation of any of the above conditions is not satisfactory.

xxiii. The SEIAA, TN may cancel the environmental clearance granted to this project under the provisions of EIA Notification, 2006, if, at any stage of the validity of this environmental clearance, if it is found or if it comes to the knowledge of this SEIAA, TN that the project proponent has deliberately concealed and/or submitted false or misleading information or inadequate data for obtaining the environmental clearance.

xxiv. Failure to comply with any of the conditions mentioned above may result in withdrawal of this

MEMBER SECRETARY
SEIAA-TN

clearance and attract action under the provisions of the Environment (Protection) Act, 1986.

xxv. The SEIAA-TN reserves the right to stipulate additional conditions if found necessary. The industry in a time bound manner shall implement these conditions.

xxvi. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, along with their amendments ,draft Minor Mineral Conservation & Development Rules, 2010 framed under MMDR Act 1957, National Commission for protection of Child Right Rules, 2006 and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/Hon'ble High Court of Madras and any other Courts of Law relating to the subject matter.

xxvii. Any appeal against this environmental clearance shall lie with the Hon'ble National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

MEMBER SECRETARY
SEIAA-TN

Copy to:

1. The Additional Chief Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
3. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. The APCCF (C), Regional Office, Ministry of Environment & Forest (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34
5. Monitoring Cell, I A Division, Ministry of Environment & Forests, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. The District Collector, Tiruvallur District.
7. Stock File.

Category of the Industry :

ORANGE

CONSENT ORDER NO. 2408257750102 DATED: 25/02/2024.

PROCEEDINGS NO.F.0001GMP/OL/DEE/TNPCB/GMP/A/2024 DATED: 25/02/2024

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT –M/s. ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED - RMD , S.F.No. Plot no. 39 to 52 EPIP, SIPCOT INDUSTRIAL COMPLEX, Gummidipoondi in s.no. 334/[1Pt,2Pt, 3Pt,3APt,3BPt,4Pt,7BPt], PAPPANKUPPAM village, Gummidipoondi Taluk and Tiruvallur 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. Proc.No.F.0001GMP/OL/DEE/TNPCB/GMP/W&A/2018 dated: 4.7.2018
2.Application No. 57750102 dated:21.02.2024
3. IR.No : F.0001GMP/OL/AE/GMP/2024 dated :24.02.2024

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 Director
M/s . ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED - RMD
S.F No. Plot no. 39 to 52 EPIP, SIPCOT INDUSTRIAL COMPLEX, Gummidipoondi in s.no. 334/[1Pt,2Pt, 3Pt,3APt,3BPt,4Pt,7BPt]
PAPPANKUPPAM Village
Gummidipoondi Taluk
Tiruvallur 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, 2030**

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

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.	Re-rolled MS Products	250000	TPA

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**
01	Coal & Oil Fired Re Heating furnace	Wet scrubber with Common Stack[Billet & Rolling Mill]	34.0	
II	**Fugitive/Noise emission :**			
Sl. No.	**Fugitive or Noise Emission sources**	**Type of emission**	**Control measures**	

Special Additional Conditions:

The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.

The industries shall take all efforts to use and popularize “Mission LiFE” logo and mascot which is available in TNPCB & MoEFCC website. They shall also request their employees to adopt “Mission LiFE” action points and document the same and furnish half yearly report to Board.

Additional Conditions:

1.The unit shall operate and maintain the air pollution control measures continuously and efficiently so as to ensure that the emission shall satisfy the AAQ/Emission standards prescribed by the Board.
2. The unit shall adhere to the ANL standards as prescribed by the Board.
3.The unit shall continue to develop green belt with trees having thick canopy cover so as to attenuate air and noise pollution

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

To
The Director,
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED - RMD,
D- 109, 4TH FLOOR,
LBR COMPLEX,
ANNA NAGAR EAST,
CHENNAI
Pin: 600102

Copy to:

1.The Commissioner, GUMMUDIPOONDI-Panchayat Union, Gummidipoondi Taluk, Tiruvallur District .

2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.

3. The District Environmental Engineer, Tamil Nadu Pollution Control Board, GUMMIDIPOONDI for favour of kind information.

4. File

Category of the Industry :

ORANGE

CONSENT ORDER NO. 2408157750102 DATED: 25/02/2024.

PROCEEDINGS NO.F.0001GMP/OL/DEE/TNPCB/GMP/W/2024 DATED: 25/02/2024

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT – M/s. ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED - RMD , S.F.No. Plot no. 39 to 52 EPIP, SIPCOT INDUSTRIAL COMPLEX, Gummidipoondi in s.no. 334/[1Pt,2Pt, 3Pt,3APt,3BPt,4Pt,7BPt], PAPPANKUPPAM village, Gummidipoondi Taluk and Tiruvallur 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. Proc.No.F.0001GMP/OL/DEE/TNPCB/GMP/W&A/2018 dated: 4.7.2018
2.Application No. 57750102 dated:21.02.2024
3. IR.No : F.0001GMP/OL/AE/GMP/2024 dated :24.02.2024

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 Director
M/s . ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED - RMD
S.F No. Plot no. 39 to 52 EPIP, SIPCOT INDUSTRIAL COMPLEX, Gummidipoondi in s.no. 334/[1Pt,2Pt, 3Pt,3APt,3BPt,4Pt,7BPt]
PAPPANKUPPAM Village
Gummidipoondi Taluk
Tiruvallur 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, 2030**

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

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.	Re-rolled MS Products	250000	TPA

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	3.2	On land for gardening
Effluent Type : Trade Effluent			
1.	Trade effluent	5.0	Recycling to process

Special Additional Conditions:

The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.

The industries shall take all efforts to use and popularize “Mission LiFE” logo and mascot which is available in TNPCB & MoEFCC website. They shall also request their employees to adopt “Mission LiFE” action points and document the same and furnish half yearly report to Board.

Additional Conditions:

1.The unit shall operate and maintain the existing combined sewage treatment plant continuously and efficiently so as to achieve the standards prescribed by the Board.
2.The treated sewage shall be used for gardening within the premises after satisfying the standards prescribed by the Board.
3.The unit shall ensure that the cooling water shall be kept under closed circuit system.
4.The unit shall ensure that no treated/untreated sewage shall gain access to the drain/water course or stagnation like pond etc at any point of time.
5.The unit shall continue to develop green belt inside the premises.

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

To
The Director,
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED - RMD,
D- 109, 4TH FLOOR,
LBR COMPLEX,
ANNA NAGAR EAST,
CHENNAI
Pin: 600102

Copy to:

1.The Commissioner, GUMMUDIPOONDI-Panchayat Union, Gummidipoondi Taluk, Tiruvallur District .

2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.

3. The District Environmental Engineer, Tamil Nadu Pollution Control Board, GUMMIDIPOONDI for favour of kind information.

4. File

Category of the Industry :

ORANGE

CONSENT ORDER NO. 2308250418536 DATED: 06/02/2023.

PROCEEDINGS NO.F.0168GMP/OL/DEE/TNPCB/GMP/A/2023 DATED: 06/02/2023

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT –M/s. ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED , S.F.No. Plot no.39 to 52 & B1/S SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI, S.No 275p, 281p,282p,283p & 334p, PAPPANKUPPAM village, Gummidipoondi Taluk and Tiruvallur 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.RCO Proc.No.F.0168GMP/OL/DEE/TNPCB/GMP/A&W/2021 dated: 18/05/2021
2.Unit's application dated 03/02/2023
3.IR.No : F.0168GMP/OL/AEE/GMP/2023 dated 04/02/2023

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 Managing Director
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
S.F.No. Plot no.39 to 52 & B1/S SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI, S.No 275p, 281p,282p,283p & 334p,
PAPPANKUPPAM village,
Gummidipoondi Taluk,
Tiruvallur 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, 2029

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

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.	M S Billets	8400	Tons/ Month

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 -25 TPH with 2 crucibles	Top & Side Hood,, Canopy Hood, Spark Arrestor, Bag Filter followed by Stack	34	
II	**Fugitive/Noise emission :**			
Sl. No.	**Fugitive or Noise Emission sources**	**Type of emission**	**Control measures**	

Special Additional Conditions:

i. 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.

ii. The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.

Additional Conditions:

1. The unit shall operate and maintain the air pollution control measures continuously and efficiently so as to ensure that the emission shall satisfy the AAQ/Emission standards prescribed by the Board.

2. The unit shall comply with the conditions stipulated in directions issued for revocation of closure direction and restoration of power supply vide Board's Proc. dated 06/01/2023

3. The unit shall continue to develop and maintain adequate green belt in and around the premises

4. The unit shall ensure that stacks are connected to CARE Centre, Guindy all the time

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

To
The Managing Director,
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
4TH FLOOR,
LBR COMPLEX,
ANNA NAGAR EAST,
Chennai
,
Pin: 600102

Copy to:

1.The Commissioner, GUMMUDIPOONDI-Panchayat Union, Gummidipoondi Taluk, Tiruvallur District .
2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.
3. The District Environmental Engineer, Tamil Nadu Pollution Control Board, GUMMIDIPOONDI for favour of kind information.
4. File

Category of the Industry :

ORANGE

CONSENT ORDER NO. 2308150418536 DATED: 06/02/2023.

PROCEEDINGS NO.F.0168GMP/OL/DEE/TNPCB/GMP/W/2023 DATED: 06/02/2023

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT – M/s. ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED , S.F.No. Plot no.39 to 52 & B1/S SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI, S.No 275p, 281p,282p,283p & 334p, PAPPANKUPPAM village, Gummidipoondi Taluk and Tiruvallur 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.RCO Proc.No.F.0168GMP/OL/DEE/TNPCB/GMP/A&W/2021 dated: 18/05/2021
2.Unit's application dated 03/02/2023
3.IR.No : F.0168GMP/OL/AEE/GMP/2023 dated 04/02/2023

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 Managing Director
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
S.F.No. Plot no.39 to 52 & B1/S SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI, S.No 275p, 281p,282p,283p & 334p,
PAPPANKUPPAM Village ,
Gummidipoondi Taluk ,
Tiruvallur 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, 2029

PERSEUS SAVIOUR LIVINGSTON

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

TAMILNADU POLLUTION CONTROL BOARD

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.	M S Billets	8400	Tons/ Month

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	6.0	On land for gardening
Effluent Type : Trade Effluent			
1.	Trade effluent 1	0.076	On land for gardening
2.	Trade effluent 2	0.116	Solar Evaporation Pans

TAMILNADU POLLUTION CONTROL BOARD

Special Additional Conditions:

The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.

Additional Conditions:

1. The unit shall operate and maintain the sewage treatment plant effectively and continuously so as to satisfy the standards prescribed by the Board immediately and
the unit shall utilize the treated sewage on unit's land for gardening

2. The unit shall ensure that the cooling water is under closed circuit system and there is no discharge on land etc.,

3. The unit shall ensure that no treated/untreated sewage shall gain access to the drain/water course/transport through tankers at any point of time.

4. The unit shall furnish latest Gross Fixed Asset without any depreciation every year and pay the consent fee accordingly.

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

To
The Managing Director,
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
AR3 STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
4TH FLOOR,
LBR COMPLEX,
ANNA NAGAR EAST,
Chennai

Pin: 600102

Copy to:

1.The Commissioner, GUMMUDIPOONDI-Panchayat Union, Gummidipoondi Taluk, Tiruvallur District .
2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.
3. The District Environmental Engineer, Tamil Nadu Pollution Control Board, GUMMIDIPOONDI for favour of kind information.
4. File

TAMILNADU POLLUTION CONTROL BOARD

Category of the Industry :

ORANG
E

CONSENT ORDER NO. 2308250418536 DATED: 06/02/2023.

PROCEEDINGS NO.F.0168GMP/OL/DEE/TNPCB/GMP/A/2023 DATED: 06/02/2023

SUB: Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT –M/s. ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED , S.F.No. Plot no.39 to 52 & B1/S SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI, S.No 275p, 281p,282p,283p & 334p, PAPPANKUPPAM village, Gummidipoondi Taluk and Tiruvallur 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.RCO Proc.No.F.0168GMP/OL/DEE/TNPCB/GMP/A&W/2021 dated: 18/05/2021
2.Unit's application dated 03/02/2023
3.IR.No : F.0168GMP/OL/AEE/GMP/2023 dated 04/02/2023

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 Managing Director
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
S.F.No. Plot no.39 to 52 & B1/S SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI, S.No 275p, 281p,282p,283p & 334p,
PAPPANKUPPAM village,
Gummidipoondi Taluk,
Tiruvallur 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, 2029

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

TAMILNADU POLLUTION CONTROL BOARD

TAMILNADU POLLUTION CONTROL BOARD

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.	M S Billets	8400	Tons/ Month

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 -25 TPH with 2 crucibles	Top & Side Hood,, Canopy Hood, Spark Arrestor, Bag Filter followed by Stack	34	
II	**Fugitive/Noise emission :**			
Sl. No.	**Fugitive or Noise Emission sources**	**Type of emission**	**Control measures**	

TAMILNADU POLLUTION CONTROL BOARD

Special Additional Conditions:

i. 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.

ii. The unit shall obtain No Objection Certificate (NOC) from the Tamil Nadu Bio Diversity Board /National Bio Diversity Authority if the unit is using any Biological resources or knowledge associated thereto as per the provisions of Biological Diversity Act 2002.

Additional Conditions:

1. The unit shall operate and maintain the air pollution control measures continuously and efficiently so as to ensure that the emission shall satisfy the AAQ/Emission standards prescribed by the Board.

2. The unit shall comply with the conditions stipulated in directions issued for revocation of closure direction and restoration of power supply vide Board's Proc. dated 06/01/2023

3. The unit shall continue to develop and maintain adequate green belt in and around the premises

4. The unit shall ensure that stacks are connected to CARE Centre, Guindy all the time

District Environmental Engineer,
Tamil Nadu Pollution Control Board,
GUMMIDIPOONDI

To
The Managing Director,
M/s.ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
ARS STEELS & ALLOY INTERNATIONAL PRIVATE LIMITED,
4TH FLOOR,
LBR COMPLEX,
ANNA NAGAR EAST,
Chennai

Pin: 600102

Copy to:

1.The Commissioner, GUMMUDIPOONDI-Panchayat Union, Gummidipoondi Taluk, Tiruvallur District.

2. Copy submitted to the Member Secretary, Tamil Nadu Pollution Control Board, Chennai for favour of kind information.

3. The District Environmental Engineer, Tamil Nadu Pollution Control Board, GUMMIDIPOONDI for favour of kind information.

4. File

State Industries Promotion Corporation of Tamil Nadu Limited

(A GOVERNMENT OF TAMILNADU UNDERTAKING)

Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No.7223, Egmore, Chennai - 600 008.

GST Reg. No. 33AAACS4643J1ZF

SIPCOT Industrial Park Administrative Office Block, Gummidipoondi-601 201. Ph.: 044-27922242/355 Fax: 044-27922242

To, ARS Steels and Alloys Intl Pvt Ltd Plot No : B1/S, Gummidipoondi Industrial Park and EPIP, Gummidipoondi.		GSTIN : 33AALCA9425H1ZL

BILL OF INVOICE

INVOICE NO: POGD2023BOSW1316			TAXABLE VALUE (Rs.)	PLACE OF SUPPLY : Gummidipoondi Industrial Park and EPIP	
				INVOICE DATE : 07-03-2024	
				DUE DATE : 22-03-2024	
SL NO.	DESCRIPTION	SAC			Total Rs.
1	Water Bill	Exempted*	18100.00		18100.00
			SUB TOTAL		18100.00
			SGST	0%	0.00
			CGST	0%	0.00
			TOTAL		18100.00
	TOTAL INVOICE VALUE	(In Words)	Rupees Eighteen Thousand One Hundred & Only		

This is a system generated invoice. No signature is required

e-mail : Website : www.sipcot.tn.gov.in

(71244 -0008)

State Industries Promotion Corporation of Tamil Nadu Limited

(A GOVERNMENT OF TAMILNADU UNDERTAKING)

Regd. Office : 19-A, Rukmani Lakshmipathy Road, Post Box No.7223, Egmore, Chennai - 600 008.

GST Reg. No. 33AAACS4643J1ZF

SIPCOT Industrial Park Administrative Office Block, Gummidipoondi-601 201. Ph.: 044-27922242/355 Fax: 044-27922242

To, ARS Steels and Alloys Intl Pvt Ltd Plot No : B1/S, Gummidipoondi Industrial Park and EPIP, Gummidipoondi.		GSTIN : 33AALCA9425H1ZL

BILL OF INVOICE

INVOICE NO: POGD2024BOSW0008			TAXABLE VALUE (Rs.)	PLACE OF SUPPLY : Gummidipoondi Industrial Park and EPIP	
				INVOICE DATE : 05-04-2024	
				DUE DATE : 20-04-2024	
SL NO.	DESCRIPTION	SAC			Total Rs.
1	Water Bill	Exempted*	22300.00		22300.00
			SUB TOTAL		22300.00
			SGST	0%	0.00
			CGST	0%	0.00
			TOTAL		22300.00
	TOTAL INVOICE VALUE	(In Words)	Rupees Twenty Two Thousand Three Hundred & Only		

This is a system generated invoice. No signature is required

e-mail : Website : www.sipcot.tn.gov.in

भारतीय गुणवत्ता परिषद्
QUALITY COUNCIL® OF INDIA
QCI Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Eco Tech Labs Pvt Ltd., Chennai

48, 2nd main road, Ram Nagar South Extension, Pallikaranai, Chennai-600100, Tamil Nadu

*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.	Thermal power plants	4	1 (d)	A
3.	Metallurgical industries-Ferrous only	8	3 (a)	B
4.	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
5.	Airports	29	7 (a)	A
6.	Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
7.	Building and construction projects	38	8 (a)	B
8.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated March 07, 2024, posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/24/3202 dated Apr. 23, 2024. The accreditation needs to be renewed before the expiry date by Eco Tech Labs Pvt. Ltd., Chennai following due process of assessment.

Issue Date
Apr. 23, 2024

Valid up to
Apr. 10, 2025

Mr. Ajay Kumar Jha
Sr. Director - NABET

Certificate No.
NABET/EIA/22-25/SA 0222

Prof (Dr) Varinder S Kanwar
CEO - NABET

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

INITIATIVES FOR REDUCING GHG EMISSION

Green House Effect

Some atmospheric gases absorb and re-emit infrared energy from the atmosphere down to the Earth's surface. This process, the greenhouse effect, leads to a mean surface temperature that is 33 °C greater than it would be in its absence. If it were not for the greenhouse gas effect, Earth's average temperature would be a chilly -18 °C.

The Earth has a natural greenhouse effect due to trace amounts of water vapour (H2O), carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) in the atmosphere. These gases let the solar radiation reach the Earth's surface, but they absorb infrared radiation emitted by the Earth and thereby lead to the heating of the surface of the planet. One needs to distinguish between the natural greenhouse effect and the enhanced greenhouse effect. The natural greenhouse effect is caused by the natural amounts of greenhouse gases, and is vital to life. In the absence of the natural greenhouse effect the surface of the Earth would be approximately 33 °C cooler. The enhanced greenhouse effect refers to the additional radiative forcing resulting from increased concentrations of greenhouse gases induced by human activities. The main greenhouse gases whose concentrations are rising are carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons (HCFCs), hydrofluoro-carbons (HFCs) and ozone in the lower atmosphere.

Carbon Dioxide Emissions

Carbon dioxide (CO2) is the primary greenhouse gas emitted through human activities. In 2020, CO2 accounted for about 79% of all U.S. greenhouse gas emissions from human activities. Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). Human activities are altering the carbon cycle–both by adding more CO2 to the atmosphere and by influencing the ability of natural sinks, like forests and soils, to remove and store CO2 from the atmosphere. The main human activity that emits CO2 is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation. Certain industrial processes and land-use changes also emit CO2.

Greenhouse gas emissions from industry (24% of 2020 greenhouse gas emissions) primarily come from burning fossil fuels for energy, as well as greenhouse gas emissions from certain chemical reactions necessary to produce goods from raw materials.

Currently the steel industry is among the three biggest producers of carbon dioxide, with emissions being produced by a limited number of locations; steel plants are therefore a good candidate for decarbonization. Every ton of steel produced in 2018 emitted on average 1.85 tons of carbon dioxide, equating to about 8 percent of global carbon dioxide emissions.

Recent studies estimate that the global steel industry may find approximately 14 percent of steel companies' potential value is at risk if they are unable to decrease their environmental impact.3 Consequently, decarbonization should be a top priority for remaining economically competitive and retaining the industry's license to operate. Moreover, long investment cycles of 10 to 15 years, multibillion financing needs, and limited supplier capacities make this issue even more relevant and lock in significant lead times for addressing the decarbonization challenge.

GHG Emission Reduction Opportunities

1. **Using renewable energy sources rather than fossil fuel to generate electricity**: Increasing the share of total electricity generated from wind, solar, hydro, and geothermal sources, as well as certain biofuel sources, through the addition of new renewable energy generating capacity.

2. **Carbon Capture and Sequestration (CCS):** Capturing CO2 as a byproduct of fossil fuel combustion before it enters the atmosphere, transporting the CO2, injecting the CO2 deep underground at a carefully selected and suitable subsurface geologic formation where it is securely stored.

3. **Fuel Switching:** Using fuels that emit less CO2 than fuels currently being used. Alternative sources can include biofuels; hydrogen; electricity from renewable sources, such as wind and solar; or fossil fuels that are less CO2-intensive than the fuels that they replace. For example:
    - Using electric or hybrid automobiles, provided that the energy is generated from lower-carbon or non-fossil fuels.
    - Adopting Car pooling technology- On a global average, cars carry 1.57 persons per trip. Increasing occupancy can decrease the amount of fossil fuels needed for transportation and so, greenhouse gas emissions.

4. **Upgrading to more efficient industrial technology. EPA's ENERGY STAR® program helps industries become more energy-efficient:** Identifying ways that manufacturers can use less energy to light and heat factories or to run equipment.

5. **Paris Agreement:** The production of steel remains a CO2 and energy-intensive activity. The steel industry should be committed to reduce the footprint from its operations and the use of its products. The industry should provide full support to the aims of Paris Agreement.

   The Paris Agreement:

   The Paris Agreement was adopted in 2015. The agreement's central aim is to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

   The agreement aims to reach a balance between anthropogenic emissions and removals by sinks in the second half of the century.

6. **Using natural gas instead of coal to run machinery**

7. **Recycling**: Producing industrial products from materials that are recycled or renewable, rather than producing new products from raw materials. For example, Using scrap steel and scrap aluminium as opposed to smelting new aluminium or forging new steel.

8. **Training and Awareness:** Making companies and workers aware of the steps to reduce or prevent emissions leaks from equipment. EPA has a variety of voluntary programs that provide resources for training and other steps for reducing emissions. For example, Instituting handling policies and procedures for perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulphur hexafluoride (SF6) that reduce occurrences of accidental releases and leaks from containers and equipment.

9. **Change in Uses of Land: Increasing carbon storage by using land differently or maintaining carbon storage by avoiding land degradation.** For example,

- Afforestation and minimizing the conversion of forest land to other land uses, such as settlements, croplands, or grasslands.
- Increasing the green cover area within the industry premises.

10. Adopting the 4Rs in steel manufacturing industry

- Reduce – reducing the amount of material energy and other resource used to create steel and reducing the weight of steel used in products
- Reuse
- Remanufacture
- Recycle – Melting steel products at the end of their useful life to create new steels.

LIFE CYCLE ASSESSMENT AND STEEL SUSTAINABILITY

1.0 Introduction

The steel industry is the second largest industry in the world after oil and gas industry. Steel is used in almost every sector which ranges from building and construction, packaging, transportation industry, and power and renewable energy sector. Use of steel is found everywhere in the present-day society. There are practically no materials or products where steel is not present or has not played a role in their production.

Crude Steel production has more than doubled, over the last three decades, with the 2020 production amounting to 1,864 million tons and the 2019 production amounting to 1,869 million tons. Steel continues to be the backbone and enabler of evolution and progress of the society. It makes the world a better place to live. The smart cities of the future are to be built on steel. Steel being an infinitely recyclable and reusable asset, its use helps in reducing the burden on the resources of the earth.

Steel has a combination of properties which are to be considered in the decision-making process at the design state. These properties include,

(i) Chemical, Metallurgical, And Mechanical Properties
(ii) Corrosion Resistance Properties
(iii) Fire Resistance Properties
(iv) Recyclability
(v) Long Life
(vi) Maintenance Requirements
(vii) Hygienic Requirements
(viii) Aesthetics
(ix) Environmental Influence.

1.1 Life cycle of steel

Steels can be recycled without loss of quality. Since metallic bonds are restored upon resolidification, steels continually recover their original performance properties, even after multiple recycling loops. This allows them to be used again and again for the same

application. By contrast, the performance characteristics of most non-metallic materials degrade after recycling.

Typically, steel products made over the integrated route have a returned process scrap content limited to a value ranging from 10 % to 20 % whereas the steel products at end-of-life are recycled at rates ranging from 85 % to 95 %. The 'recycled content' method only incorporates the environmental benefits realized today, in contrast with the 'end-of-life' method which additionally accounts for the future environmental benefits emerging from scrap which is generated at end-of-life. For steel industry, the 'end-of-life recycling rate' is the most appropriate indicator, while available volumes of end-of-life scrap are insufficient to match the present demand.

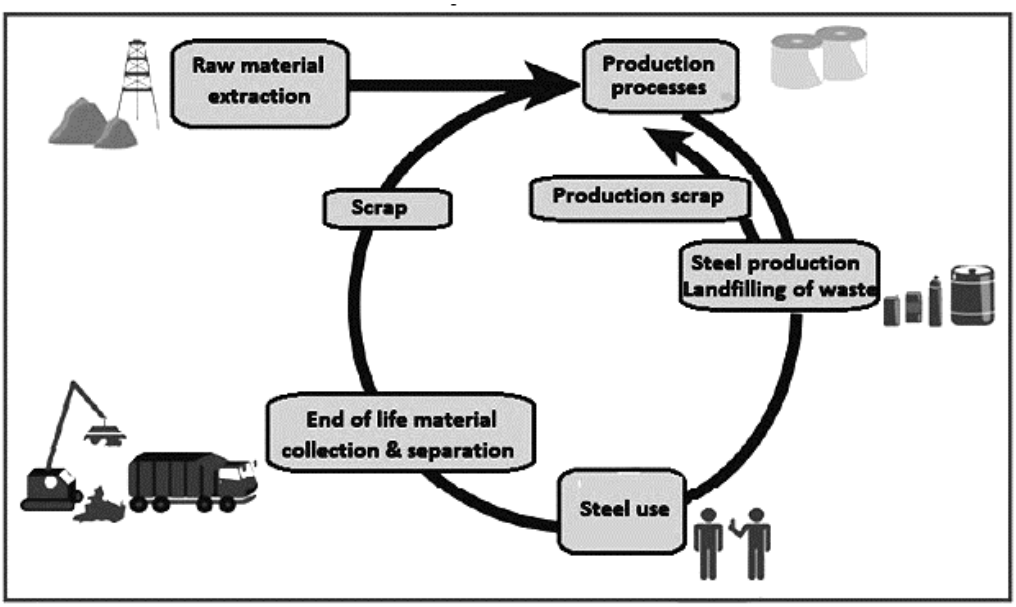


Figure -1 Life Cycle of Steel

1.2 Principle for Life Cycle Assessment

The production of primary (virgin) steel typically includes ore mining and concentrating, smelting, and refining to obtain the steel of the specified chemistry, with a number of processing routes available. In each stage, impurities and byproducts are separated and the concentration of the iron in the final product increases. The refining of steel to sufficient purities frequently needs energy-intensive and precisely-controlled melting stages, which are normally based on the use of fossil-fuel inputs directly as a reductant or indirectly for heat and electricity. Iron and steel production accounts for a substantial global industrial carbon dioxide (CO2) emissions.

In the mining and beneficiation area, there are processes which consist of treating ores in liquid solution to concentrate ore by separating it from the associated minerals. In some processes, very high temperatures are not normally needed and the treatment can take place at high pressures which needs energy to maintain the pressures

Pyro-metallurgy involves treatment of ore concentrates at high temperatures, in order to strip the iron from its associated mineral constituents. This, in turn, necessitates use of fossil fuels in heating furnaces or electricity to power the furnaces. Further, steel industry produces different types of steel products. These different types of steel products can be made in the same steel plant and from the same primary production processes. Each of these products needs different processing routes for the production of the products used by the end consumers.

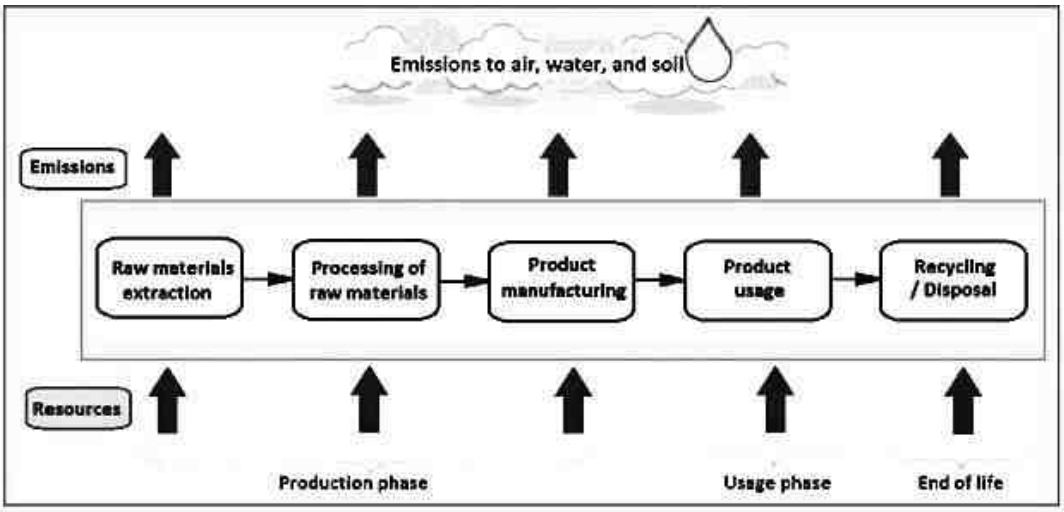


Figure -2 Principle for Life Cycle Assessment (LCA)

1.3 Components of Steel Sustainability

Human activities which need material and energy to develop have irreversible effects on ecological systems and environment such as climate change, the depletion of natural resources, waste generation, and pollution etc. Most of these impacts have hazardous consequences for human health and survival and most of these effects have long-termed results. Climate change and the sustainable use of natural resources are among the main challenges for society today.

Sustainability concerns the whole cycle of a product production i.e. from raw material acquisition, through planning, design, construction and operations, to the its use and end of

life waste management. It is a big and important challenge for the future in the steel industry. Several efforts have been made by the steel industry to reduce its carbon footprint by increasing recyclability and improving the processes.

In the sustained development, there is encouragement for the development of methods which are economically and environmentally healthy. The production and distribution of the materials are carried out with the minimum of transportation. Also, those materials are used which are available as close as possible.

Steel sustainability consists of three components:

(i) Environmental
(ii) Social
(iii) Economic

Life cycle analysis of steel is done for determining environmental impact. Three aspects which determine the environmental impact are,

(i) Production of Steel Product
(ii) Use of The Steel Product
(iii) Recycling of The End of The Life Material.

The materials efficiency of the steel product is determined by three criteria namely (i) reduce, (ii) reuse, and (iii) recycle. The quantities of raw materials to produce steel are to be reduced by improving process efficiencies for the reduction of the CO2 emissions. After the life of a steel product is over, part of the steel content of the product can be reused without any loss of steel basic properties. This makes the reuse of steel very important. Steel is 100 % recyclable. All the steel scrap is reused in making fresh steel.

The social impact of steel is quite substantial. The social impact is influenced by (i) standards of living, (ii) education of the people, (iii) community, and (iv) equal opportunity for everyone.

A sustainable material does not harm the people working to produce it, or who handle it during its use, recycling, and ultimate disposal. The safety, like injury-free and healthy workplace of the employees, is the key priority for the steel industry. Steel also improves the quality of life by making technical advances possible.

The economic component of steel sustainability is very important. The factors influencing the economics include (i) production cost, (ii) profit, (iii) cost savings, (iv) economic growth, and (v) generation of revenues for investments is research and development activities.

Life cycle cost (LCC) is an important criterion for the economic component of steel sustainability. It is the sum of all cost related to a product incurred during the life cycle which consists of (i) conception, (ii) production / fabrication, (iii) its use / operation, and (iv) end-of-life. Besides environmental, social, and economic aspects for steel sustainability, there are three overlapping areas such as (i) environmental-social, (ii) social-economic, and (iii) economic-environmental. The economic-environmental area includes operational efficiency, energy efficiency, and use of renewable resources.

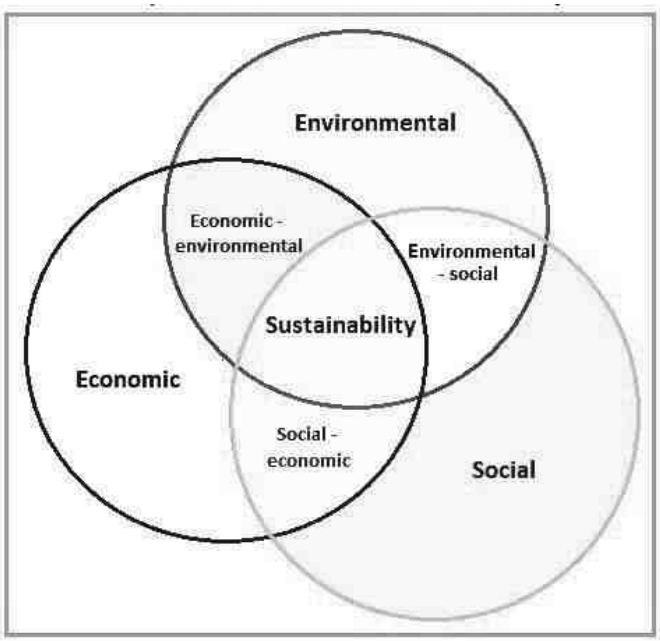


Figure -3 The Components of Steel Sustainability

1.4 Life Cycle Assessment Framework

Steel is a highly durable material used in many qualified applications. Like all materials, its production and use affect the environment in many different ways. The evaluation of the sustainability of the projects can be conducted with the help of a number of tools which have been developed over a period of last few years.

LCA can assist in identifying opportunities to improve the environmental performance of the projects at various points in their life cycle. The objective of a LCA is to create the

complete environmental profile of a product over its entire life cycle, showing the results with the aid of environmental indicators in a more understandable way.

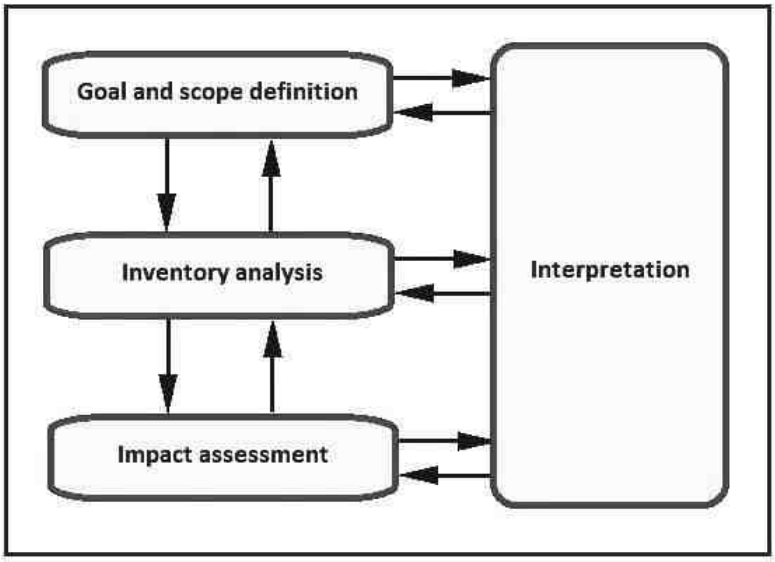


Figure- 4 Life Cycle Assessment Framework

1.5 Recyclability

The recyclability and recycling potential of a product, i.e. reduction potential of environmental impacts by recycling, is also important in LCA, in addition to the environmental impacts in the production and use phases. Because steel scrap can be easily recovered and sorted magnetically, almost all the end-of-life steel products are recovered as scrap. It can be recycled again and again in any steel products. Therefore, steel products achieve closed-loop recycling.

Meanwhile, the recovery rates of other materials are generally low, because they are difficult to sort, and removing impurities is difficult. As a result, the number of materials that achieve closed-loop recycling like steel is small.

By E-mail only
Ref No.
WL5/HOTNFD/386/2024

O/o. Principal Chief Conservator of Forests
(HoFF),
State Forest Headquarters,
Guindy-Velachery Main Road,
Chennai - 600 032
Dated: 25-10-2024

Sub: Forests - Wildlife - Proposed Expansion of steel melting plant by ARS Steels and Alloy International Pvt Ltd - Regarding.

Ref: M/s. ARS Steels and Alloy International PVT Ltd., Chennai letter No. ARS/Wildlife/NBWL NOC/2024-25 dated 14-10-2024.

* * * *

With reference to the above, it is informed that the Standing Committee of National Board for Wildlife has recommended the proposal vide Agenda No. 78.3.25. Based on the above, No Objection has been issued to expansion of Steel Melting Plant to increase the production capacity from 1,42,200 TPA to 2,88,000 TPA MS Billets by M/s. ARS Steels & Alloy International Pvt., Ltd., vide this office Ref. No. WL5/4441/2022 dated 01-03-2024. Further the proposed expansion is to increase the production capacity from 2,88,000 MT / annum to 6,00,000 MT / annum without construction of additional building. Hence, prior clearance from the Standing Committee of National Board for Wildlife is not required.

This certificate is issued only for obtaining Environmental clearance from the competent authority.

Signed by Srinivas R Reddy
Date: 25-10-2024 10:33:43

Principal Chief Conservator of Forests
and Chief Wildlife Warden

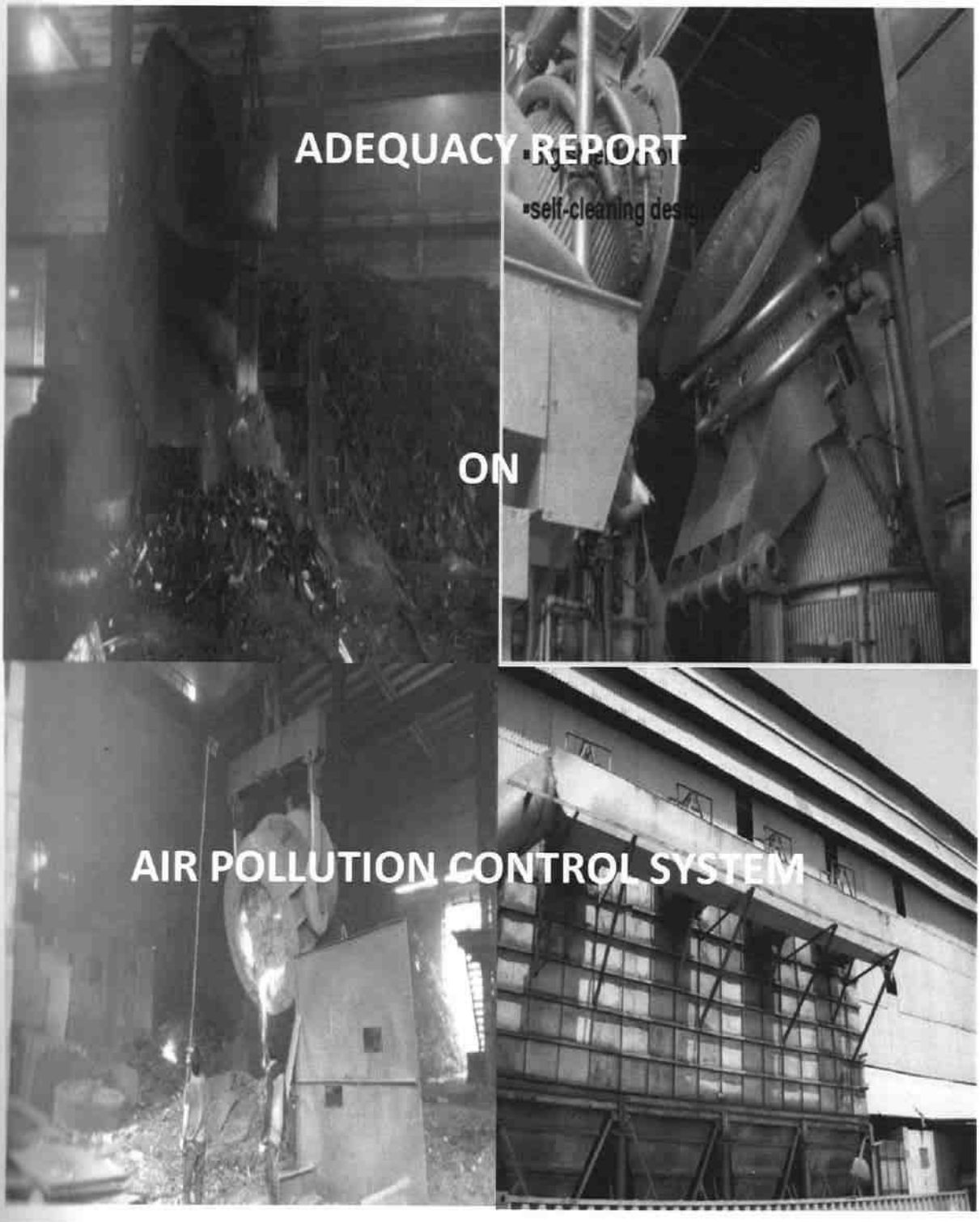
To
M/s. ARS Steels & Alloy International Pvt., Ltd.,
B-1/S, SIPCOT Industrial Complex,
Gummidipoondi - 601 021

Copy to the Additional Principal Chief Conservator of Forests and Director, Arignar Anna Zoological Park, Vandalur, Chennai - 48 for information.

Copy to the Wildlife Warden, Chennai for information.

ARS STEEL & ALLOY INTERNATIONAL PVT LTD

SIPCOT PAPPANKUPPAM GUMMIDIPOONDI TIRUVALLUR



Department of Chemical Engineering

AC TECH Campus,

Anna University, Chennai 600025

CONTENTS

1. ABOUT ARS

"ARS Steels is one of the major player in Secondary Steel located at Gummidipoondi, Tamil Nadu. ARS is certified with ISO 9001 and 14001 for its state of the art production facility and the products are certified by SGS a Swiss based multinational company which provides inspection, verification, testing, and certification services for every batch and consignment.

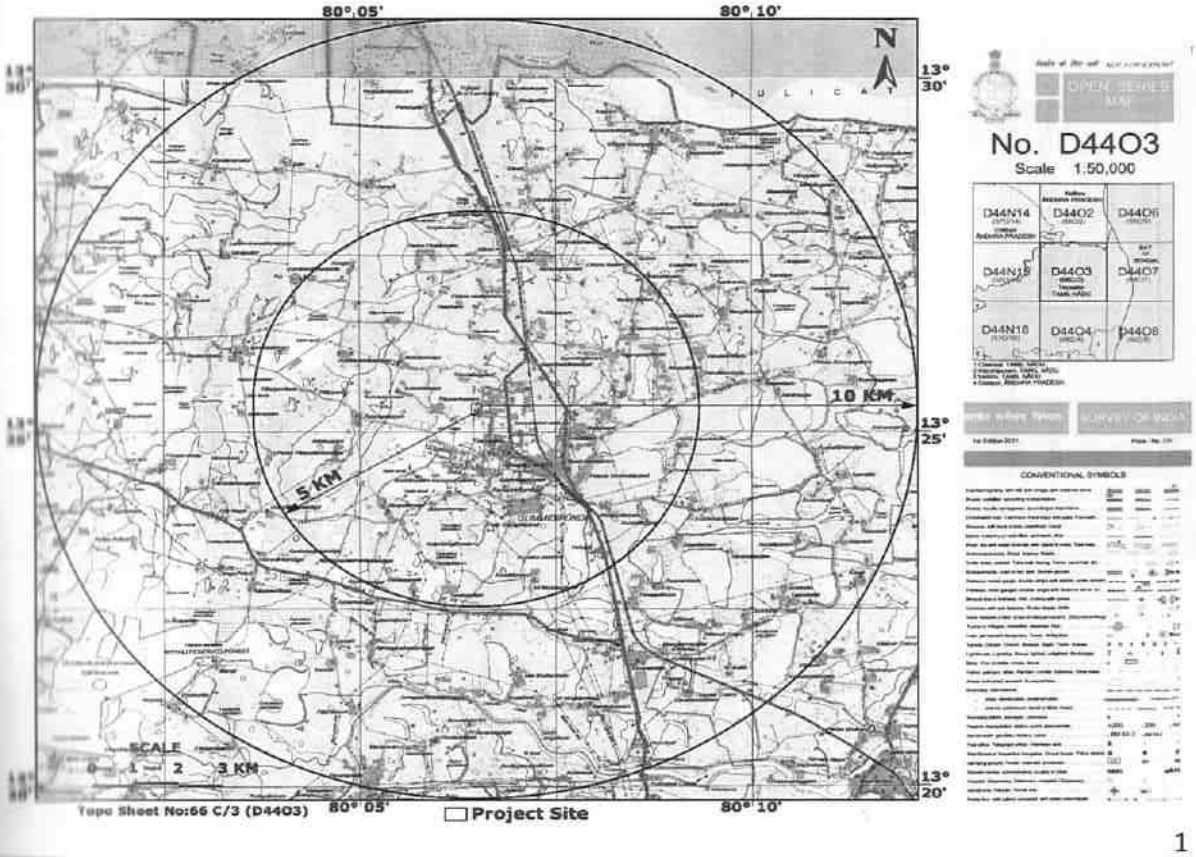
ARS has been producing Mild Steel Billets and TMT Bars for over two decades. Started with 3 MT furnace in 1992 at Pondicherry and further expanded with the present plant at Gummidipoondi, by installing a new plant, thereby increasing its total capacity of Billet 1,58,000 MT per Annum, and Rolling Mill capacity to 1,80,000 MT per Annum.

It has proposed to increase its capacity of the Gummidipoondi plant to 2,88,000 TPA of Billet / Rolled Products.

ARS Steels also has its own Captive Power Plant to meet its Energy requirement, the Captive Power Plant is located away from this steel plant at Gummidipoondi.

2. LOCATION

The plant is located at SIPCOT Industrial Complex, Pappankuppam Village, Gummidipoondi Taluk, Tiruvallur District, Tamil Nadu.



3. PRODUCT

The major product produced is TMT Bar (Rolled Product), for which the said Billet is made in-house. The details of their Existing & Proposed Product as also its capacity are as follows.

Sl. No.	Description	Production Quantity (TPA)	
		Existing	Upon Expansion
1.	Billet (1 x 25 T Electric Induction Furnace)	1,00,800	1,44,000
2.	Billet (1 x 25 T Electric Induction Furnace)	-	1,44,000
			2,88,000
3.	Rolled Products (Rolling Mill)	2,50,000	**2,50,000**

4. RAW MATERIAL CONSUMPTION

The major raw material for making TMT Bar/Rolled Product is Mild Steel Scrap (MS Scraps) apart from Sponge Iron & Ferro Alloys.

The raw material that would be required upon expansion is as follows

Sl. No.	Raw Material	Quantity (TPA) (2 x 25 T)
1.	Sponge Iron	63,360
2.	Melting Scrap	2,53,440

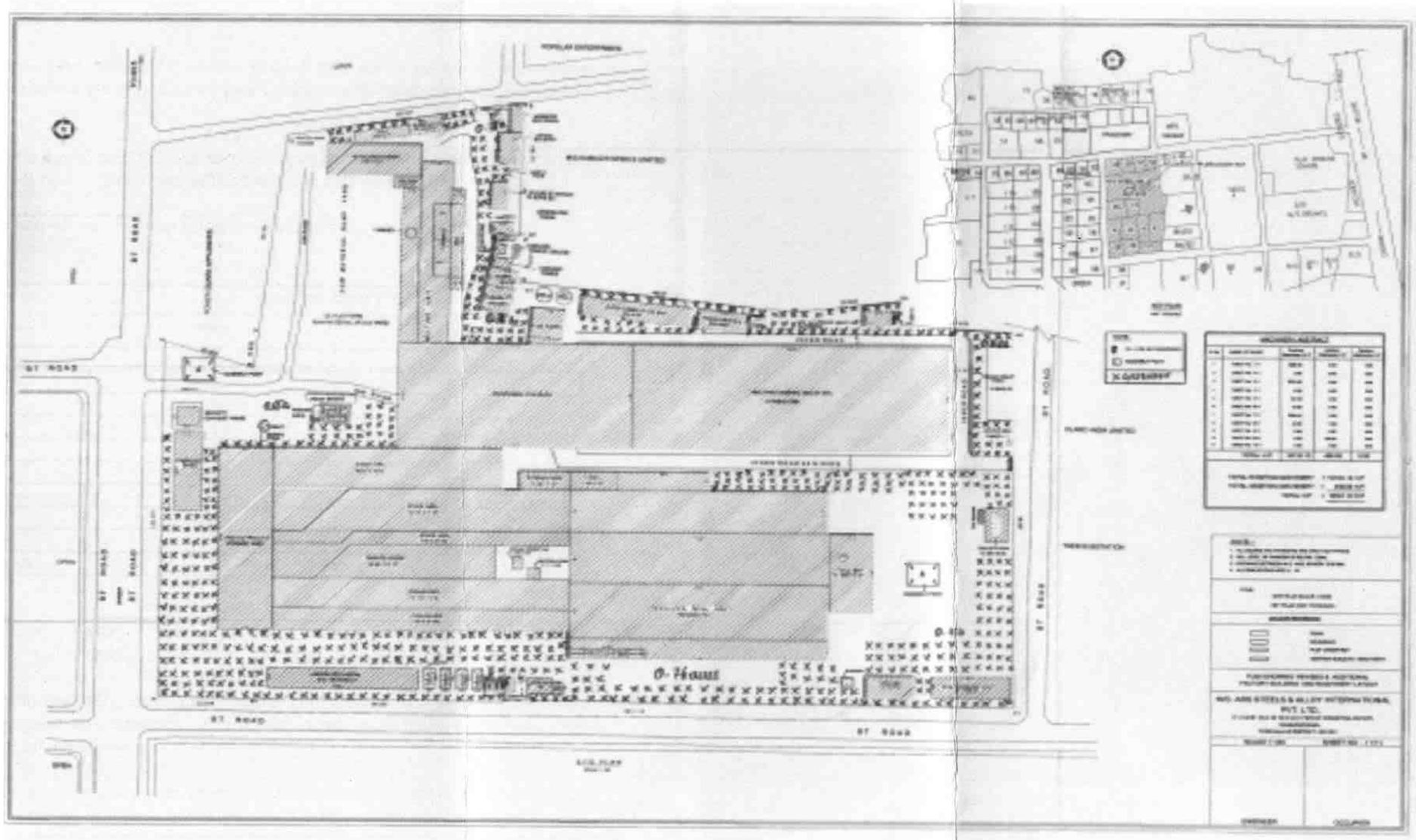
The extent of usage of these raw material in charge is as follows

Sl. No.	Type of Charge Mix	Extent of Usage (%)
1.	Steel Scrap	0 – 100
2.	Sponge Iron	0 – 10
3.	Ferro Silicon / Manganese	0 – 2

Production of TMT Bars entails to a large extent 100% M.S. Scrap or a mixture of M.S. Scrap & Sponge Iron. The charge mix depends on the availability of M.S. Scrap its quality, as also quality of TMT Bar required.

The charge mix is maximum to the extent in order to reduce "SLAG", & thus use sponge iron to dilute or reduce the slag being generated.

5. PLANT LAYOUT



6. TMT BARS – INDUCTION FURNACE ROUTE

Medium /High frequency Induction Furnace is/will be used by ARS Steels. The size of Induction Furnace used at present and that upon expansion is 25-Tonne per charge.

In Induction Furnace electromagnetic induction is used to heat the metal. An alternating current supplied to a primary coil (inductor) sets up a variable magnetic field around the coil.

The variable magnetic flux in turn induces an electromotive force in the secondary circuit (metallic charge), and heat is generated at the place were its consumed.

The typical composition of raw material based on Induction Furnace Melting is

Particulars	Composition (%)	
	Min.	Max.
Steel Scrap		
Carbon (C)	0.15	0.30
Manganese (Mn)	0.60	1.00
Silicon (Si)	0.15	0.35
Phosphorus (P)	0.04	0.06
Sulphur (S)	0.04	0.06
Sponge Iron		
Carbon (C)	0.05	0.20
Fe (total)	90.00	92.00
Gangue or non-metallics	Balance	

$Si + O_2 \rightarrow SiO_2$ Si is lost

$P + O_2 + Ca \rightarrow CaPO_4$ P is lost

The molten metal will, therefore, have the chemical composition having all elements as per specification because the presence of cast iron scrap in small quantity does not influence in increase of any element.

Sponge iron addition is done along with charge up to a maximum of 10% depending on the bath chemistry. Sponge iron has carbon less than 0.2%, which in fact dilutes excess carbon in steel scrap and is a great advantage in reducing carbon content of bath. FeO present in sponge iron reduces the carbon content.

$FeO + C \rightarrow CO + Fe$

If carbon in bath is in excess of 0.3%, more sponge iron is used. Thus refining is carried out, wherein Ferroalloys are added to molten metal but this addition does not lead to any air pollution as the alloys dissolve in molten metal.

Electric Induction Furnace is an open hearth furnace, and predominantly uses the atmospheric air for melting, wherein energy is supplied by Electrical Heat, and thus any semblance of CO is <100 PPM, and even this because of immediate contact with ambient air, gets converted to CO_2, and concentration of this is very negligible.

7. POLLUTION – ELECTRIC INDUCTION MELTING

Only air pollution occurs, and no water or noise pollution takes place in Induction Furnace Melting. The scrap charge when melted emits metallurgical smoke due to oxidation having solid particles.

The steel melting scrap charge may have dust and rust which on heating disintegrates from metal, & some refractory lining also contributes to solid pollutants. Thus the solid pollutants will consists of suspended particulates matters of Iron oxide, silica, manganese and alkali oxide. The gaseous pollutant is predominantly CO_2, wherein concentration is less than 10 PPM.

From the description of pollution potential from induction furnaces, it is observed that volume, quantity and harmful emission of solid and gaseous contaminants are fairly low. The equipment need not be elaborate and can be made cost effective. At the same time, the pollutants emitted should be in conformity to regulations. The Steps Involved are

- Extraction of Fumes
- Cleaning in cyclone / bagfilter
- Allow clean gas to pass to Atmosphere

8. EMISSION REGULATION

The Latest Draft Regulation [G.S.R 984(E) dated 04.12.2019] for Emission is

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 4th December, 2019

G.S.R. 894(E).— The following draft of the notification, which the Central Government proposes to issue in exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) is hereby published, as required under sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, for the information of the public likely to be affected thereby; and notice is hereby given that the said draft notification shall be taken into consideration on or after the expiry of a period of sixty days from the date on which copies of the Gazette containing this notification are made available to the public.

Any person interested in making any objections or suggestions on the proposals contained in the draft notification may forward the same in writing, for consideration of the Central Government within the period specified above to the Secretary, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003, or send it to Member Secretary, CPCB and Scientist 'E' Ministry at the e-mail address i.e. mschcpcb@nic.in and h.kharkwal@nic.in.

Draft Notification

The Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:-

1. **Short title and commencement.**- (1) These rules may be called the Environment (Protection) Amendment Rules, 2019.

(2) They shall come into force on the date of their final publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in Schedule-I, for serial number 24 and the entries relating thereto, the following serial number and entries shall be substituted, namely:-

S. No.	Industry	Parameter	Standards
"24.	Iron and Steel plants		
		A1. Coke Oven Battery - Emission	
		Particulate Matter (PM)	50 mg/Nm^3
		SO_2	500 mg/Nm^3
		NOx	500 mg/Nm^3
		A2. Coke Oven - Visible Fugitive emission: PLD, PLL & PLO, %	
			BP Recovery type ovens
		Leakage from doors - Percent Leaking Doors (PLD)	5
		Leakage from charging lids -Percent Leaking Lids (PLL)	1
		Leakage from AP covers - Percent Leaking Off takes (PLO)	2

			Non-Recovery type ovens
		Leakage from doors - Percent Leaking Doors (PLD)*	1
		Leakage from charging lids -(Percent Leaking Lids (PLL)	NA
		Leakage from AP covers - Percent Leaking Off takes (PLO)	NA
		A3. Coke Oven - Fugitive emission: Charging emission duration, seconds	
		BP Recovery type - top charging	30
		BP Recovery type - stamp charging	50
		Non-Recovery type	30
		A4. Coke Oven - Fugitive emission: Benzo-a-Pyrene	
		Top of the coke oven battery	5 $\mu g/m^3$
		Other areas of coke oven plant	2 $\mu g/m^3$
		B. Sintering and Pelletizing Plants - Main and secondary stacks emission	
		Particulate Matter (PM)	50 mg/Nm^3
		SO_2	500 mg/Nm^3
		NOx	500 mg/Nm^3
		C1.Blast Furnace - Stove stack emission	
		Particulate Matter (PM)	30 mg/Nm^3
		SO_2	250 mg/Nm^3
		NOx	200 mg/Nm^3
		CO	1% (max.)
		C2. Blast Furnace – Cast house fume extraction system	
		Particulate Matter (PM)	50 mg/Nm^3
		D1. Basic Oxygen Furnace(BOF)/Energy Optimization Furnace (EOF)-Main stack emission*	
		Particulate Matter (PM) - Normal operation - Blowing and lancing	 50 mg/Nm^3 100 mg/Nm^3
		SO_2	500 mg/Nm^3
		NOx	500 mg/Nm^3
		*these standards are relevant to the furnaces without gas recovery.	
		D2. Basic Oxygen Furnace (BOF) / Energy Optimization Furnace (EOF) – Secondary refining process stack and Fume extraction system	
		Particulate Matter (PM)	50 mg/Nm^3
		E. Process Gas Based Power Plants / Boilers	
		Particulate Matter (PM)	50 mg/Nm^3
		SO_2	300 mg/Nm^3
		NOx	400 mg/Nm^3
		F. Rolling Mills	
		Particulate Matter (PM)	50 mg/Nm^3
		SO_2	300 mg/Nm^3
		NOx	400 mg/Nm^3
		G. Lime kilns, Dolomite kilns, Refractory units	
		Particulate Matter (PM)	50 mg/Nm^3
		SO_2	400 mg/Nm^3
		NOx	500 mg/Nm^3
		H1. Coal based Sponge Iron Plant –Kiln / WHR Boiler stack emissinn**	
		Particulate Matter (PM)	50 mg/Nm^3
		CO	1% (max.)
		**Stack emission test results shall be normalized at 12% CO_2	
		H2. Gas based Sponge Iron Plant – Process gas heater stack emission	
		Particulate Matter (PM)	50 mg/Nm^3
		SO_2	250 mg/Nm^3
		NOx	200 mg/Nm^3
		CO	1% (max.)
		H3. Sponge Iron Plants (Coal/Gas) –De-dusting /Fumes extraction System	
		Particulate Matter (PM)	50 mg/Nm^3

		I. Electric Arc Furnaces	
		Particulate Matter (PM)	50 mg/Nm^3
		J. Induction Furnaces	
		Particulate Matter (PM)	50 mg/Nm^3
		K. Fugitive emissions	
		PM_{10} at 20 metre from sources	2000 µg/m^3
		L. Effluent standards	
		pH	6.0 to 8.5
		BOD, 3 days at 27 °C (mg/l)	30
		COD (mg/l)	250
		Suspended Solids (SS) (mg/l)	50
		Oil & grease (mg/l)	10
		Ammonical nitrogen as N (mg/l)	50
		Phenol (mg/l)	1
		Cyanide, as CN (mg/l)	0.2
		Note: 1. Height of process stack, H shall be minimum 30 m or as per the formula - $H=14Q^{0.3}$ (where Q is SO_2 emission in kg/hr), and maximum of two shall apply. 2. The above PM emission limits shall be complied by the existing units within three years, till then the PM emission limits prescribed by earlier notification dated 31.03.2012 shall apply on such units. 3. The above effluent SS limit shall be complied by existing units within one year, till then SS-100 mg/l limit shall apply on such units. 4. Effluent from various processes shall be reused within the plant to maximum possible extent after necessary pre-treatment as per requirement of the process. The final effluent shall be treated as per prescribed standards before disposal into the environment. 5. New coal based Sponge Iron Plants shall come up with kiln waste heat boiler. For existing sponge iron plants, SPCBs / PCCs shall prepare policy for respective states for implementation of waste heat recovery boiler based on capacity of the plants. 6. New coal based Sponge Iron Plants shall come up with boiler for utilisation of the dolochar produced from the kiln. For existing sponge iron plants, SPCBs shall prepare policy for respective states for utilisation of the dolochar produced from the kiln. 7. For standalone Rolling Mill Re-heating Furnaces, Foundries (Cupola, Arc and Inductions Furnaces), and Lime Kilns of small scale sector the standards at S. No. 111, 108 and 110 shall apply.	

3 In the Environment (Protection) Rules, 1986, in Schedule-I, Rule 3: Standard for Emission or Discharge of Environmental Pollutants from various Industries, the entry at serial number 99 for Sponge Iron Plant (Rotatary Kiln) shall be deleted."

[F.No. Q-15017/32/2007-CPW]
ARVIND KUMAR NAUTIYAL, Jt. Secy.

Note : The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3,Sub-section (i) vide number S.O. 844 (E), dated the 19th November, 1986 and lastly amended vide notification G.S.R. 5(E), dated the 3rd January, 2019.

9. WET SCRINNER Vs. BAG FILTER

Although Efficiency of Wet Scrubber is 99% in control of dust emission as much as Bag filter too, but, during the initial charging the flue gas contains finer particles ie <5 µm and Wet Scrubber has been found to be largely inefficient in controlling finer particles and this is where Bag Filter are better equipment to capture these finer particles vis-à-vis the Wet Scrubber, and hence Bag Filter are a largely better option to control emission of finer as well as heavier particles.

Further use of Bagfilter instead of Wet Scrubber eliminates requirement of water and thus conserve water as also prevent waste water generation.

10. PROPOSED SYSTEM - AIR POLLUTION CONTROL

10.1 DESIGN BASIS

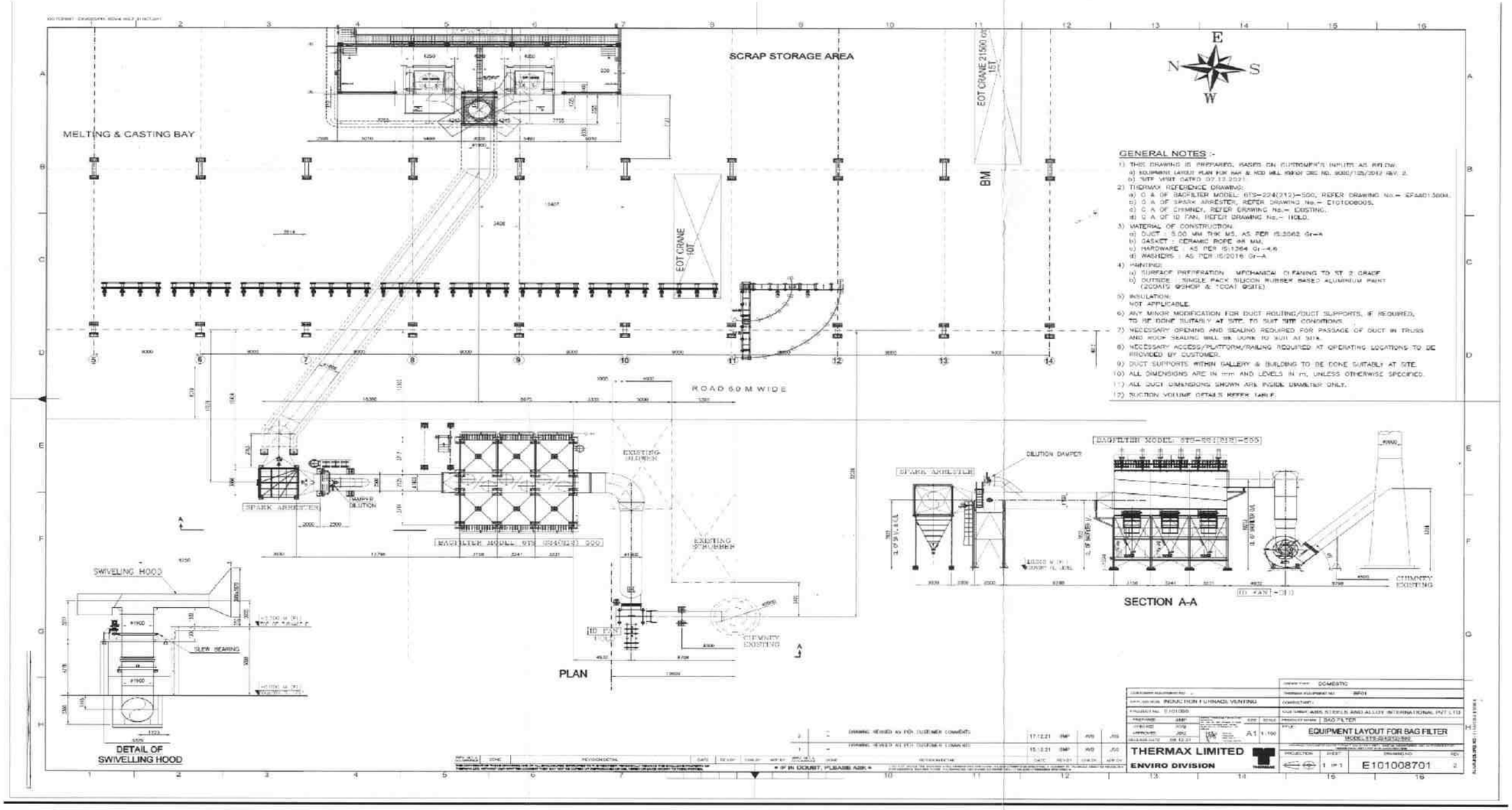
1	**Volumetric flow**		
	Design Value	m3/hr	200000
	Operating Value	m3/hr	200000
2	**Gas temperature continuous**		
	Design Value	Deg. C	120
	Operating Value	Deg. C	120
3	**Gas temperature peaks (maximum for 5 minutes once in a week)**	Deg. C	NA
4	**Static pressure at Bag Filter inlet**	(-) mm of WG	350
5	**Casing design pressure**	(+/-) mm WC	500
6	**Dust to be handled**		Particulates
7	**Dust properties**	**Abrasiveness**	Non Abrasive, Free flowing
8	**Dust concentration in the gas at Inlet of bag filter**		
	Design Value	mg/Nm3	450
	Operating Value	mg/Nm3	450
9	**Bulk density of dust**		
	For sizing calculations (Minimum)	kg/m3	1400
	For power calculations (Maximum)	kg/m3	1600
10	**Dust emission at outlet of bag filter**	mg/Nm3	**30**

10.2 BAGFILTER - PROPOSED

SR.	DESCRIPTION	Unit	200000
1	Bag Filter Arrangement		Twin Compartments
2	Bagfilter mounting		On ground level
3	Material of construction		Steel
4	Gas entry		Hopper
5	Type of Cleaning System		Offline-High Pressure (5-7 kgf/cm2)
6	Air-to-Cloth Ratio	$m^3/m^2/min$	1.08/1.3
7	Pitch between bags	mm	DDE
8	Tubesheet configuration		DDE
9	Bag Filter Dimensions		
10	- Total Length	m	10.1
11	- Total Width	m	10.2
12	- Total Height	m	12.8
13	Air Header arrangement		Single header
14	No. of compartment	Nos.	6
15	No. of bags per compartment	Nos.	212
16	Total No. of bags	Nos.	1272
17	Hopper Type		Pyramidal
18	Total No. of Hoppers	Nos.	6
19	Hopper Angle Type		Valley
20	Hopper Angle Value	Degrees	60
	Filter Bag Specifications		
21	- Filtration Area per Bag	m2	2.43
22	- Total Filtration Area	m2	3087
23	- Inside Diameter	mm	149
24	- Length	mm	5050
25	- Fabric Material		Polyester
26	- Treatment for Bag Fabric		Oil and water repellent
27	- Bag Construction		Stitched
28	- Fabric Weight	gm/m2	550
	Filter Bag Cleaning System		
29	- Compressed Air Quantity	Nm3/hr	157
30	- @ compressed air pressure	kgf/cm2	5-7
31	- Pulse Valve Size	mm	40
32	- Pulse Valve Total Qty.	Nos.	84

33	- Compressed Air Quality		Max. oil = 50 ppm & Max. Moisture = 2 gm/Nm3 (Atm. Press. Dew point: 10 deg C)
34	**Device for bag cleaning**		Microprocessor based sequential controller
35	**Device for balance operation of bagfilter**		Customer PLC/DCS

10.3 LAYOUT OF SYSTEM



11. DESIGN ADEQUACY OF BAG FILTER

The 5- Key Parameters for Optimum Performance of Bag Dust Collector are

- Airflow in CFM (Cubic Feet per Minute)
- Vacuum Pressure or Suction
- Static Pressure (Resistance Generated by the System)
- Air Velocity & Minimum Conveying Velocity
- Air to Cloth Ratio (Ratio of Gas Volume (CFM) to Total Cloth Area (sq.ft) of the Baghouse)

11.1 AIR FLOW

Volume of Flue Gas : 2,00,000 m^3/hr = 1,17,703 CFM

Radius of Duct : = 3.11' (ie Feet)

Thus,

Conveying Velocity : = 3875 ft/m

Any **Conveying Velocity Between 3500 ft/m to 4500 ft/m, is optimum** and Hence, the proposed conveying velocity of **3875 ft/m** is **ADEQUATE** ie for Duct Size of 1900 mm with Flue Gas Capacity of 2,00,000 m^3/hr.

11.2 STATIC PRESSURE & VACUUM PRESSURE

Friction Loss @ Velocity of 4000 Feet/minute = 2.33 Inch per 100 Feet of Duct Length

Length of Duct = 400 Feet

Thus,

Friction Loss (**Static Pressure**) = 9.32 Inches ie **236.728 mm**

However, the **ID Fan proposed is to overcome 350mm WG**, which is sufficient to overcome the STATIC PRESSURE, and hence **ADEQUATE**.

11.3 AIR TO CLOTH RATIO

No. of Bags Proposed	=	1,272 Nos.
Area per Bag	=	26.153 ft² (2.43 m²)
Hence,		
Total Filtration Area	=	33228.19 ft² (3,087 m²)
Volume of Flue Gas	=	7062933 ft³/hr (2,00,000 m³/hr)
		ie 117715.55 ft³/m (3,333 m³/m)
Air to Cloth Ratio	=	117715.55/33228.19 = **3.54**

Even a **Air to Cloth Ratio of 5:1** would be **sufficient**, however, the **Air to Cloth Ratio** Proposed is **3.54** and thus is more than **ADEQUATE**.

12. CONCLUSION

Although the system proposed is **Adequate**, and will meet the permissible Standards with respect to dust emission levels ie < 50 mg/Nm³, however, it would require to ensure optimum operation, with meticulous monitoring as follows,

- Monitoring of PARTICULATE MATTER using CONTINUOUS EMISSION MONITORING SYSTEM
- Measurement of Pressure Drop by Installing Differential Pressure Gauge.

13. REFERENCES

i. *Technical Guidance Manual for Induction, Electric Arc, & Cupola Furnace of MoEF&CC, GoI.*

ii. *Air Pollution Control and Design for Industry P and N Cider emission off, Taylor & Francis Group.*

iii. *Designing & Sizing Bag House Dust Collection System, Dominick Dalsanto – BAGHOUSE.COM*

23/03/2022

Dr.V.T.PERARASU
Associate Professor
Department of Chemicals Engineering
A.C. Tech Campus, Anna University
Chennai - 600025, INDIA

ENERGY AUDIT REPORT

of

M/s ARS Steels & Alloy International Pvt. Ltd

Sipcot Industrial Complex Road,
Hosur, Tamil Nadu – 635126

BY

PHD Chamber of Commerce and Industry
PHD House, 4/2 Siri Institutional Area
August Kranti Marg, New Delhi-110016
Email: sustainability@phdcci.in
Website: www.phdcci.in

Oct' 2024

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ACKNOWLEDGMENT

PHDCCI places on record its sincere thanks to the Management of ARS Steel for entrusting the task of conducting Energy Audit at M/s ARS Steels & Alloy International Pvt. Ltd.

We hereby express our sincere thanks to **Mr. Ashwani Kumar Bhatia (Director), Mr. Rajesh Bhatia (Director) & Mr. A.K. Jha (EHS- Head)**; from ARS Steels for their proactive support and courtesy extended to the PHDCCI team during field study.

PHDCCI Audit Team is thankful to the technical team of ARS Steels for their keen interest in the Energy audit study and the wholehearted support and cooperation during the conduct of the field study, without which the study would not have steered to its successful completion.

It is well worthy to mention that the efforts being taken and the enthusiasm shown by all the personnel towards energy conservation are really admirable.

PHD Chamber of Commerce and Industry

Dr. Ranjeet Mehta
(CEO & Secretary General, PHDCCI)

CERTIFICATE

We certify the following

- The report is based on the data collected at site during Audit and information provided by the ARS Steels & Alloy International Pvt. Ltd.
- The data collection has been carried out diligently and truthfully.
- All data measuring devices used by the team are in good working condition, have been calibrated and have valid certificate from the authorized approved agencies and tampering of such devices has not occurred.
- All reasonable professional skill, care and diligence have been taken in preparing the energy audit report and the contents thereof are a true representation of the facts and figures.

PHD Chamber of Commerce and Industry

Dr. Ranjeet Mehta

(Executive Director, PHDCCI)

ABBREVIATIONS

A	Ampere
AC	Alternating Current
Avg.	Average
AMD	Actual Maximum Demand
BD	Billing Demand
CD	Contract Demand
ECM	Energy Conservation Measure
HPS	High Pressure Switch
KL	Kilo Liter
KV	Kilo Volt
kVA	Kilo Volt Ampere
KVAr	Kilo Volt Ampere Reactive
kW	Kilo Watts
kWh	Kilo Watt Hour
Lit	Litres
LPCD	Litre Per Capita per Day
LPS	Low Pressure Switch
M or m	Meter
Max.	Maximum
mbgl	meters below ground level
Min.	Minimum
MT	Metric Ton
No.	Number
PF	Power Factor
RO	Reverse Osmosis
STP	Sewage Treatment Plant
ETP	Effluent Treatment Plant
V	Voltage

EXECUTIVE SUMMARY

This report is an attempt of PHDCCI to provide an overview of the Energy usage at M/s ARS Steels & Alloy International Pvt. Ltd. The report also highlights the major energy source & consumption area and available energy saving opportunities in the plant. A set of recommendations which will assist in improving energy efficiency has also been highlighted in this report. This report has emerged after a detailed energy audit conducted by PHDCCI in plant from 09/09/2024 to 12/09/2024.

<table>
<tr><td colspan="2">Project Title:</td><td colspan="2">PHDCCI Report Number:</td></tr>
<tr><td colspan="2">Energy Audit at M/s ARS Steels & Alloy International Pvt. Ltd, Sipcot Industrial Complex Road,
Hosur, Tamil Nadu – 635126</td><td colspan="2">2024-25/ PHDCCI/S/W/042</td></tr>
<tr><td colspan="4">Client:</td></tr>
<tr><td colspan="4">M/s ARS Steels & Alloy International Pvt. Ltd.</td></tr>
<tr><td colspan="4">Contact Person:</td></tr>
<tr><td colspan="4">Mr. A.K. Jha (EHS Head)</td></tr>
<tr><td colspan="2">Date of Audit:</td><td colspan="2">Source of Electricity:</td></tr>
<tr><td colspan="2">09/09/2024 to 12/09/2024.</td><td colspan="2">TANGEDCO</td></tr>
<tr><td colspan="2">Date of this Report:</td><td colspan="2">Date of Approval:</td></tr>
<tr><td colspan="2">21/10/2024</td><td colspan="2">23/10/2024</td></tr>
<tr><td>Work Carried out by: (Team Composition)</td><td>Shish Pal Singh Negi
Pushpendra Yadav
Akhilesh Yadav
Shubham Kumar</td><td>Team Lead
Project Lead
Team Member
Team Member</td><td>No Distribution without permission from the client or responsible organization or unit</td></tr>
<tr><td rowspan="2">Final Report Approved:</td><td colspan="3">  </td></tr>
<tr><td colspan="2">Dr. Ranjeet Mehta
(Executive Director, PHDCCI)</td><td>Date: 23/10/2024</td></tr>
</table>

HIGHLIGHTS

ARS Steels & Alloy International Pvt. Ltd. established in 1992 with a modest 3 MT furnace, ARS Steels has grown into one of India's major integrated steel plants. Located in Gummidipoondi, Tamil Nadu, ARS Steels boasts ISO 9001 and 14001 certifications for its state-of-the-art production facility. ARS Steels products are rigorously tested and certified by SGS, ensuring quality and reliability in every batch.

- ARS Steels & Alloy International Pvt. Ltd. draws power from the Tamil Nadu Generation and Distribution Corporation (TANGEDCO) at 33 kV via 2 Nos. of transformer. Further, the power supply to various equipment is fed through circuit breakers fitted in a fore mentioned power control centers (PCC).
- From Tariff order for FY 2024-25, It has been noticed that Applicable Energy Charges & Fixed Charges for HTS Tariff category is about Rs. 7.25/kWh and Rs. 589 kVA/month. Fixed Charges for HT Tariff I category are in Rs. / KVA of Contract Demand.

  Plant has maintained the Electricity Bill details for last 1 Year of total Energy Consumption & Purchase Units. It is recommended to include the Sanctioned load/Contract load, Current Load Demand, Power factor has to be incorporated in Electricity Bill to evaluate the demand variation and power factor variation pattern.
- From the Electricity bill (Apr'23 to Mar'24), It has been noticed that for total units consumed; the % purchased unit through CCP (61%), TNE (19%), IEX (12%), WIND (5%), Solar (3%).
- Team have done the power measurement at main incomer to exhibit the loading pattern. Team noticed; loading was varied in range from 548 kW to 27378 kW with average loading of 5684 KW. However, Load pattern was varied in range from 16411 KW to 27378 KW for around 2.4min. duration only. Thus, their demand utilization noticed within the limit.

  Average Voltage THD (%) at Main Incomer was observed to be range from 0.38% to 0.9% which is in the prescribed limit as per IEEE standard. And, Average Current Harmonics at Main Incomer level was observed to be around 1.0% to 8.2% with average current THD of 2.1%.
- During Audit, the operating power factor at main incomer was noticed to be varied in range from 0.844pf to 1.0pf with average power factor of 0.980pf. In order to maintain the Power factor, Plant has installed HT Capacitor (Old) & new HT capacitor installed but not in operation because of Plant is in expansion. However, Installed HT Capacitor (Old) was not in line/non-operational during audit period. Thus, It is recommended put the HT capacitor is in line and maintain the average power above 0.99, this results in reduced demand savings of around 60KVA which results in monetary benefits of Rs. 4.2 lacs/year.

- ARS Steels has installed 2 X 25MT Furnace to meet their production requirements as per their consent. During Audit, Team has done the Performance test of the Furnace, as per site conditions, the evaluated Furnace Efficiency of Old & New Furnace was around 72% & 71% respectively.

- During Study Period, Total Input Material used in Induction Furnace (Old) & Induction Furnace (New) for melting was about 31430Kg & 31250Kg respectively. However, Total Metal rolled out was about 28156Kg & 28845Kg respectively. Thus resulting in Slag in Old Furnace and New Furnace calculated to be around 3274 Kg (10%) & 2405 Kg (7.7%), Which seems to be on higher side as per national and international standards for slag to metal ratio.

  Thus, It is recommended to limit the Slag as per Indian standard

  Indian Standards:

  1. Bureau of Indian Standards (BIS): IS 10748:2004 recommends 0.02-0.04 (slag/metal)
  2. Indian Institute of Metals (IIM): 0.015-0.030 (slag/metal)

- It has been observed during the audit that, 1 Compressor in Furnace Div. & 3 Compressor in Rolling Div. was operational to meet the compressed air demand of plant. Compressor is having set point pressure of 8.6 bar. For Furnace Div., FAD of compressor was estimated to be about 268CFM against rated capacity of 336 CFM. FAD of Rolling Compressors was not done because of continious operation of Plant and all compressors were in line.

- The maximum air pressure required for the pneumatic operation is 6.5kg/cm2. In addition, cleaning has been done through the same line. Because of leakages present in the system (pipeline leakages, Psynumetic Air Filters, Gun used in Packing Section), plant operating the compressor at Cutin pressure of 8.6 bar (7.6 kg/cm^2) and Cut off pressure of Compressor is 7.6 bar (7.7 kg/cm2); in order to maintain the pressure for pneumatic operations & at packing section.

  Team noticed; the exhaust of compressor & drier (Compressor Exhaust Temperature- 48°C & Drier Exhaust Temperature- 40°C) has been discharged to the same area where the compressor has been placed. This results air inside the Compressor suction is 36.6°C which is warmer than the air outside the building and Ambient Air temperature was observed to be around 33.2°C

- The maximum air pressure required in the Plant is upto 6.5kg/cm2. Because of leakages present in the system, plant operating the compressor at Cutoff pressure of 8.6 bar (8.7 kg/cm2) and Cut in pressure of 7.6bar (7.7 kg/cm2); in order to maintain the pressure for pneumatic operations in plant. Thus, it is recommended to reduce the Air Compressor Cutoff Pressure from 8.6bar (8.7kg/cm2) to 6.6Bar (6.7kg/cm2). For every pressure reduction by 1 kg/cm2, the saving in power observed to be about 6%. In addition of reducing the pressure, Plant management may further install Control Air IFC system to manage and maintain the air requirement as per demand to Downstream. Recommended Control Air IFC system GE-10 (500CFM) for Furnace Div. & GE-20 (1000CFM) for Rolling Div. The energy savings of around 4% to 10% will be achieved as per manufacturer. In addition, to reduce the fluctuation in Air requirement, the Plant may install a receiver tank at utilization area like at Packaging Section where leakages from Gun normally exist.

- Plant management has installed 4 Nos. of cooling tower for Induction Furnace (Old); 3 Nos. of CT for Induction Furnace (New); 2 Nos. of CT for CCM & 1CT having 2 Cells for Rolling Mill for proper operation of the Plant.

During Study Period,

For Induction Furnace (Old): - Out of installed 4 CT's; 3R + 1SB. The Effectiveness of operating Cooling Tower CT1, CT2 & CT4 were calculated to be around 31%, 40% & 34% respectively. Operating Temperature Range ∆T noticed to be 4.1°C, 4.9°C & 4.5°C. Correspondingly, CT Heat Load is calculated to be around 230TR, 170TR & 109TR respectively; which results in total cumulative heat load on CT was around 509TR which meets the PHE Heat load of Induction Furnace (Old). Effectiveness of all CT's are low, however operating CT1 is slightly on lower side comparing to CT2 & CT3; resulting in operational of additional 1 CT to meet the Heat load.

Thus, on increasing the Range ∆T of CT2 (4.9°C) & CT3 (4.5°C) to ∆T 5°C (min.). Two CT's will meet the requirement. Saving achieved by keeping One CT fan as standby. However, Team noticed CT designed for ∆T of 12°C (Classik Make) as per available data.

For Induction Furnace (New): - Out of installed 3 CT's; All 3CT's were found operational. The Effectiveness of operating Cooling Tower CT1, CT2 & CT3 were calculated to be around 43%, 19% & 33% respectively. Operating Temperature Range ∆T noticed to be 3.1°C, 1.8°C & 3.0°C. Correspondingly, CT Heat Load is calculated to be around 159TR, 111TR & 119TR respectively; which results in total cumulative heat load on CT was around 389TR which meets the PHE Heat load of Induction Furnace (New). Effectiveness of all CT's are low, however operating CT2 is very less; resulting in operational of additional 1 CT to meet the Heat load.

Thus, on increasing the Range ∆T of CT1 (3.1°C) & CT3 (3.0°C) to ∆T 4.5°C (min.). Two CT's will meet the requirement. Saving achieved by keeping One CT fan as standby. However, Team noticed CT designed for ∆T of 12°C (Classik Make) as per available data.

For CCM: - Out of installed 2 CT's; All 2CT's were found operational. The Effectiveness of operating Cooling Tower CT1 & CT2 were calculated to be around 20% & 25% respectively. Operating Temperature Range ∆T noticed to be 2.5°C & 3.2°C. Correspondingly, CT Heat Load is calculated to be around 49TR & 66TR respectively; which results in total cumulative heat load on CT was around 115TR. Effectiveness of all CT's are low, however operating CT1 is very less; resulting in operational of additional 1 CT to meet the Heat load.

Thus, on increasing the Range ∆T of CT2 (3.2°C) to ∆T 5°C (min.). Saving achieved by keeping One CT fan as standby. However, Team noticed CT designed for ∆T of 18°C (Classik Make) as per available data.

For Rolling Mill: - 1CT is being installed with 2 Cells; All 2CT Cells were found operational. The Effectiveness of operating Cooling Tower Cell 1 & Cell 2 were calculated to be around 17% & 42% respectively. Operating Temperature Range ∆T noticed to be 2.4°C & 5.9°C. Correspondingly, CT Heat Load is calculated to be around 118TR & 287TR respectively; which results in total cumulative heat load on CT was around 405TR. Effectiveness of operating CT1 is very less comparing to CT2. However, Average Measured Fan velocity of CT2 is around 3.9m/s comparing average fan velocity of CT1 (5.2m/s).

Thus, CT2 Fan performance has to be increased, thereafter CT1 Fan can be kept standby to maintain the L/G ratio.

Remarks: Low CT Effectiveness, It might be due to L/G Ratio not maintained, secondly the path for air from one CT to another CT is very Narrow.

High capacity Pump has been used to get the CT heat load because of low range (∆T). Thus, on increasing the range (∆T) & considering the same heat load, less flow would be needed resulting in slightly low range pump capacity can be used which further results in savings in energy.

- It was observed during the audit that all 2No's of PHE Installed each for Induction Furnace (Old) & Induction Furnace (New). For Induction Furnace (Old), 2 Nos. of PHE were found operational & for Induction Furnace (New), 1No. of PHE were found operational & 2nd is on Standby.

  Induction Furnace (Old): As per operating conditions, The Effectiveness of PHE 1 & PHE2 were calculated to be around 36.2% & 95.9% respectively. Thus, Cleaning of PHE 1 is recommended to handle optimum Heat Load.
  Induction Furnace (New): As per operating conditions, The Effectiveness of PHE2 was calculated to be around 92.6%.

- Team noticed, 3Nos. of Pump installed for Induction Furnace (Old) for Cooling Purpose, Pump namely reference as Furnace 1 Coil Motor 100HP, Furnace 1 Pump 50HP & Furnace 1 Pump 30HP based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 80%, 61% & 65% respectively. Similarly, 3Nos. of Pump installed for Induction Furnace (New) for Cooling Purpose, Pump namely reference as Furnace 2 Coil Motor 100HP, Furnace 2 Pump 50HP & Furnace 2 Pump 30HP based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 84%, 66% & 81% respectively.

- Pump namely reference as Primary Pump-1, Primary Pump-2, Secondary Pump-1 & Secondary Pump-2 based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 67%, 73%, 57% & 43% respectively. Similarly, Pump namely reference as Pump 2 (Cold Sump Pump) & Pump 3 (Cold Sump Pump) based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 51% & 58% respectively.

- During Audit, team also noticed the plant has installed with mostly IE2 level motor efficiency. Thus, it is recommended to replace IE2 level efficiency motor with IE3 level motor which improves in motor efficiency at least by around 1%. This can be done in phased manner or if motor comes in rewinding/replacement.

Given the above scenario of prevailing resource challenge, accelerating over time Progressive management of ARS Steels is very keen to do Energy audit of premises. To get benefit of Energy saving projects, Plant management has awarded the task of above activity to PHDCCI.

The Audit is focused on identifying Energy Conservation opportunities. Accordingly, the field study and data collection for the said Energy audit was carried out by the PHDCCI Audit team. Summary of Audit findings are presented in the below.

SUMMARY OF RECOMMENDATIONS

Description	Observations	Recommendations	Energy savings (kWh/m3)/ day	Annual energy savings (kWh/m3)/ year	Annual Monetary savings (Rs. In Lakhs)
Demand Savings by Increasing the Average Power Factor from 0.98PF to nearby unity	The operating power factor at main incomer was noticed to be varied in range from 0.844pf to 1.0pf with average power factor of 0.980pf. In order to maintain the Power factor, Plant has installed HT Capacitor (Old) & new HT capacitor installed but not in operation because of Plant is in expansion. However, Installed HT Capacitor (Old) was not in line/non-operational during audit period.	It is recommended put the HT capacitor is in line and maintain the average power above 0.99, this results in reduced demand savings of around 60KVA which results in monetary benefits of Rs. 4.2 lacs/year	60 KVA/month		4.2
Reduce the Air Compressor Cutoff Pressure from 8.6bar (8.7kg/cm2) to 7.6Bar (7.7kg/cm2) By Arresting the leakages & reducing the intake high temperature	The maximum air pressure required in the Plant for pneumatic operation is upto 6.5kg/cm2. Also, The air inside the Compressor house is warmer than the air outside the building. If the intake air temperature is reduced the efficiency of the compressor is improved. It was observed by the energy audit team that the temperature across the suction of intake air was around 36.6 ºC while the ambient temperature outside was 33.2 ºC. In general, the efficiency of the compressor improves by 1% for every 4 ºC drop in intake air temperature	It is recommended to reduce the Air Compressor Cutoff Pressure from 8.6Bar (8.7kg/cm2) to 6.6Bar (6.7kg/cm2). For every pressure reduction by 1 kg/cm2, the saving in power observed to be about 6%.	289 kWh	105660 kWh	7.7

<table>
<tr><th>Description</th><th>Observations</th><th>Recommendations</th><th>Energy savings (kWh/m3)/ day</th><th>Annual energy savings (kWh/m3)/ year</th><th>Annual Monetary savings (Rs. In Lakhs)</th></tr>
<tr><td>Installation of Control Air IFC System for Furnace Div. & Rolling Div.</td><td>Presently, 1Nos. of Air Compressor having 336.9 CFM installed in Furnace Div. And, 4 Nos. of Air Compressor installed for Rolling Div. with cumulative installed capacity of around 828CFM. Compressor were found continuous in load condition & fluctuating demand.</td><td>It is recommended to install Control Air IFC system to manage and maintain the air requirement as per demand to Downstream. Recommended Control Air IFC system GE-10 (500CFM) for Furnace Div. & GE-20 (1000CFM) for Rolling Div. The energy savings of around 4% to 10% will be achieved as per manufacturer.

In addition, to reduce the fluctuation in Air requirement, the Plant may install a receiver tank at utilization area like at Packaging Section where leakages from Gun normally exist</td><td></td><td></td><td></td></tr>
<tr><td>Increasing the Range ∆T of CT's of Induction Furnace (New & Old), CCM & Rolling Mill</td><td>Delta T of CT's noticed to be very low as per their designed capacity resulting in low effectiveness of CT's. Details are shown below;

<table><tr><th></th><th>Furnace (Old)</th><th>Furnace (New)</th><th>CCM</th><th>Rolling Mill (Cell 1)</th><th>Rolling Mill (Cell 2)</th></tr><tr><td>CT1</td><td>31%</td><td>43%</td><td>20%</td><td>17%</td><td>42%</td></tr><tr><td>CT2</td><td>40%</td><td>19%</td><td>25%</td><td></td><td></td></tr></table></td><td>It is recommended to increase the Delta T of CT to nearby or asper OEM manual. On increasing the Delta T, result in savings in Energy by keeping on CT Fan on Standby.

Presently, because of low range, High Capacity pumps are installed to maintain the heat load on CT. Thus, on increasing the range (∆T) & considering the same</td><td>Energy Savings

& System Safety

& reliability</td><td></td><td></td></tr>
</table>

Description	Observations	Recommendations	Energy savings (kWh/m3)/ day	Annual energy savings (kWh/m3)/ year	Annual Monetary savings (Rs. In Lakhs)
	CT3 33% CT4 34%	heat load, less flow would be needed resulting in slightly low range pump capacity can be used which further results in savings in energy.			
Total			60KVA/month, 289 kWh & 30m3/day	105660 kWh & 11118 m3/year	11.9

1. INTRODUCTION

Energy Conservation has become a top most priority in today's scenario in order to have a sustainable growth, productivity, enhancement & Environmental Protection. Considering the vast potential of energy savings and benefits of energy efficiency as per the report prepared by National Development Council (NDC) Committee on power, Govt. of India enacted the Energy Conservation Act 2001. Accordingly, the Govt. of India set up the Bureau of Energy Efficiency (BEE) under the provision of the Energy Conservation Act 2001 for development of policies and strategies with a thrust on self-regulation and market principles, with the primary objective of reducing energy intensity of the Indian Economy.

All Industrial Sectors are focusing on Energy Conservation and Energy Efficiency in a larger extent for higher productivity. Efficient Energy management, Use of Energy Efficient Technologies and adopting best-practices would help a plant management to reduce their energy cost considerably. Growth of GDP of a country is directly linked with growth rate of power consumption of that country.

1.1 PLANT DETAILS

Brief description of Assignment	:	Energy Study of ARS Steels & International Pvt. Ltd.
Name & Address of the Origination	:	ARS Steels & International Pvt. Ltd. Sipcot Industrial Complex Road, Hosur, Tamil Nadu – 635126
Name of Representative, Designation, Email & Mobile No.	:	Name: Mr. A.K. Jha Designation: EHS Head Email Id: Contact No.: 8939836474
Operating Days & Working HRS/day	:	365 & 24
Power		
Source of Power	:	Tamil Nadu Generation and Distribution Corporation (TANGEDCO)
Sanctioned Load & Contract Demand	:	---
Demand Charges	:	Rs. 589 kVA/month
Energy Charges	:	Rs. 7.25/kWh
Purchased Power Consumption		

April- 23 to March- 24	:	104683200 kWh
Source of Purchased Power	:	
IEX (April- 23 to March- 24)	:	12859710 kWh (12%)
CCP (April- 23 to March- 24)	:	63658915 kWh (61%)
WIND (April- 23 to March- 24)	:	5021804 kWh (5%)
SOLAR (April- 23 to March- 24)	:	3004212 kWh (3%)
TNEB (April- 23 to March- 24)	:	20138559 kWh (19%)

1.2 BRIEF DESCRIPTION ABOUT THE PLANT:

Various grades of scrap such as super melting scrap, bazaar melting scrap, commercial scrap, sponge iron etc., are melted in electrically operated induction furnace and further poured into the billets using a Continuous Casting Machine (CCM). Then the billets are used to the desired finishing section in the hot condition by way of passing the material between a pair of grooved rolls and providing suitable drafts at various stages. The whole operation is conducted at a particular temperature range and within a limited time span. The stages of rolling operation are comprised of heating of feed stock to rollable temperature, rolling the feeding stock in different mill stands, cropping the hot bar during the process of rolling between mill stands as applicable and subsequently finishing in form of hot rolled deformed bar in straight length. The hot bar coming out of the last pass is then conveyed through a TMT line and collected in a cool bed after shearing. The bars at almost ambient temperature are sheared to commercial length, stored and kept ready for dispatch.

Process flow chart of Steel Melting Shop is shown below;

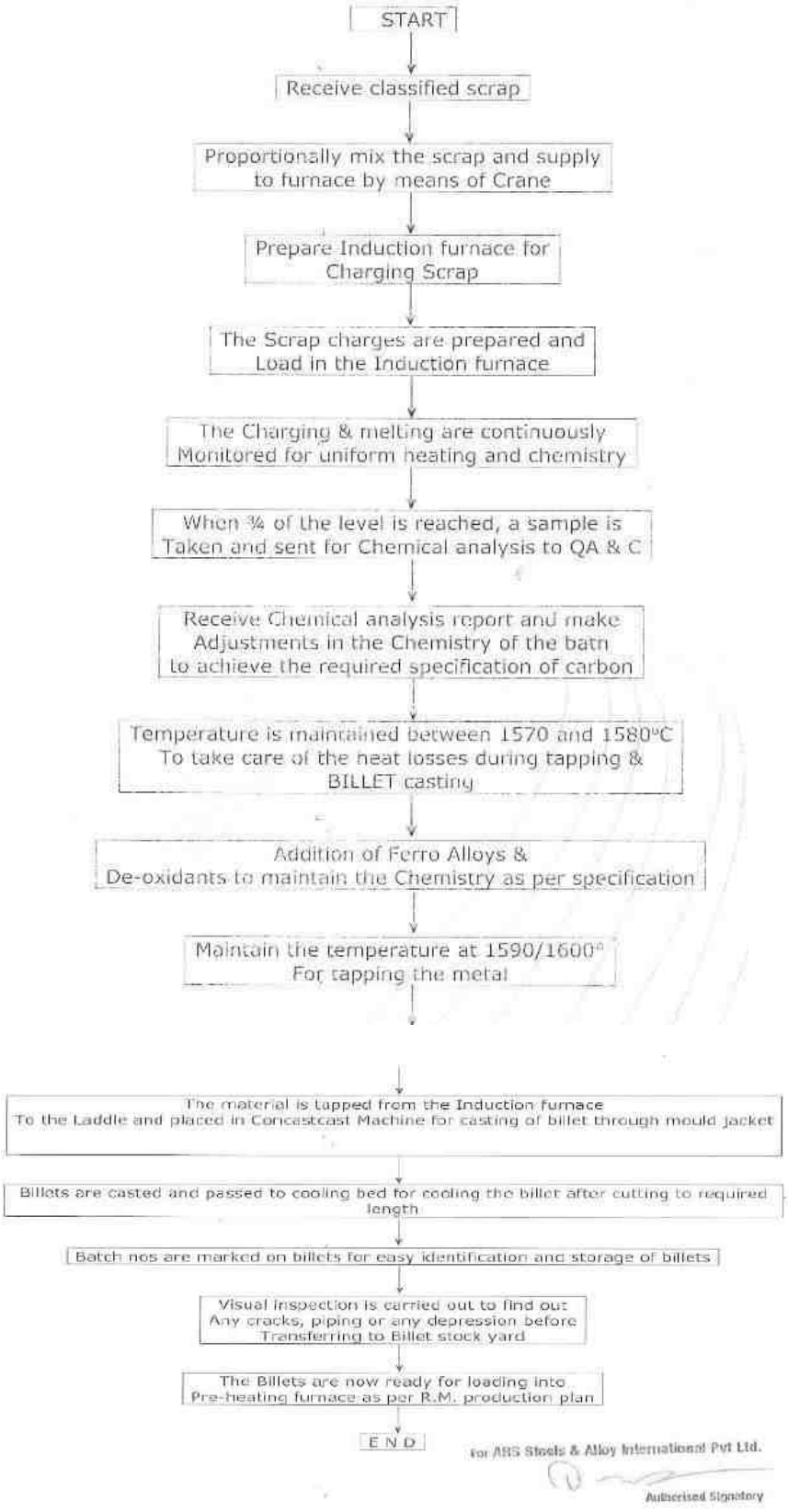


Figure 1 Process Flow diagram of Steel Melting Shop

1.3 SCOPE OF WORK

The main objective of the study was to identify the Energy saving opportunities. Scope of work of the study includes the following:

- Electrical Power Distribution System
- Furnace Efficiency
- Compressed Air System
- Cooling Tower
- Major Electrical Motors
- Power Quality Analysis

1.4 METHODOLOGY

The following step by step methodology and approach were adopted to carry out the energy study of ARS Steel. PHDCCI team of 3 Nos. visited plant from 09/09/2024 to 12/09/2024 for the field measurement and conducting the audit. The team had a meeting / discussion with senior officials on the scope of work. The broad methodology adopted for the Energy Study is furnished below.

- Preliminary discussions with management, senior electrical engineer and all concerned departments.
- The representative of the ARS Steels has to be accompanied with the audit team to different areas of the plant for system familiarization.
- All the staff/heads of the departments of different sections is requested to co-operate with the audit team for data collection and taking measurements in the respective areas while visiting the areas.
- Data collection through discussions, past records, equipment specification.
- Field studies in each of the utility areas involving:

✓ Performance trials.

✓ Measurement of electrical energy parameters, wherever possible using portable instruments.

- Identification of energy conservation options on short, medium & long terms.
- Identification of Investment grade projects in the building for detailed analysis towards implementation.
- Submission of report to the management.

The study focused on improving energy use efficiency and identifying energy saving opportunities at various equipment. The analysis included simple payback calculations where investments are required to be made to implement recommendations, to establish their economic viability.

1.5 INSTRUMENTS USED FOR ENERGY AUDIT

The audit study made use of various portable instruments for carrying out various measurements and analyses. Wire team carried latest, sophisticated, portable, diagnostic and measuring instruments to support our energy audit investigations and analyses. The specialized instruments that were used during the energy audit include:

- ✓ Portable load manager for electrical parameters
- ✓ Clamp on electrical power analysers
- ✓ Ultrasonic flow meter
- ✓ Infrared pyrometer
- ✓ Anemometer
- ✓ Thermo couples & Indicators
- ✓ Hygrometer
- ✓ Lux meter

During the audit, there was continuous interaction between the audit team and facility personnel, to ensure that the suggestions made are realistic, practical and implementable to allow for possible concurrent implementation.

2. PRESENT ENERGY SCENARIO

ARS Steels, Tamil Nadu has two main sources of energy i.e. Electricity and Fuel. Electricity demand of the plant is fulfilled by two basic sources that is, Grid power supply and own DG set Generation. DG is mainly used during power cut which is not frequent. Therefore, Main source of Power to Plant is Grid Power Supply.

ARS Steels & Alloy International Pvt. Ltd. draws power from the Tamil Nadu Generation and Distribution Corporation (TANGEDCO) at 33 kV via 2 Nos. of transformer. Further, the power supply to various equipment is fed through circuit breakers fitted in a fore mentioned power control centers (PCC).

It is a standard practice for any Energy Audit to establish the Actual Energy consumption of the unit and comparing it with the Actual production the Specific Energy Consumption (SEC) is established. This SEC could be set as a baseline and Quarterly/ Half yearly and Annual Energy targets could be set using this established SEC as a baseline as a level of comparison.

The Energy consumption was available however production details were not available to furnish the information; Therefore, the SEC of the plant is provided below.

Table 1: Total Annual MTOE Consumption

Sr. No	Description	UoM	April'23 - March'24
A.	**Electricity Consumption**		
1	Total Annual units purchased from grid	kWh	104683200
2	Unit conversion 1kWh= 860 kcal		860
3	Energy input	Million Kcal	90027.6
4	**Total Annual MTOE Consumption- Electricity, A**	**MTOE**	9002.8
B.	**Liquid Fuel Consumption**		
1	Annual HSD Consumption	Lit.	NA
2	Specific gravity		0.85
3	Total Annual HSD Consumption	kg	--
4	Average Gross calorific Value of HSD	kcal/kg	10800
5	Energy input	Million Kcal	--
6	**MTOE- HSD consumption, B**	**MTOE**	**--**
C.	**Total Annual MTOE Consumption, D= A+B**	MTOE	9002.8

**Annual Production details not available, Thus SEC is not evaluated.*

2.1 HISTORICAL DETAILS OF ELECTRICITY BILLS

During Audit, team reviewed the Electricity bill for FY 2023 -24 based on the data entered & Electricity Bill available, the trend in monthly electricity consumption is shown below,

Table 2: Monthly electricity bill Details for FY 2023-24

Sr. No	Month	Total Consumption (KWH)	Purchased Units				
			IEX	CCP	WIND	Solar	TNEB
1	Apr-23	9079000	3945715	0.0	0	0	5133285
2	May-23	9180000	4429049	0.0	0	0	4750951
3	Jun-23	8422800	3817341	0.0	0	0	4605459
4	Jul-23	8414600	0	8141462	0	0	273138
5	Aug-23	9222000	0	8144000	0	0	1078000
6	Sep-23	8983200	0	7484953	0	0	1498247
7	Oct-23	9051800	0	8184000	0	0	867800
8	Nov-23	8150820	0	7920000	0	0	230820
9	Dec-23	7388520	410750	4910400	1434912.0	631257.0	1201
10	Jan-24	8687520	109860	6762805	1170250.0	635511.0	9094
11	Feb-24	9019120	0	6040960	1692325.0	831205.0	454630
12	Mar-24	9083820	146995	6070335	724317.0	906239.0	1235934
	Total	**104683200**	**12859710**	**63658915**	**5021804**	**3004212**	**20138559**

*Plant may include the Sanctioned load/Contract load, Current Load Demand, Power factor has to be incorporated in Electricity Bill to evaluate the demand variation and power factor variation pattern.

Out of Total Purchase Units, Following are the sources through which power have been purchased and its contribution pattern has been shown below;

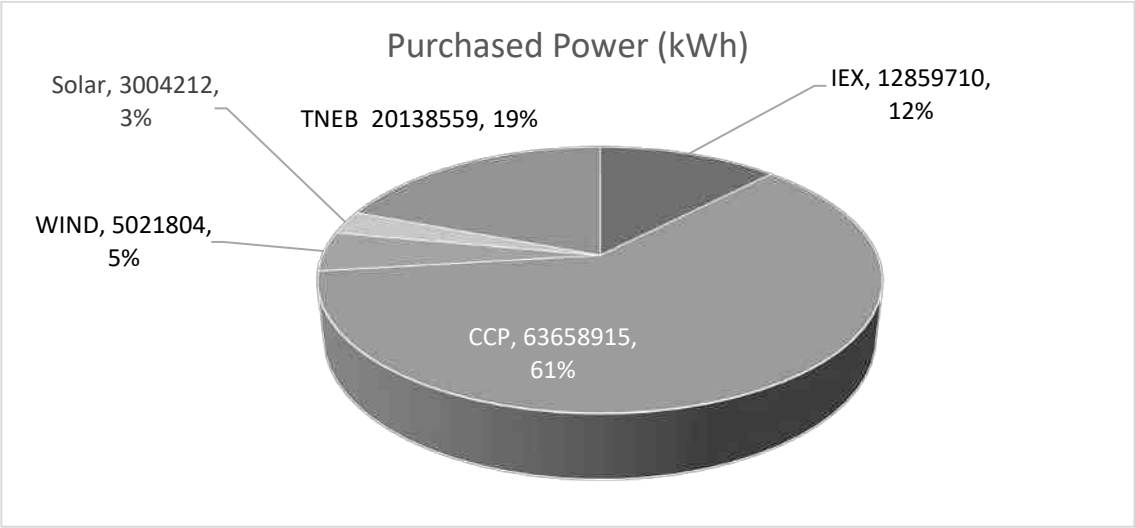


Figure 2 Graphical Representation of Purchased Power (%)

3. UTILITIES DESCRIPTION & PERFORMANCE EVALUATION

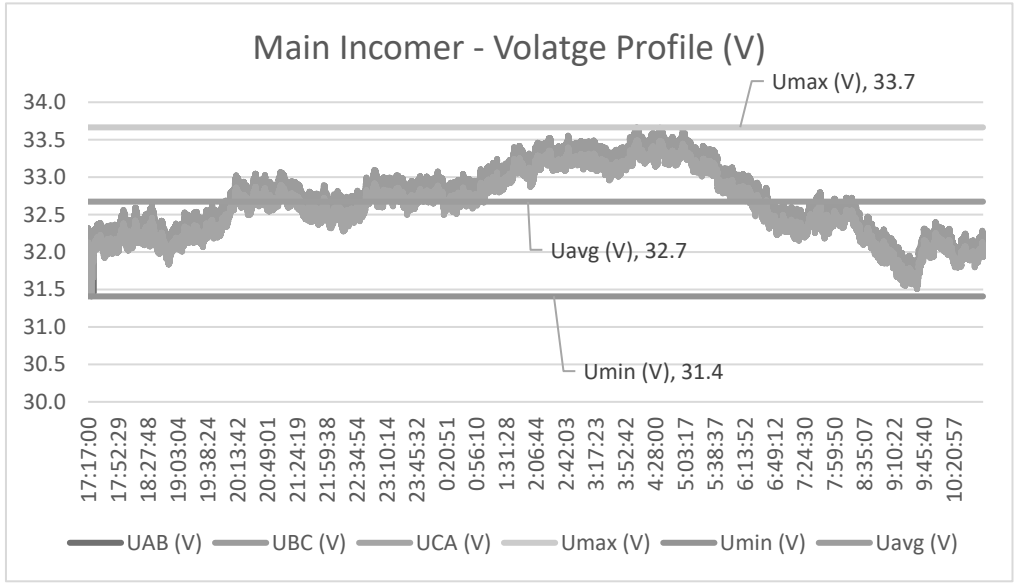
ARS Steels & Alloy International Pvt. Ltd. draws power from the Tamil Nadu Generation and Distribution Corporation (TANGEDCO) at 33 kV via 2 Nos. of transformer. Team has done total load profile of the plant by installing the meter at main incomer.

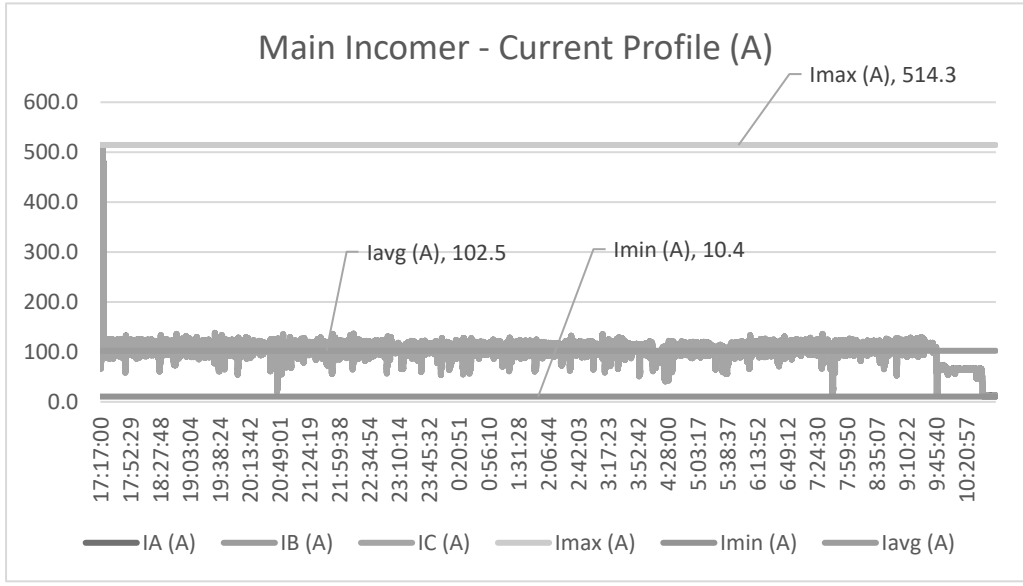
3.1 POWER QUALITY & INCOMER LOAD PROFILE

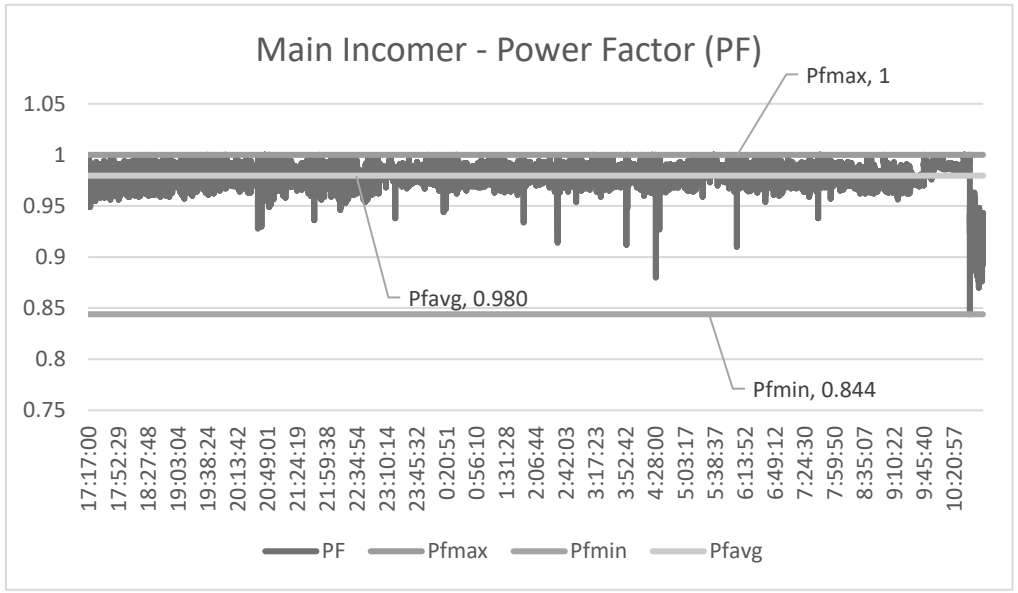
To ascertain the loading on the transformers, Audit team uses 3 Phase power analyzer. The typical loading pattern is shown below;

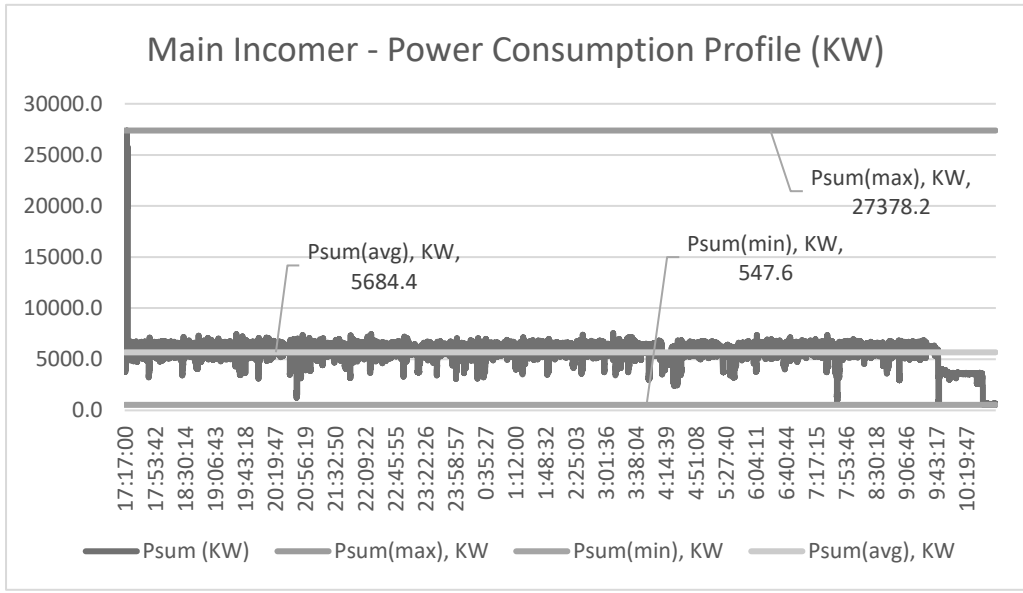
Table 3 Main Incomer loading of the plant

Location	UoM	Main Incomer
Date/Time of Measurement		09-09-2024 Start Time 17.17 AM
		10-09-2024 End Time 10.56 AM
Measured Condition		
V max.	V	33.7
V min.	V	31.4
V avg.	V	32.7
I max.	A	514.3
I min.	A	10.4
I avg	A	102.5
PF max.		1
PF min.		0.844
PF avg.		0.980
True Power max.	KW	27378
True Power min.	KW	548
True Power avg.	KW	5684
Apparent Power max.	kVA	28494
Apparent Power min.	kVA	607
Apparent Power avg.	kVA	5802
Voltage THD max.	%f	0.90
Voltage THD min.	%f	0.38
Voltage THD avg.	%f	0.66
Current THD max.	%f	8.2
Current THD min.	%f	1.0
Current THD avg.	%f	2.1


Main Incomer - Volatge Profile (V)
Umax (V), 33.7
Uavg (V), 32.7
Umin (V), 31.4
UAB (V)
UBC (V)
UCA (V)
Umax (V)
Umin (V)
Uavg (V)


Main Incomer - Current Profile (A)
Imax (A), 514.3
Iavg (A), 102.5
Imin (A), 10.4
IA (A)
IB (A)
IC (A)
Imax (A)
Imin (A)
Iavg (A)


Main Incomer - Power Factor (PF)
Pfmax, 1
Pfavg, 0.980
Pfmin, 0.844
PF
Pfmax
Pfmin
Pfavg


Main Incomer - Power Consumption Profile (KW)
Psum(max), KW, 27378.2
Psum(avg), KW, 5684.4
Psum(min), KW, 547.6
Psum (KW)
Psum(max), KW
Psum(min), KW
Psum(avg), KW

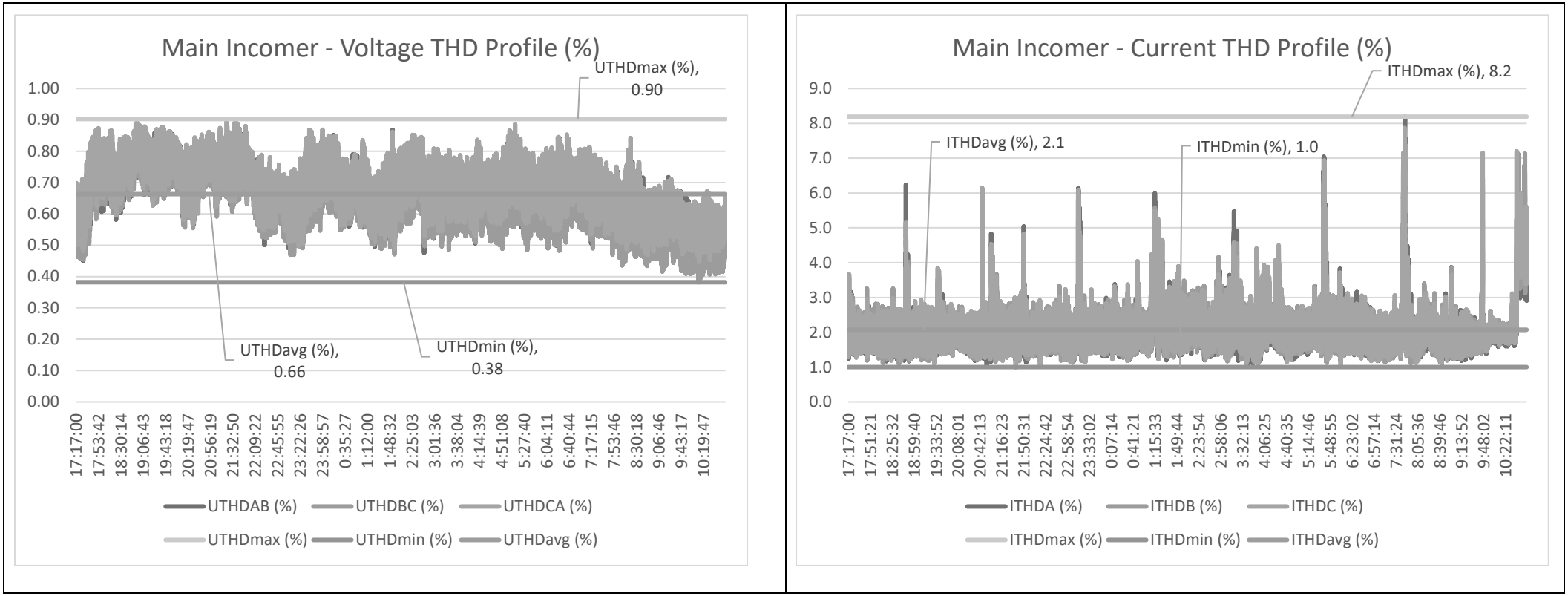


Figure 3 Power Quality Profile of the Main Incomer

Observations & Recommendations

- It is evident from the above figure that voltage at Main Comer level is varied in range from 31.4 KV to 33.7 KV and average voltage observed to be around 32.7 KV. It is also noticed from above graph that voltage in day time is noticed below the average voltage while in night time voltage is more than average voltage.
- Team noticed; loading was varied in range from 548 kW to 27378 kW with average loading of 5684 KW. However, Load pattern was varied in range from 16411 KW to 27378 KW for around 2.4min. duration only. Thus, their demand utilization noticed within the limit.
- Average Voltage THD (%) at Main Incomer was observed to be range from 0.38% to 0.9% which is in the prescribed limit as per IEEE standard. And, Average Current Harmonics at Main Incomer level was observed to be around 1.0% to 8.2% with average current THD of 2.1%.
- The Power Factor at Main Incomer level was noticed to be in range from 0.844pf to 1.0pf with average power noticed to be around 0.980pf. In order to maintain the Power factor, Plant has installed HT Capacitor (Old) & new HT capacitor installed but not in operation because of Plant is in expansion. However, Installed HT Capacitor (Old) was not in line/non-operational during audit period. Thus, It is recommended put the HT capacitor is in line and maintain the average power above 0.99, this results in reduced demand savings of around 60KVA which results in monetary benefits of Rs. 4.2 lacs/year,

Table 4 Monetary Savings by improving the power factor

Sr. No.	Location	UoM	Value
1	**Measured Condition**		
2	V avg.	V	33
3	I avg.	A	102
4	Operating PF avg.	PF	0.98
5	Active Power avg.	KW	5684
6	Apparent Power avg.	kVA	5802
7	Average Energy Consumption per day	KWh/day	136425
8	Average Annual Energy Consumption @ 365days annual operation	KWh/year	49795248
9	Desired PF (nearby unity)	PF	0.999
10	PF correction		0.203
11	Capacitors Required for maintaining nearby unity pf at every load condition	kVAR	1154
12	New Demand after Improving the Power factor	KVA	5742
13	Saving in Maximum demand by improving the power factor close to unity	KVA	60
14	Demand Charges	Rs./KVA	589

Sr. No.	Location	UoM	Value
15	Overall Energy Rate (Net Bill Amount/KWh)	Rs./KWh	7.3
16	Demand Savings by improving power factor	Rs.	423963
17	Investments Required for the capacitor Bank (APFC Panel)	Rs.	1730896
18	Approx Total Investment	Rs.	1730896
19	Payback Period	month	24.5

***As average loading has been increased, the savings would be more with reduced demand which results in lower payback period. If present installed HT capacitor (Old) is working and putted in line then savings will be immediate. Else, Savings is furnished in terms of reduced demand.**

3.2 FURNACE

The existing Plant has been operating in SIPCOT lease land area of 4.51 Ha (11.14 acres) which features Furnace, Billet & Rolling Mill division. The Furnace division comprises of 2 X 25MT Induction Furnace to produce MS Billets. The Rolling Mill Division comprises of 1 X 25 TPH reheating Furnace to produce TMT bars.

During Audit period, Reheating Furnace was found non-operational. Thus, Team has done the performance evaluation of Induction Furnace Only;

3.2.1 Input Materials

The below are the details which has been used as a raw material for the Induction Furnace.

Table 5 Raw materials used in the Induction Furnace & Its composition

	Old (25MT)		New (25MT)	
Input Material	**Qty.(Kg)**	**% Used**	**Qty.(Kg)**	**% Used**
Melting	11540	36.72%	8280	26.5%
SHD	1900	6.05%	1860	6.0%
SIL	690	2.20%	800	2.6%
TB + SH	4670	14.86%	5170	16.5%
Tin	3280	10.44%	4730	15.1%
SM	9350	29.75%	10410	33.3%
Total	**31430**	**100%**	**31250**	**100%**

3.2.2 Output Details

The below are the details which has been used as a raw material for the Induction Furnace.

Table 6 Raw materials used in the Induction Furnace & Its composition

	Old (25MT)		New (25MT)	
Output Metal	**Qty.**	**Total Production (mtr.)**	**Qty.**	**Total Production (mtr.)**
6mtr.	49	294	49	294
3.1mtr.	1	3.1	5	15.5
5mtr.	1	5		
Total (mtrs.)		**302.1**		**309.5**
Total (Kg)		**28156**		**28845**

3.2.3 Furnace Performance Assessment

During Audit, Team has done the assessment for 1 complete heat cycle. Input material and its compositions and total output production is shown in Table 7 & Table 8. Thus, Team evaluated the efficiency of the Old & New furnace. Detailed calculation is shown in below table;

Table 7 Furnace Efficiency

Sr. No	Description	UOM	Old Furnace	New Furnace
1	Weight of Metal	Kg	28156	28845
2	Weight of Slag	Kg	3274	2405
3	Final Melting Temperature	°C	1650	1650
4	Initial Temperature of Material	°C	33	33
5	Heat Required for melting metal	kWh	10752	11016
6	Heat Required for melting Slag	kWh	1501	1102
7	Total Theoretical Heat Required for melting	kWh	12253	12118
8	Electricity Consumed	kWh	16943	17048
9	**Furnace Efficiency**	**%**	**72%**	**71%**
10	**Speed**	**Kg/min**	**260.7**	**274.7**

3.2.4 Observations & Recommendation

- From Table 9, Furnace Efficiency of Old Furnace and New Furnace calculated to be around 72% and 71% respectively.
- From above table, Slag in Old Furnace and New Furnace has been noticed to be around 3274 Kg (10%) & 2405 Kg (7.7%), Which seems to be on higher side slag to metal ratio as per national and international standards.

  Thus, It is recommended to limit the Slag as per Indian standard or as per International standard

  Indian Standards:

  1. Bureau of Indian Standards (BIS): IS 10748:2004 recommends 0.02-0.04 (slag/metal)

2. Indian Institute of Metals (IIM): 0.015-0.030 (slag/metal)

International Standards:

1. American Society for Metals (ASM): 0.02-0.05 (slag/metal)
2. American Iron and Steel Institute (AISI): 0.015-0.030 (slag/metal)
3. European Standard (EN): 0.02-0.04 (slag/metal)

- **Factors influencing Slag/Metal Ratio:**

1. Furnace size and design
2. Steel grade and composition
3. Operating temperature and pressure
4. Flux usage and type
5. Melting rate and tapping practice

- **Optimal Slag/Metal Ratio Benefits:**

1. Improved steel cleanliness
2. Reduced inclusions
3. Enhanced mechanical properties
4. Increased furnace life
5. Better energy efficiency

3.3 COMPRESSED AIR SYSTEM

ARS Steels has installed the air compressors to meet the compressed air requirement for various machine application. Compressor installed at the plant consist of following major components: Intake air filters, inter-stage coolers, after coolers, air dryers, moisture drain traps, receivers, piping network, filters, regulators and lubricators

- Intake Air Filters: Prevent dust from entering compressor; Dust causes sticking valves, scoured cylinders, excessive wear etc.
- Air-dryers: The moisture present in the air are removed using air dryers, as air for instrument and pneumatic equipment has to be relatively free of any moisture. The moisture is removed by using adsorbents like silica gel /activated carbon, or refrigerant dryers, or heat of compression dryers.

- Moisture Drain Traps: Moisture drain traps are used for removal of moisture in the compressed air.
- Receivers: Air receivers are provided as storage and smoothening pulsating air output - reducing pressure variations from the compressor.

3.3.1 Compressor Performance

ARS Steels has installed 1Nos. of Screw type air compressors to meet the compressed air requirements of the plant for induction furnace & 3Nos. at Rolling Mill Section. The Rated parameters of the compressor is shown below;

Table 8 Compressor Rated parameters

Sl. No.	Description	Furnace Div.	Rolling Div.			
		Comp. 1	Comp. 1	Comp. 2	Comp. 3	Comp. 4
1	Make	Atlas Copco	Atlas Copco	Atlas Copco	Atlas Copco	Atlas Copco
2	Rated Capacity (CFM)	336.9	212	212	150	254
3	Connected Motor (KW)	55 KW	37 KW	37 KW	22 KW	45 KW
4	Type	Screw Type	Screw Type	Screw Type	Screw Type	Screw Type
5	Max. Allowable Working Pressure	10 Bar	10 Bar	10 Bar	10 Bar	11 Bar

Capacity of a compressor is the full rated volume flow of compressed air and delivered air is termed as Free Air Delivery (FAD) i.e. air at atmospheric conditions at any specific location. To check the actual performance of compressors, the FAD Test is carried out for compressors. The steps involved are isolation of the air receiver from the air network by closing the delivery valve after the receiver followed by filing the fixed volume receiver in specified time. The detailed calculation of FAD Test for Furnace Division compressor is as below,

Table 9 FAD- Compressor data

Sr. No	Description	UoM	Furnace Division
	Rated Parameters		
1	Make		Atlas Copco
2	Motor Capacity	kW	55
3	Rated Flow	CFM	336.9
4	Rated working Pressure	bar	10
5	Air Receiver Tank Capacity	m3	1
	Operating Parameters- FAD Test		
6	Voltage	V	410.7
7	Current	A	78.3

Sr. No	Description	UoM	Furnace Division
8	Power Factor	pf	0.803
9	Average Operating Load	kW	44.8
10	Ambient Temperature	**°C**	36.6
11	Discharge Temperature	**°C**	89
12	Atmospheric Pressure	**kg/cm2**	1.03
13	Initial Pressure after bleeding	**kg/cm2**	0.1
14	Final pressure	**Bar**	8.6
15	Total Time taken to reach the Final Pressure	**sec**	56
16	Free Air Delivery	**m3/min**	7.6 (268 CFM)
17	Specific Power Consumption	**kW/(m3/min)**	5.9

During Audit, FAD test of the compressor was not possible for Rolling Mill because of continuous operation of Plant. However, Team measured the electrical parameters of the compressor. Details are provided below,

Table 10 Compressor data- Electrical Parameters

Sr. No	Description	UOM	Furnace Div.	Rolling Div.		
			Comp. 1	Comp. 1	Comp. 2	Comp. 3
1	Voltage	V	410.7	411.1	410.5	411
2	Current	I	78.3	56	55.2	62
3	Power Factor	PF	0.803	0.865	0.862	0.854
4	Power	kW	44.8	34.5	33.8	37.7

3.3.2 Observations & Recommendation

- It has been observed during the audit that, 1 Compressor in Furnace Div. & 3 Compressor in Rolling Div. was operational to meet the compressed air demand of plant. Compressor is having set point pressure of 8.6 bar. It was calculated that the FAD of Screw compressor was 268CFM against rated capacity of 336 CFM.
- The maximum air pressure required for the pneumatic operation is 6.5kg/cm2. In addition, cleaning has been done through the same line. Because of leakages present in the system, plant operating the compressor at Cutin pressure of 8.6 bar (7.6 kg/cm2) and Cut off pressure of Compressor is 7.6 bar (7.7 kg/cm2); in order to maintain the pressure for pneumatic operations & at packing section.
- During Audit, High leakage was observed because of pipeline leakages, Psynumetic Air Filters, Gun used in Packing Section.

- Team noticed; the exhaust of compressor & drier (Compressor Exhaust Temperature- 48°C & Drier Exhaust Temperature- 40°C) has been discharged to the same area where the compressor has been placed. This results air inside the Compressor suction is 36.6°C which is warmer than the air outside the building and Ambient Air temperature was observed to be around 33.2°C.

Recommendation

1. Reduce the Air Compressor Cutoff Pressure from 8.6bar (8.7kg/cm2) to 7.6Bar (7.7kg/cm2) By Arresting the leakages & reducing the intake high temperature

The maximum air pressure required in the Plant for pneumatic operation is upto 6.5kg/cm2. However, Hotel management operating the air compressor at Cutoff pressure of 8.6 bar (8.7 kg/cm2) and Cut in pressure of 7.6Bar (7.7 kg/cm2) because of leakages present in the system. Thus, it is recommended to reduce the Air Compressor Cutoff Pressure from 8.6Bar (8.7kg/cm2) to 6.6Bar (6.7kg/cm2). For every pressure reduction by 1 kg/cm2, the saving in power observed to be about 6%.

Also, The air inside the Compressor house is warmer than the air outside the building. If the intake air temperature is reduced the efficiency of the compressor is improved. It was observed by the energy audit team that the temperature across the suction of intake air was around 36.6 ºC while the ambient temperature outside was 33.2 ºC. In general, the efficiency of the compressor improves by 1% for every 4 ºC drop in intake air temperature.

Table 11 Energy Saving by reducing the Air Compressor Cutoff Pressure from 8.6bar (8.7kg/cm2) to 6.6Bar (6.7kg/cm2) by arresting the leakages

Sr. No	Parameters	UoM	Furnace Div. - Air Compressor 1		Rolling Div. - Air Compressor 1		Rolling Div. - Air Compressor 2		Rolling Div. - Air Compressor 3	
			Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
1	Operating Pressure (Cut off)	kg/cm2	8.7	6.7	8.7	6.7	8.7	6.7	8.7	6.7
2	Operating Pressure (Cut in)	kg/cm2	7.6	6	7.6	6	7.6	6	7.6	6
3	Average Power Consumption	kWh	44.8	39	34.5	30	33.8	30	37.7	33
4	Expected Saving in Power	kWh		5.37		4.1		4.1		4.5
5	Expected Power Savings by reduction in Pressure from 8.5kg/cm2 to 6.8kg/cm2	kWh	18.09							
6	Average Operating hrs/day	hrs	16							

Sr. No	Parameters	UoM	Furnace Div. - Air Compressor 1		Rolling Div. - Air Compressor 1		Rolling Div. - Air Compressor 2		Rolling Div. - Air Compressor 3	
			Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
7	Expected Annual Energy Savings @365 days of operation	kWh/Annual	105660							
8	Energy Cost	Rs./kWh	7.25							
9	Annual Monetary Savings	Rs. Lakhs	7.7							
10	Approx. Investment For Arresting the leakages/Replacing the Gun having high leakages	Rs. In Lakhs	1.5							
11	Payback	Months	2.3							

In addition of reducing the pressure, Plant management may installation Control Air IFC system to manage and maintain the air requirement as per demand to Downstream[1].

IFC - Demand Side Management Solution, is the revolutionary energy saving solution in the field of compressed air system. IFC creates useful storage by introducing a controlled differential pressure across an upstream receiver and itself. This storage isolates the compressors from demand side fluctuations. Peaks are dealt with using the reserve energy in storage instead of additional horsepower, allowing the compressors to run on reduced load. Thus by providing air at a controlled differential and at an optimum pressure to the plant, the mass of air consumed by pneumatic equipment, tools & leakages is reduced which in turn results in reduction in energy consumed by air compressors.

IFC – Downstream Controller: IFC is designed specifically to operate at intermediate point of the compressed air system i.e. on the downstream side of the filter/ dryer/ receiver and upstream side of the main piping distribution system. The energy savings of around 4% to 10% will be achieved.

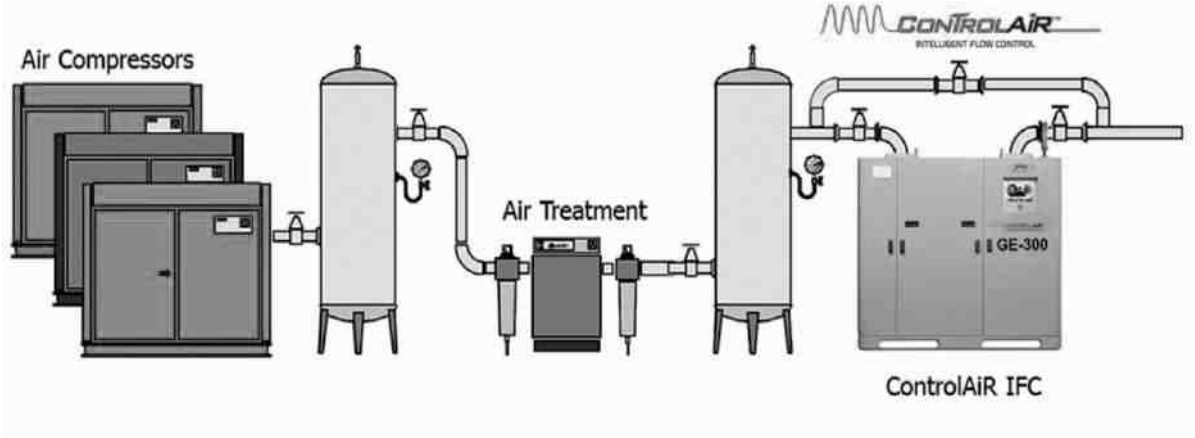


Figure 4 Typical Installation of Control Air IFC in Compressed Air System

[1] Godrej General Engineering | Electicals and Electronics | ControlAiR™-IFC–Demand-Side-Management-Solution (godrejenterprises.com)

As per information sourced from Godrej, Godrej Model GE-10 (500CFM) & GE-20 (1000CFM) [2] Can be used in Furnace Div. & Rolling Div respectively as per their demand capacity.

3.4 COOLING TOWER & PHE

Plant management has installed 4 Nos. of cooling tower for Induction Furnace (Old); 3 Nos. of CT for Induction Furnace (New); 2 Nos. of CT for CCM & 1CT having 2 Cells for Rolling Mill for proper operation of the Plant. The following are the operational practices noticed during the audit Period;

Table 12 CT Operational Details

Sr. No.	Description	Furnace Div.		CCM	Rolling Mill
		Old	New		
1	Type of Furnace	Induced Draft			
2	Installed CT	4	3	2	1
3	No. of Cells/CT	1	1	1	2
4	Operational Status	Out of 4 Nos; 3R + 1SB	3Nos. Operational	2Nos. Operational	Both CT Cells operational

3.4.1 Cooling Tower Performance

The actual air flow, water flow, temperature and power were measured on cooling tower. The effectiveness and cooling capacity of cooling towers is shown below;

A. Induction Furnace CT

Induction Furnace (Old): Out of 4 CT's; 3R + 1SB was noticed during study period.

Table 13 Induction Furnace (Old) CT Performance

Sr. No.	Description	Unit	CT 1 Cell 1	CT 2 Cell 1	CT 3 Cell 1	CT 4 Cell 1
1	Average measured Fan Velocity	m/sec	3.08	3.32		7.80
2	Cooling Water Measured flow	m3/hr	170	105		73
3	Return cooling water temp.	^{0}C	40	40		40
4	Cold cooling water Outlet temp.	^{0}C	35.9	35.1		35.5
5	Air Inlet (DBT)	^{0}C	32.1	36.3		31.4
6	(WBT)	^{0}C	26.6	27.6		26.6
7	Enthalpy of Inlet Air	Kcal/kg	19.90	21.00		19.95
8	Air Outlet (DBT)	^{0}C	41.1	37.05		37.05
9	(WBT)	^{0}C	40.1	33.65		36.12
10	Enthalpy of Air Outlet	Kcal/kg	40.02	28.83		32.74
11	Moist air density	kgs/m3	1.12	1.12		1.12

[2] ControlAir IFC - Asia Pneumatic Engineering

Sr. No.	Description	Unit	CT 1 Cell 1	CT 2 Cell 1	CT 3 Cell 1	CT 4 Cell 1
12	Operating Range temp.	^{0}C	4.1	4.9		4.5
13	Approach temp.	^{0}C	9.3	7.5		8.9
	Key Indicator of Performance					
14	Effectiveness of cooling tower	%	31%	40%		34%
15	TR load based on water temp. (heat load on CT)	TR	230	170		109
16	Evaporation Loss	m3/hr	1.07	0.79		0.50
17	L/G Ratio	kg/kg	4.91	1.60		2.84

The Effectiveness of operating Cooling Tower CT1, CT2 & CT4 were calculated to be around 31%, 40% & 34% respectively. Operating Temperature Range ΔT noticed to be 4.1°C, 4.9°C & 4.5°C. Correspondingly, CT Heat Load is calculated to be around 230TR, 170TR & 109TR respectively; which results in total cumulative heat load on CT was around 509TR which meets the PHE Heat load of Induction Furnace (Old).

Induction Furnace (New): Out of 3 CT's; 3R was noticed during study period.

Table 14 Induction Furnace (New) CT Performance

Sr. No.	Description	Unit	CT 1 Cell 1	CT 2 Cell 1	CT 3 Cell 1
1	Average measured Fan Velocity	m/sec	5.18	3.93	4.03
2	Design Water flow rate	m3/hr	240	240	240
3	Cooling Water Measured flow	m3/hr	155	186	120
4	Return cooling water temp.	^{0}C	37	37	37
5	Cold cooling water Outlet temp.	^{0}C	33.9	35.2	34
6	Air Inlet (DBT)	^{0}C	36	36.2	36.3
7	(WBT)	^{0}C	29.85	27.37	27.96
8	Enthalpy of Inlet Air	Kcal/kg	23.64	20.69	21.36
9	Air Outlet (DBT)	^{0}C	33.6	33	33.5
10	(WBT)	^{0}C	32.11	31.52	31.25
11	Enthalpy of Air Outlet	Kcal/kg	26.66	25.85	25.48
12	Moist air density	kgs/m3	1.12	1.12	1.12
13	Operating Range temp.	^{0}C	3.1	1.8	3.0
14	Approach temp.	^{0}C	4.1	7.8	6.0
	Key Indicator of Performance				
15	Effectiveness of cooling tower	**%**	43%	19%	33%
16	TR load based on water temp. (heat load on CT)	TR	159	111	119
17	Evaporation Loss	m3/hr	0.74	0.51	0.55
18	L/G Ratio	kg/kg	0.97	2.87	1.37

Out of installed 3 CT's; All 3CT's were found operational. The Effectiveness of operating Cooling Tower CT1, CT2 & CT3 were calculated to be around 43%, 19% & 33% respectively. Operating Temperature Range ΔT noticed to be 3.1°C, 1.8°C & 3.0°C. Correspondingly, CT Heat Load is calculated to be around 159TR, 111TR & 119TR respectively; which results in

total cumulative heat load on CT was around 389TR which meets the PHE Heat load of Induction Furnace (New).

B. CCM CT: Out of 2 CT's; 2R was noticed during study period.

Table 15 CCM CT Performance

Sr. No.	Description	Unit	CT 1 Cell 1	CT 2 Cell 1
1	Average measured Fan Velocity	m/sec	2.83	4.10
2	Design Water flow rate	m3/hr	240	240
3	Cooling Water Measured flow	m3/hr	59	63
4	Return cooling water temp.	^{0}C	41	41
5	Cold cooling water Outlet temp.	^{0}C	38.5	37.8
6	Air Inlet (DBT)	^{0}C	36.3	36.2
7	(WBT)	^{0}C	28.71	28.13
8	Enthalpy of Inlet Air	Kcal/kg	22.24	21.56
9	Air Outlet (DBT)	^{0}C	38.6	37.6
10	(WBT)	^{0}C	37.66	36.04
11	Enthalpy of Air Outlet	Kcal/kg	35.39	32.60
12	Moist air density	kgs/m3	1.1	1.12
13	Operating Range temp.	^{0}C	2.5	3.2
14	Approach temp.	^{0}C	9.8	9.7
	Key Indicator of Performance			
15	Effectiveness of cooling tower	%	20%	25%
16	TR load based on water temp. (heat load on CT)	TR	49	66
17	Evaporation Loss	m3/hr	0.23	0.31
18	L/G Ratio	kg/kg	5.26	3.45
19	Remarks		Air Suction was not proper because of Dust across the Fins	

The Effectiveness of operating Cooling Tower CT1 & CT2 were calculated to be around 20% & 25% respectively. Operating Temperature Range ΔT noticed to be 2.5°C & 3.2°C. Correspondingly, CT Heat Load is calculated to be around 49TR & 66TR respectively; which results in total cumulative heat load on CT was around 115TR.

C. Rolling Mill CT: 1CT is having 2 Cells; Both Cells were operational during study period.

Table 16 Rolling Mill CT Performance

Sr. No.	Description	Unit	CT 1 Cell 1	CT 1 Cell 2
1	Average measured Fan Velocity	m/sec	5.18	3.93
2	Cooling Water Measured flow	m3/hr	148	147
3	Return cooling water temp.	^{0}C	40.5	40.5
4	Cold cooling water Outlet temp.	^{0}C	38.1	34.6
5	Air Inlet (DBT)	^{0}C	33.6	33.6
6	(WBT)	^{0}C	26.26	26.43

Sr. No.	Description	Unit	CT 1 Cell 1	CT 1 Cell 2
7	Enthalpy of Inlet Air	Kcal/kg	19.44	19.62
8	Air Outlet (DBT)	^{0}C	37.4	37.6
9	(WBT)	^{0}C	36.21	36.92
10	Enthalpy of Air Outlet	Kcal/kg	32.76	33.96
11	Moist air density	kgs/m3	1.12	1.12
12	Operating Range temp.	^{0}C	2.4	5.9
13	Approach temp.	^{0}C	11.8	8.2
	Key Indicator of Performance			
14	Effectiveness of cooling tower	%	17%	42%
15	TR load based on water temp. (heat load on CT)	TR	118	287
16	Evaporation Loss	m3/hr	0.54	1.33
17	L/G Ratio	kg/kg	5.55	2.43

The Effectiveness of operating Cooling Tower Cell 1 & Cell 2 were calculated to be around 17% & 42% respectively. Operating Temperature Range ΔT noticed to be 2.4°C & 5.9°C. Correspondingly, CT Heat Load is calculated to be around 118TR & 287TR respectively; which results in total cumulative heat load on CT was around 405TR

3.4.2 Plate Heat Exchanger (PHE) Performance

2 Nos. PHE each installed for Old Induction Furnace & New Induction Furnace. Team measured, the actual water flow, temperature for assessment of PHE Performance. The results are shown below;

A. Induction Furnace (Old): 2PHE's installed; Both were found operational

Table 17 Induction Furnace (Old)- PHE Performance

Description	Unit	PHE 1	PHE 2
CW Flow	m³/hr	115	255
CW In Temp	ºC	36	35.5
CW out Temp	ºC	39	40
ΔT of CW Temp	**ºC**	**3**	**4.5**
CW Inlet Pressure	kg/cm2	3.8	2.6
CW Outlet Pressure	kg/cm2	2.8	1.9
ΔP drop across CW side	**kg/cm2**	**1**	**0.7**
Coil Cooling Flow	m³/hr	25	200
Coil Cooling In Temp	ºC	38	46
Coil cooling out Temp	ºC	33	40.5
ΔT of Coil cooling Temp	**ºC**	**5**	**5.5**
Coil Cooling Inlet Pressure	kg/cm2	3.3	6
Coil cooling Outlet Pressure	kg/cm2	3	4
ΔP drop across Coil cooling side	**kg/cm2**	**0.3**	**2**
Heat Gain	**kcal/hr**	345000	1147500
Heat Release	**kcal/hr**	125000	1100000
Effectiveness	**%**	36.2	95.9

B. Induction Furnace (New): 2PHE's installed; 1R + 1SB during study period

Table 18 Induction Furnace (New)- PHE Performance

Description	Unit	PHE 1	PHE 2
CW Flow	m³/hr		315
CW In Temp	ºC		34.6
CW out Temp	ºC		37.4
ΔT of CW Temp	**ºC**		**2.8**
CW Inlet Pressure	kg/cm2		2.1
CW Outlet Pressure	kg/cm2		0.9
ΔP drop across CW side	**kg/cm2**		**1.2**
Coil Cooling Flow	m³/hr		215
Coil Cooling In Temp	ºC	Standby	43.2
Coil cooling out Temp	ºC		39.4
ΔT of Coil cooling Temp	**ºC**		**3.8**
Coil Cooling Inlet Pressure	kg/cm2		1
Coil cooling Outlet Pressure	kg/cm2		0.5
ΔP drop across Coil cooling side	**kg/cm2**		**0.5**
Heat Gain	**kcal/hr**		882000
Heat Release	**kcal/hr**		817000
Effectiveness	**%**		92.6

Observations & Recommendation

- It was observed during the audit that all 2No's of PHE Installed each for Induction Furnace (Old) & Induction Furnace (New). For Induction Furnace (Old), 2 Nos. of PHE were found operational & for Induction Furnace (New), 1No. of PHE were found operational & 2nd is on Standby.
- Induction Furnace (Old): As per operating conditions, The Effectiveness of PHE 1 & PHE2 were calculated to be around 36.2% & 95.9% respectively. Thus, Cleaning of PHE 1 is recommended to handle optimum Heat Load.
- Induction Furnace (New): As per operating conditions, The Effectiveness of PHE2 was calculated to be around 92.6%.

3.5 MOTORS LOAD ANALYSIS

The two parameters of importance in a motor are efficiency and power factor. The efficiencies of induction motors remain almost constant between 50 to 100% loading. With motors designed to perform this function efficiently; the opportunity for savings with motors rests primarily in their selection and use. The operating parameters of motors were checked by the audit team. These are listed below;

3.5.1 Motor Loading

Table 19 Motor Loading

Area	Equipment	Rated HP	Rated KW	IE2 / IE3	Volt	Amp	PF	KW	% Loading
CCM Terning Wall Moter	Motor 1	15	11.2		410.9	10.5	0.94	7.0	63%
	Motor 2	15	11.2		411.1	10	0.95	6.8	61%
	Motor 3	15	11.2		412.5	9.4	0.987	6.6	59%
	Motor 4	15	11.2		404.3	9.5	0.984	6.5	58%
	Motor 5	15	11.2		413.6	10.3	0.95	7.0	62%
Hot Water Sum	Water Pump 1	25	18.7		405.4	21.2	0.69	10.3	55%
	Water Pump 2	10	7.5		407.3	14.8	0.68	7.1	95%
	Water Pump 3	15	11.2		413.7	17.5	0.68	8.5	76%
	Water Pump 5	25	18.7		414.3	22.8	0.684	11.2	60%
Cooling Tower CT Fan	CT Fan 1	15	11.2		405.2	16.1	0.835	9.4	84%
	CT Fan 2 (loose belt)	15	11.2		411.5	10.8	0.78	6.0	54%
TMT Pump	Pump 3	150	111.9		426.7	160.4	0.357	42.3	38%
	Pump 4	150	111.9		426.1	132.29	0.359	35.0	31%
AC lifting Water Pump	Pump 1	25	18.7		421.8	37.1	0.58	15.7	84%
Bill Water Pump	Pump 1 (VFD)	75	56.0		353	71.25	0.58	25.3	45%
	Pump 2	75	56.0		424.3	74.1	0.54	29.4	53%
	Pump 3	20	14.9		410.8	29.7	0.475	10.0	67%
Conveyer Motor of Dropping Conveyor 15HP*4 (2R + 2SB)	Moter 1	15	11.2		419	13.7	0.911	9.1	81%
	Moter 3	15	11.2		422.1	11	0.985	7.9	71%
Roughing Motor	Motor 1	1125	839.3		415	1125	0.98	792.5	94%
Cutting Machine Main line Front Shear	Motor 1	15	11.2		415.8	11.2	0.994	8.0	72%
	Motor 2	15	11.2		415.1	7.6	0.989	5.4	48%
Roughing Motor before Point Table Conveyer motor	Motor 2	15	11.2		412.3	10.6	0.998	7.6	68%
	Motor 3	10	7.5		413.4	10.2	0.995	7.3	97%
	Motor 1	10	7.5		414.1	10.1	0.991	7.2	96%
Pinch Role Motor	Motor 1	20	14.9		418.5	14	0.994	10.1	68%
	Motor 2 (VFD)	25	18.7		418.4	17.4	0.997	12.6	67%
	Pump 1 (VFD)	30	22.4		295	16.05	0.97	8.0	36%

Area	Equipment	Rated HP	Rated KW	IE2 / IE3	Volt	Amp	PF	KW	% Loading
Furnace cooling water pump	Pump 2 (VFD)	30	22.4		338	15.24	0.98	8.7	39%
Centre cutting/Shearing Cutting Motor	Motor 1	20	14.9		417.4	9.2	0.965	6.4	43%
	Motor 2	15	11.2		419.4	10.6	0.762	5.9	52%
Bypass Cooling Bed Area- Cold Cutting	Motor	40	29.8		414.4	27.2	0.975	19.0	64%
Bypass Cooling Bed Area - 7nos. Conveyor belt 1	Motor 1				417.1	24.1	0.9	15.7	
	Motor 3				417.2	14.3	0.89	9.2	
	Motor 4				417.2	39.1	0.56	15.8	
	Motor 5				417.2	36.1	0.56	14.6	
	Motor 6				417.2	27.2	0.66	13.0	
	Motor 7				417.2	59.2	0.67	28.7	
Furnace 1	CT Fan 1				396	10.6	0.98	7.1	
	CT Fan 2				422	15.6	0.9	10.5	
	CT Fan 4				421	11.9	0.8	7.2	
	Coil Pump 100HP		75		422	116.4	0.50	42.8	57%
	Pump 50HP		37		423	58.5	0.6	24.3	66%
	Pump 30HP		22		425	31.5	0.8	18.3	41%
Furnace 2	CT Fan 1		11.25	IE2	417	18.5	0.54	7.2	64%
	CT Fan 2		11.25	IE2	416.7	17.0	0.4	4.3	38%
	CT Fan 3		11.25	IE2	416.7	16.4	0.6	6.9	61%
	Coil Pump 100HP		75		417.3	120.0	0.64	55.5	48%
	Pump 50HP		37		412	61.0	0.6	25.2	68%
	Pump 30HP		22		420.2	35.1	0.6	14.0	63%
CCM	CT Fan 1		5.5		396	9.4	0.93	6.0	103%
	CT Fan 2		5.5		400	9.3	0.9	6.1	105%
Rolling Mill	Primary Pump 1				397	92.1	0.4	23.3	
	Primary Pump 2				400	78.8	0.3	18.6	
	Secondary Pump 1				405	40.4	0.4	11.6	
	Secondary Pump 2				402	34.8	0.7	17.1	

Team also noticed the plant has installed with mostly IE2 level motor efficiency. Thus, it is recommended to replace IE2 level efficiency motor with IE3 level motor which improves in motor

efficiency at least by around 1%. This can be done in phased manner or if motor comes in rewinding/replacement.

3.6 PUMP ANALYSIS

During Audit, Team measured the flow, head & power of the major pumps to evaluate the efficiency. Based on the site conditions and the measurement, the computed operating pumpset efficiency is furnish in below table;

Table 20: Pump Efficiency Calculation

Particulars	Unit	Furnace 1 Coil Motor 100HP	Furnace 1 Pump 50Hp	Furnace 1 Pump 30HP	Furnace 2 Coil Motor 100HP	Furnace 2 Pump 50Hp	Furnace 2 Pump 30hP	Primary Pump 1	Primary Pump 2	Secondary Pump 1	Secondary Pump 2	Pump 2 (Cold Water Sump)	Pump 3 (Cold Water Sump)
Design Data													
Head	m		28		55	30	32			100			
Flow	m³/h		310		310	310	180			60			
Motor Rating	kW	75	37	22	75	37	22			30		110	110
Speed	rpm		1475				2940					2866	2866
Voltage	V		415		415	415	415			415		415	415
Site Measurements													
Suction pressure	kg/cm²g	0.17	0.17	0.17	0.3	0.23	0.23	0.15	0.15	0.15	0.15	0.3	0.3
Discharge pressure	kg/cm²g	6	2.4	3.8	5.8	2.3	3.1	7.5	7.5	5	5	8.5	8.5
Volume flow	m³/h	215	244	120	310	293	145	77.8	68	50	55	165	197
Power input to motor	kW	43	24	18	55.5	25.2	14.0	23.3	18.6	11.6	17.1	72.3	75.6
Calculations for estimation of pump efficiency													
Discharge head	m	60.00	24.00	38.00	58.00	23.00	31.00	75.00	75.00	50.00	50.00	85.00	85.00
Suction head	m	1.70	1.70	1.70	3.00	2.30	2.30	1.50	1.50	1.50	1.50	3.00	3.00
Differential head	m	58.30	22.30	36.30	55.00	20.70	28.70	73.50	73.50	48.50	48.50	82.00	82.00
Total Volume flow	m³/h	215	244	120	310	293	145	78	68	50	55	165	197
Hydraulic Power developed by pump	kW	34.16	14.83	11.87	46.46	16.53	11.34	15.58	13.62	6.61	7.27	36.87	44.02
Performance Evaluation													
Overall pump set efficiency	%	80%	61%	65%	84%	66%	81%	67%	73%	57%	43%	51%	58%
Specific Energy Consumption	kWh/m3	0.20	0.10	0.15	0.18	0.09	0.10	0.30	0.27	0.23	0.31	0.44	0.38

3.6.1 Observations & Recommendations:

- Team noticed, 3Nos. of Pump installed for Induction Furnace (Old) for Cooling Purpose, Pump namely reference as Furnace 1 Coil Motor 100HP, Furnace 1 Pump 50HP & Furnace 1 Pump 30HP based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 80%, 61% & 65% respectively.
- Team noticed, 3Nos. of Pump installed for Induction Furnace (New) for Cooling Purpose, Pump namely reference as Furnace 2 Coil Motor 100HP, Furnace 2 Pump 50HP & Furnace 2 Pump 30HP based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 84%, 66% & 81% respectively.
- Pump namely reference as Primary Pump-1, Primary Pump-2, Secondary Pump-1 & Secondary Pump-2 based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 67%, 73%, 57% & 43% respectively.
- Pump namely reference as Pump 2 (Cold Sump Pump) & Pump 3 (Cold Sump Pump) based on the site conditions and the measurement, the computed operating pumpset efficiency has been calculated to be around 51% & 58% respectively
- It is recommended to replace the pumps which operated at efficiency below 50% to energy savings.

4. GENERAL TIPS FOR ENERGY CONSERVATION IN DIFFERENT UTILITY SYSTEMS

4.1 ELECTRICITY

- Schedule your operations to maintain a high load factor
- Minimize maximum demand by tripping loads through a demand controller
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.99 under rated load conditions.
- Set transformer taps to optimum settings.
- Shut off unnecessary computers, printers, and copiers at night.

4.2 MOTORS

- Properly sized to the load for optimum efficiency.
- (High-efficiency motors offer 4 - 5% higher efficiency than standard motors)
- Check alignment.
- Provide proper ventilation
- (For every 10°C increase in motor operating temperature over the recommended peak, the motor life is estimated to be halved)
- Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply.
- (An Imbalanced voltage can reduce 3 - 5% in motor input power)
- Demand efficiency restoration after motor rewinding.

4.3 FANS

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.

- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimize bends in ductwork
- Turn fans off when not needed.

4.4 PUMPS

- Operate pumping near the best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps -- add an auto-start for an online spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

4.5 HVAC (HEATING / VENTILATION / AIR CONDITIONING)

- Tune up the HVAC control system.
- Consider installing a building automation system (BAS) or energy management system (EMS) or restoring an out-of-service one.
- Balance the system to minimize flows and reduce blower/fan/pump power requirements.
- Eliminate or reduce reheat whenever possible.
- Use appropriate HVAC thermostat setback.
- Use building thermal lag to minimize HVAC equipment operating time.
- In winter during unoccupied periods, allowing temperatures to fall as low as possible without freezing water lines or damaging stored materials.

- In summer during unoccupied periods, allowing temperatures to rise as high as possible without damaging stored materials.
- Improve control and utilization of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. -- night, weekend).
- Optimize ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. -- computer rooms).
- Provide dedicated outside air supply to kitchens, cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Clean HVAC unit coils periodically and comb mashed fins.
- Upgrade filter banks to reduce pressure drop and thus lower fan power requirements.
- Check HVAC filters on a schedule (at least monthly) and clean/change if appropriate.
- Check pneumatic control air compressors for proper operation, cycling, and maintenance.
- Isolate air-conditioned loading dock areas and cool storage areas using high-speed doors or clear PVC strip curtains.
- Install ceiling fans to minimize thermal stratification in high-bay areas.
- Relocate air diffusers to optimum heights in areas with high ceilings.
- Consider reducing ceiling heights.
- Eliminate obstructions in front of radiators, baseboard heaters, etc.
- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally designed industrial ventilation hoods for dust and vapor control.
- Use local infrared heat for personnel rather than heating the entire area.
- Use spot cooling and heating (e.g. -- use ceiling fans for personnel rather than cooling the entire area).
- Purchase only high-efficiency models for HVAC units.
- Put HVAC window units on timer control.

- Don't oversize cooling units. (Oversized units will "short-cycle" which results in poor humidity control.)
- Install multi-fueling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you don't need to?)
- Minimize HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Seal leaky HVAC ductwork.
- Seal all leaks around the coils.
- Repair loose or damaged flexible connections (including those under air handling units).
- Eliminate simultaneous heating and cooling during seasonal transition periods.
- Zone HVAC air and water systems to minimize energy use.
- Inspect, clean, lubricate, and adjust damper blades and linkages.
- Establish an HVAC efficiency maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

4.6 LIGHTING

- Reduce excessive illumination levels to standard levels using switching; de-lamping, etc. (Know the electrical effects before doing de-lamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- Install Energy Efficient alternatives to incandescent lighting, mercury vapor lighting, etc.
- Upgrade obsolete fluorescent systems, Compact fluorescents, and electronic ballasts to energy-efficient LED lights.
- Consider lowering the fixtures to enable using less of them.
- Consider daylighting, skylights, etc.
- Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- Change exit signs from incandescent to LED.

4.7 DG SETS

- Optimize loading
- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs
- Clean air filters regularly
- Insulate exhaust pipes to reduce DG set room temperatures
- Use cheaper heavy fuel oil for capacities of more than 1MW

4.8 BUILDINGS

- Seal exterior cracks/openings/gaps with caulk, gas kiting, weather tripping, etc.
- Consider new thermal doors, thermal windows, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but the light is required, consider replacing exterior windows with an insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Use landscaping to your advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimize the building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

4.9 WATER & WASTEWATER

- Recycle water, particularly for uses with less critical quality requirements.

- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.
- Eliminate once-through cooling with water.
- Use the least expensive type of water that will satisfy the requirement.
- Fix water leaks.
- Test for underground water leaks. (It's easy to do over a holiday shutdown.)
- Check water overflow pipes for proper operating level.
- Automate the blowdown to minimize it.
- Provide proper tools for washing down -- especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.
- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more efficient system for the cooling season service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionized water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pretreatment to reduce TOC and BOD surcharges.
- Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water)
- Verify the sewer flows if the sewer bills are based on them.

4.10 MISCELLANEOUS

- Meter any unmetered utilities. Know what is normal efficient use. Track down causes of deviations.
- Shut down spare, idling, or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off -- including utilities like compressed air and cooling water.
- Install automatic control to efficiently coordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Renegotiate utility contracts to reflect current loads and variations.
- Consider buying utilities from neighbors, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your lease will continue for several more years.
- Adjust fluid temperatures within acceptable limits to minimize undesirable heat transfer in long pipelines.
- Minimize the use of flow bypasses and minimize bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high-pressure drops across valves.
- Turn off the winter heat tracing that is on in summer.

5. ENERGY MANAGEMENT STRATEGY

Energy Management should be seen as a continuous process. Strategies should be reviewed annually and revised as necessary. The key activities suggested have been outlined below:

5.1 IDENTIFY A STRATEGIC CORPORATE APPROACH

The starting point in energy management is to identify a strategic corporate approach to energy management. Clear accountability for energy usage needs to be established, appropriate financial and staffing resources must be allocated and reporting procedures initiated. An energy management program requires commitment from the whole organization to be successful. A record of Energy consumption must be kept and monitored on a regular basis, to optimize Energy consumption. For this, various meters may have to be installed.

5.2 DESIGNATE AN ENERGY MANAGER

An Energy Manager must be identified and time-bound responsibility must be given to him in implementing the findings of the Energy Audit points, which the Building / Establishment has planned to implement.

5.3 SET UP AN ENERGY MONITORING AND REPORTING SYSTEM

Successful energy management requires the establishment of a system to collect/ analyze and report energy costs and consumption patterns. This will enable an overview of energy use and its related costs, as well as facilitate the identification of savings that might `otherwise not be detected. The system needs to record both historical and ongoing energy use, as well as cost information from billing data, and be capable of producing summary reports regularly. This information will provide how trends can be analyzed and reviewed for corrective measures.

5.4 IMPLEMENT A STAFF AWARENESS AND TRAINING PROGRAM

A key ingredient to the success of an energy management program is maintaining a high level of awareness among staff. This can be achieved in several ways, including formal training, newsletters, posters, and publications. It is important to communicate program plans and case studies that demonstrate savings and to report results at least at 12-month intervals. Staff may need training from specialists on energy-saving practices and equipment.

6. ENERGY CONSERVATION POTENTIAL

Table 21 Electrical Energy Conservation Opportunities

Description	Observations	Recommendations	Energy savings (kWh/m3)/ day	Annual energy savings (kWh/m3)/ year	Annual Monetary savings (Rs. In Lakhs)
Demand Savings by Increasing the Average Power Factor from 0.98PF to nearby unity	The operating power factor at main incomer was noticed to be varied in range from 0.844pf to 1.0pf with average power factor of 0.980pf. In order to maintain the Power factor, Plant has installed HT Capacitor (Old) & new HT capacitor installed but not in operation because of Plant is in expansion. However, Installed HT Capacitor (Old) was not in line/non-operational during audit period.	It is recommended put the HT capacitor is in line and maintain the average power above 0.99, this results in reduced demand savings of around 60KVA which results in monetary benefits of Rs. 4.2 lacs/year	60 KVA/month		4.2
Reduce the Air Compressor Cutoff Pressure from 8.6bar (8.7kg/cm2) to 7.6Bar (7.7kg/cm2) By Arresting the leakages & reducing the intake high temperature	The maximum air pressure required in the Plant for pneumatic operation is upto 6.5kg/cm2. Also, The air inside the Compressor house is warmer than the air outside the building. If the intake air temperature is reduced the efficiency of the compressor is improved. It was observed by the energy audit team that the temperature across the suction of intake air was around 36.6 ºC while the ambient temperature outside was 33.2 ºC. In general, the efficiency of the compressor improves by 1% for every 4 ºC drop in intake air temperature	It is recommended to reduce the Air Compressor Cutoff Pressure from 8.6Bar (8.7kg/cm2) to 6.6Bar (6.7kg/cm2). For every pressure reduction by 1 kg/cm2, the saving in power observed to be about 6%.	289 kWh	105660 kWh	7.7
Installation of Control Air IFC System for Furnace Div. & Rolling Div.	Presently, 1Nos. of Air Compressor having 336.9 CFM installed in Furnace Div. And, 4 Nos. of Air Compressor installed for Rolling Div. with cumulative installed capacity of around 828CFM. Compressor were found continuous in load condition & fluctuating demand.	It is recommended to install Control Air IFC system to manage and maintain the air requirement as per demand to Downstream. Recommended Control Air IFC system GE-10 (500CFM) for Furnace Div. & GE-20 (1000CFM) for Rolling Div. The energy savings of around 4% to 10% will be achieved as per manufacturer.			

<table>
<tr><th>Description</th><th>Observations</th><th>Recommendations</th><th>Energy savings (kWh/m3)/ day</th><th>Annual energy savings (kWh/m3)/ year</th><th>Annual Monetary savings (Rs. In Lakhs)</th></tr>
<tr><td></td><td></td><td>In addition, to reduce the fluctuation in Air requirement, the Plant may install a receiver tank at utilization area like at Packaging Section where leakages from Gun normally exist</td><td></td><td></td><td></td></tr>
<tr><td>Increasing the Range ΔT of CT's of Induction Furnace (New & Old), CCM & Rolling Mill</td><td>Delta T of CT's noticed to be very low as per their designed capacity resulting in low effectiveness of CT's. Details are shown below;
<table><tr><th></th><th>Furnace (Old)</th><th>Furnace (New)</th><th>CCM</th><th>Rolling Mill (Cell 1)</th><th>Rolling Mill (Cell 2)</th></tr><tr><td>CT1</td><td>31%</td><td>43%</td><td>20%</td><td>17%</td><td>42%</td></tr><tr><td>CT2</td><td>40%</td><td>19%</td><td>25%</td><td></td><td></td></tr><tr><td>CT3</td><td></td><td>33%</td><td></td><td></td><td></td></tr><tr><td>CT4</td><td>34%</td><td></td><td></td><td></td><td></td></tr></table></td><td>It is recommended to increase the Delta T of CT to nearby or asper OEM manual. On increasing the Delta T, result in savings in Energy by keeping on CT Fan on Standby.

Presently, because of low range, High Capacity pumps are installed to maintain the heat load on CT. Thus, on increasing the range (ΔT) & considering the same heat load, less flow would be needed resulting in slightly low range pump capacity can be used which further results in savings in energy.</td><td>Energy Savings

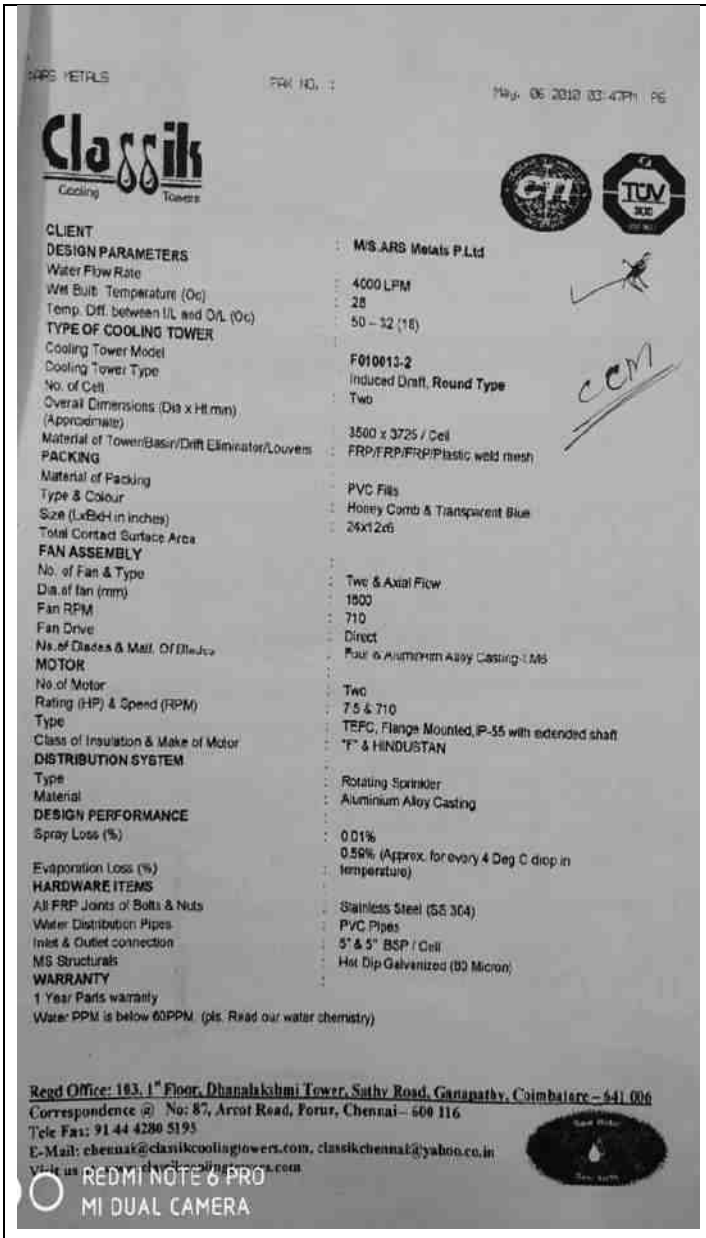
& System Safety

& reliability</td><td></td><td></td></tr>
<tr><td>Total</td><td></td><td></td><td>60KVA/month, 289 kWh & 30m3/day</td><td>105660 kWh & 11118 m3/year</td><td>11.9</td></tr>
</table>

7. ANNEXURES

A. Site Photographs

B. Cooling Tower Data Sheet



ARS METALS FAX NO. : May. 06 2010 03:47PM P6

Classik Cooling Towers

CLIENT	M/S ARS Metals P.Ltd
DESIGN PARAMETERS	
Water Flow Rate	4000 LPM
Wet Bulb Temperature (Oc)	28
Temp. Diff. between I/L and O/L (Oc)	50 – 32 (18)
TYPE OF COOLING TOWER	
Cooling Tower Model	F010013-2
Cooling Tower Type	Induced Draft, Round Type
No. of Cell	Two
Overall Dimensions (Dia x Ht mm) (Approximate)	3500 x 3725 / Cell
Material of Tower/Basin/Drift Eliminator/Louvers	FRP/FRP/FRP/Plastic weld mesh
PACKING	
Material of Packing	PVC Fills
Type & Colour	Honey Comb & Transparent Blue
Size (LxBxH in inches)	24x12x6
Total Contact Surface Area	
FAN ASSEMBLY	
No. of Fan & Type	Two & Axial Flow
Dia.of fan (mm)	1800
Fan RPM	710
Fan Drive	Direct
No.of Blades & Matl. Of Blades	Four & Aluminium Alloy Casting / MS
MOTOR	
No.of Motor	Two
Rating (HP) & Speed (RPM)	7.5 & 710
Type	TEFC, Flange Mounted, IP-55 with extended shaft
Class of Insulation & Make of Motor	"F" & HINDUSTAN
DISTRIBUTION SYSTEM	
Type	Rotating Sprinkler
Material	Aluminium Alloy Casting
DESIGN PERFORMANCE	
Spray Loss (%)	0.01%
Evaporation Loss (%)	0.59% (Approx. for every 4 Deg C drop in temperature)
HARDWARE ITEMS	
All FRP Joints of Bolts & Nuts	Stainless Steel (SS 304)
Water Distribution Pipes	PVC Pipes
Inlet & Outlet connection	5" & 5" BSP / Cell
MS Structurals	Hot Dip Galvanized (80 Micron)
WARRANTY	
1 Year Parts warranty	
Water PPM is below 600PPM. (pls. Read our water chemistry)	

Regd Office: 103, 1st Floor, Dhanalakshmi Tower, Sathy Road, Ganapathy, Coimbatore – 641 006
Correspondence @ No: 87, Arcot Road, Porur, Chennai – 600 116
Tele Fax: 91 44 4280 5195
E-Mail: chennai@classikcoolingtowers.com, classikchennai@yahoo.co.in

REDMI NOTE 8 PRO
MI DUAL CAMERA

Classik® Cooling Towers

Corporate Member of CII

CLIENT	ARS STEELS & ALLOYS INTERNATIONAL P.LTD
DESIGN PARAMETERS	
Water Flow Rate	4000 LPM
Wet Bulb Temperature (oC)	28°C
Temp. Diff. between I/L and O/L (oC)	48°C – 32°C (12°C)
TYPE OF COOLING TOWER	
Cooling Tower Model	CCF-RDS-22
Cooling Capacity	3840000 Kcal/Hr
Cooling Tower Type	Induced Draft, Round Type
No. of Cell	One
Overall Dimensions (Dia x Ht mm) (Approximate)	4810 x 4025 MM
Material of Tower/Basin/Drift Eliminator/Louvers	FRP/FRP/FRP/Plastic mesh
PACKING	
Material of Packing	PVC Fills
Type & Colour	Honey Comb & Blue/ Black
Size (LxBxH in mm)	600 X 300 X 150 mm
FAN ASSEMBLY	
No. of Fan & Type	One & Axial Flow
Dia.of fan (mm)	2800
Fan RPM	600
Fan Drive	Direct Driven
No.of Blades & Matl. Of Blades	Six & FRP
Maximum Noise level	72 DB
MOTOR	
No.of Motor	One
Rating (HP) & Speed (RPM)	15 (11.25kw, 415V, 3ph, 50Hz) & 600
Full Load Current	22.5 Amps
Actual current consumed by motor	18 Amps
Type	TE/TEFC, Flange Mounted, IP-55, Efficiency class,IE2
Class of Insulation	"F"
DISTRIBUTION SYSTEM	
Type	Rotating Sprinkler
Material	Aluminium Alloy Casting
DESIGN PERFORMANCE	
Spray Loss (%)	0.01%
Evaporation Loss (%)	2.448%
HARDWARE ITEMS	
All FRP Joints of Bolts & Nuts	Stainless Steel (SS 304)
All HDG Structural with FRP Joints	Galvanized Iron
Water Distribution Pipes	PVC Pipes
Inlet & Outlet connection	8" & 8" BSP
MS Structural	Hot Dip Galvanized (80 Micron)
WARRANTY	

a. 1 Year Parts warranty from date of supply
b. Free Replacement: Only against manufacturing defect or bad workmanship materials within warranty period
c. Suggested feed Water hardness should be below 120PPM.

P +91 422 3256 987
E: classikcoolingtowers@gmail.com

www. classikcoolingtowers.com

C. Electricity Data Sheet

1. Steel Consumption Data			Purchased Units				
	Month / Year	Total Units Consumed (KWh)	IEX	CCP	WIND	SOLAR	TNEB
	Apr-23	9079000	3945715	0	0	0	5133285
	May-23	9180000	4429049	0	0	0	4750951
	Jun-23	8422800	3817341	0	0	0	4605459
	Jul-23	8414600	0	8141462	0	0	273138
	Aug-23	9222000	0	8144000	0	0	1078000
	Sep-23	8983200	0	7484953	0	0	1498247
	Oct-23	9051800	0	8184000	0	0	867800
	Nov-23	8150820	0	7920000	0	0	230820
	Dec-23	7388520	410750	4910400	1434912	631257	1201
	Jan-24	8687520	109860	6762805	1170250	635511	9094
	Feb-24	9019120	0	6040960	1692325	831205	454630
	Mar-24	9083820	146995	6070335	724317	906239	1235934
	Total	**104683200**	**12859710**	**63658915**	**5021804**	**3E+06**	**2E+07**

Ref: ARSS/MOEF/CCR/2024,
16th November 2024.

Ministry of Environment, Forest & Climate Change (MOEF & CC),
Integrated Regional Office (Chennai),
1st Floor, Additional Office Block For GPOA,
Shastri Bhawan, Haddows Road,
Nungambakkam,
Chennai – 600 006.

Kind Attn: **The Regional Officer / The Director.**

Sir,

Sub: Certified Compliance Report – MOEF&CC – Environmental Clearance issued by SEIAA, Tamil Nadu under Schedule 3(a), Category- 'B1' for Billet Manufacturing Unit with the production capacity of 2,88,000 MT/Annum of Billets at S.F.No.B1S, SIPCOT Industrial Complex, Gummidipoondi, Tiruvallur District – Reg.

Ref: 1) Letter No.SEIAA-TN/F.No.6443/EC/3(a)/ /2024 Dated:17.04.2024.
2) Letter No.SEIAA -TN/F.No.10905/ToR/3(a)/2024 Dated:04.07p.2024

This has reference to the above mentioned subject, Please find enclosed herewith the copy of Environmental Clearance issued by SEIAA-TN vide letter No. SEIAA-TN/F.No.6443/EC/3(a)/ /2024 Dated:17.04.2024 for our proposed expansion of billet manufacturing unit with the production capacity of 2,88,000 MT / Annum of MS Billets at SS.F.No.B1S,SIPCOT Industrial Complex, Gummidipoondi, Tiruvallur District , Tamil Nadu.

As per the obtained Environmental Clearance, we are operating a billet manufacturing unit at S.F.No.B1s, Sipcot Industrial Complex, Gummidipoondi, Tiruvallur District. At present we have obtained ToR from SEIAA - TN vide letter No.SEIAA-TN/F.No.10905/ToR/3(a)/2024 Dated 04.07.2024 for our proposed plant capacity Expansion from 2,88,000 MT/Annum to6,00,00 MT/Annum. Therefore, we need a Certified Compliance Report from Regional office, MoEF&CC for the obtained environmental clearance.

Request you to kindly provide us the Certified Compliance Report for further process at SEIAA, Tamil Nadu to get EC for Expansion.

Received

Thanking you,
Yours Faithfully ,
For **STEELS & ALLOY INTERNATIONAL Pvt. Ltd.,**

Authorized Signatory.

Enclosure:

1. **Check List, 2.EC copy, 3. ToR copy, 4. Latest Monitoring Reports, 5. Latest CTO Copy.**

To,

Dr. Perarasu V T Professor
Department of Chemical Engineering
AC Tech Campus, Anna University
Chennai – 600 025

Name of the Company : ARS STEELS & ALLOY INTERNATIONAL PVT.LTD

GST No : 33AALCA9425H1ZL

TAN No : CHEA21277E

PAN No : AALCA9425H

Name : N.PRABU

Designation : Deputy Director

Email ID : prabu@arssteels.co.in

Mobile No : 9444389907

To comply with a ToR condition issued by SEIAA to our expansion proposal, we need to get an adequacy report for the existing STP available in our steel plant located at SIPCOT, Gummidipoondi, Tiruvallur district. In this we request to provide your proposal to do the said assignment. Copy of the TOR is enclosed for your ready reference.

Kindly do the needful

Thanking You,

Yours faithfully,

For ARS Steels & Alloy International Private Limited

Authorised Signatory.

Received,
17.1.2024

Dr. V.T. PERARASU
Professor
Department of Chemical Engineering
AC Tech Campus, Anna University
Chennai - 600025, India

Ref:ARSS/ PCB/CTO-CCR/2024,
19th November 2024.

To
The District Environmental Engineer,
Tamil Nadu Pollution Control Board ,
Sipcot Industrial Complex ,
Gummidipoondi , Tiruvallur District.

Dear Sir,

Sub: Certified Compliance Report – CTO (Air & Water) issued by TNPCB Tamil Nadu under Schedule 3(a), Category- 'B1' for Billet Manufacturing Unit with the production capacity of 2,88,000 MT/Annum of Billets at S.F.No.B1S, SIPCOT Industrial Complex , Gummidipoondi , Tiruvallur District – Reg.

Ref: 1) Consent to Operate - Order No.2407261214772 Dated: 30/08/2024.
2) Letter No.SEIAA –TN/F.No.10905/ToR/3(a)/2024 Dated: 04.07.2024

This has reference to the above mentioned subject , Please find enclosed herewith the copy of Consent to Operate (Air & Water) issued by Tamil Nadu Pollution Control Board vide order No.2407261214772 Dated 30.08.2024 for our billet manufacturing unit expansion with the production capacity of 2,88,000 MT / Annum of MS Billets at SS.F.No.B1S,SIPCOT Industrial Complex , Gummidipoondi , Tiruvallur District , Tamil Nadu.

At present we have obtained ToR from SEIAA – TN vide letter No.SEIAA-TN/F.No.10905/ToR/3(a)/2024 Dated 04.07.2024 for our proposed plant capacity Expansion from 2,88,000 MT/Annum to 6,00,00 MT/Annum. Therefore, we need a **Certified Compliance Report** on CTO from District Environmental Engineer , Tamil Nadu Pollution Control Board , Tiruvallur District for the obtained CTO (Air & Water).

Request you to kindly provide us the Certified Compliance Report for further process at SEIAA ,Tamil Nadu to get EC for Expansion.

Thanking you,

Yours Faithfully ,
For **STEELS & ALLOY INTERNATIONAL Pvt. Ltd.,**

Authorized Signatory.

19 NOV 2024

SITE PHOTOGRAPHS

Jun/2024

PROJECT SITE	1st week		2 week		3 week		4 week		Avg
PM10	65	64	62	64	63	65	61	65	64
PM2.5	29	29	26	29	28	31	26	30	29
SO2	19	18	17	18	20	19	20	20	19
NO2	34	33	30	32	37	35	35	38	34

GUMMIDIPOONDI	1st week		2 week		3 week		4 week		Avg
PM10	65	65	67	63	66	69	67	66	66
PM2.5	30	28	32	26	29	34	31	29	30
SO2	21	20	22	20	21	22	21	23	21
NO2	35	33	37	32	34	42	41	40	37

PEDDIKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	48	43	42	43	46	44	45	48	45
PM2.5	21	18	17	16	21	19	19	21	19
SO2	11	10	12	11	10	10	11	12	11
NO2	21	18	17	23	20	18	21	23	20

THERUALI	1st week		2 week		3 week		4 week		Avg
PM10	43	38	37	38	41	39	40	43	40
PM2.5	19	16	15	14	19	17	17	19	17
SO2	6	5	7	6	5	5	6	7	6
NO2	12	9	8	14	11	9	12	14	11

PAPPANKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	51	50	49	46	45	47	49	52	49
PM2.5	23	22	21	19	18	20	22	25	21
SO2	11	9	8	9	7	9	10	11	9
NO2	22	17	15	17	13	19	20	23	18

MTC-BUSINESS LTD PAPANKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	57	57	59	55	58	61	59	58	58
PM2.5	27	25	29	23	26	31	28	26	27
SO2	23	22	24	22	23	24	23	25	23
NO2	29	28	31	31	30	36	35	34	32

ARS Energy Private Limited	1st week		2 week		3 week		4 week		Avg
PM10	57	56	54	56	55	57	53	57	56
PM2.5	26	26	23	26	25	28	23	27	26
SO2	22	21	20	21	23	22	23	23	22
NO2	29	28	25	27	32	30	30	33	29

Viki Steel	1st week		2 week		3 week		4 week		Avg
PM10	61	60	58	60	59	61	57	61	60
PM2.5	27	27	24	27	26	29	24	28	27
SO2	13	12	11	12	14	13	14	15	13
NO2	23	22	19	21	26	24	24	27	23

Jul/2024

PROJECT SITE	1st week		2 week		3 week		4 week		Avg
PM10	61	60	64	63	65	62	62	60	62
PM2.5	28	25	29	29	30	27	29	25	28
SO2	18	17	19	18	20	17	18	17	18
NO2	31	26	32	29	34	28	30	29	30

GUMMIDIPOONDI	1st week		2 week		3 week		4 week		Avg
PM10	67	63	65	60	59	62	64	62	63
PM2.5	29	28	30	27	27	28	27	28	28
SO2	21	20	21	20	19	21	22	20	21
NO2	37	35	37	34	34	38	39	36	36

PEDDIKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	46	44	44	42	45	43	44	43	44
PM2.5	21	19	21	18	21	20	17	18	19
SO2	11	10	11	10	10	11	10	11	11
NO2	21	17	20	18	19	20	18	21	19

THERUALI	1st week		2 week		3 week		4 week		Avg
PM10	40	38	38	36	39	37	38	37	38
PM2.5	18	16	18	15	18	17	14	15	16
SO2	7	6	7	6	6	7	6	7	7
NO2	15	11	14	12	13	14	12	15	13

PAPPANKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	46	43	42	47	48	52	48	52	47
PM2.5	20	18	18	20	20	23	20	24	20
SO2	9	8	7	9	7	10	8	10	8
NO2	18	15	12	18	13	20	16	16	16

MTC-BUSINESS LTD PAPANKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	59	55	57	52	51	54	56	54	55
PM2.5	26	25	27	24	24	25	24	25	25
SO2	24	23	24	23	22	24	25	23	24
NO2	32	30	32	29	29	33	34	31	31

ARS Energy Private Limited	1st week		2 week		3 week		4 week		Avg
PM10	53	52	56	55	57	54	54	52	54
PM2.5	25	22	26	26	27	24	26	22	25
SO2	20	19	21	20	22	19	20	19	20
NO2	28	23	29	26	31	25	27	26	27

Viki Steel	1st week		2 week		3 week		4 week		Avg
PM10	61	57	59	54	53	56	58	56	57
PM2.5	27	26	28	25	25	26	25	26	26
SO2	12	11	12	11	10	12	13	11	12
NO2	20	18	20	17	17	21	22	19	19

Aug/2024

PROJECT SITE	1st week		2 week		3 week		4 week		Avg
PM10	60	58	57	61	60	61	57	60	59
PM2.5	29	26	25	27	27	28	25	27	27
SO2	17	16	12	16	17	17	15	16	16
NO2	32	28	25	29	30	31	27	28	29

GUMMIDIPOONDI	1st week		2 week		3 week		4 week		Avg
PM10	62	59	60	62	63	62	61	63	62
PM2.5	30	29	27	29	28	27	27	28	28
SO2	18	15	16	17	18	17	15	18	17
NO2	36	29	31	33	36	33	31	33	33

PEDDIKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	41	40	38	36	38	50	40	42	41
PM2.5	17	15	15	14	15	20	16	17	16
SO2	7	6	7	8	9	6	7	6	7
NO2	14	12	16	17	20	14	15	13	15

THERUALI	1st week		2 week		3 week		4 week		Avg
PM10	36	35	33	31	33	45	35	37	36
PM2.5	15	13	13	12	13	18	14	15	14
SO2	5	4	5	6	7	4	5	4	5
NO2	8	6	10	11	14	8	9	7	9

PAPPANKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	45	46	44	41	42	49	47	49	46
PM2.5	16	18	18	15	17	20	19	21	18
SO2	6	7	7	6	7	9	8	9	7
NO2	14	13	14	11	14	19	16	19	15

MTC-BUSINESS LTD PAPANKUPPAM	1st week		2 week		3 week		4 week		Avg
PM10	54	51	52	54	55	54	53	55	54
PM2.5	27	26	24	26	25	24	24	25	25
SO2	22	19	20	21	22	21	19	22	21
NO2	31	24	26	28	31	28	26	28	28

ARS Energy Private Limited	1st week		2 week		3 week		4 week		Avg
PM10	51	49	48	52	51	52	48	51	50
PM2.5	25	22	21	23	23	24	21	23	23
SO2	19	18	14	18	19	19	17	18	18
NO2	27	23	20	24	25	26	22	23	24

Viki Steel	1st week		2 week		3 week		4 week		Avg
PM10	56	51	54	55	57	56	55	57	55
PM2.5	26	22	23	23	26	25	23	26	24
SO2	11	8	9	10	11	10	8	11	10
NO2	21	14	16	18	21	18	16	18	18

भारतीय गैर न्यायिक

एक सौ रुपये Rs. 100

रु. 100 ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMILNADU Rs.100/- DN 203974

ARS STEEL & ALLOY INTERNATIONAL PVT. LTD.

V.S.KANNAN
Stamp Vendor, L.C.No.5839/A4/93,
G.N.T. Road, Gummidipoondi,
Tamil Nadu - 601 201.

21/12/24

Subject: Affidavit Submission – Renewable Energy Roadmap

The District Environmental Engineer,
Tamilnadu Pollution Control Board,
88A, First Cross Road, SIPCOT Industrial Complex,
Gummidiponndi, Tiruvallur District, T.N - 601 201.

Respected Sir,

I, N Prabu, Deputy Director of ARS Steels, hereby submit this affidavit to affirm our commitment to sourcing renewable energy. We appreciate the committee's continued focus on promoting renewable energy consumption. In line with the requirements, we are submitting this affidavit outlining ARS Steels' current initiatives and roadmap towards achieving the 75% renewable energy target.

To date, ARS Steels has made significant investments in renewable energy procurement through group captive agreements. We have entered into Power Purchase Agreements (PPAs) with the following entities:

- Davlaipurm Renewables for 4.0 crore units
- Cleantech Solar for 6.11 crore units
- Torrent Power for 9.40 crore units

For ARS STEELS & ALLOY INTERNATIONAL PVT. LTD.

Authorised Signatory

This totals 19.51 crore units of renewable energy annually. Our total investment in securing this renewable power amounts to approximately Rs. 40.0 crores. Out of 19.51 crore units procured from renewable energy 15.51 crore units will be sourced from solar energy and 4.0 crore units from wind energy.

Following our planned expansion, our total annual energy consumption is estimated to be around 40.0 crore units. With the PPAs already executed, we will be consuming 19.51 crore units of renewable energy, representing 50% of our total electricity consumption post-expansion. While this demonstrates a substantial commitment to green energy, there are challenges in further increasing this share.

Challenges in Renewable Energy Utilization

- Solar energy availability: Solar power is primarily available from 7 AM to 5 PM, covering about 40% of daily energy consumption, which limits its availability for evening peak periods.

- Wind energy intermittency: Wind power is predominantly available during peak seasons, particularly from June to September, covering just four months of the year. Beyond this, wind generation decreases significantly, and excess energy produced during peak seasons often cannot be efficiently utilized.

- Regulatory challenges: Existing regulations complicate the use of renewable energy, particularly when balancing solar generation across peak consumption periods.

Despite these hurdles, ARS Steels remains committed to maximizing renewable energy usage. We are actively exploring innovative strategies to increase our green power consumption and are determined to work towards achieving the 75% renewable energy target, contingent on favourable regulatory support and practical feasibility.

Thanking you,

For ARS STEELS & ALLOY INTERNATIONAL PVT LTD.,

Authorised Signatory.

तमिलनाडु TAMIL NADU 08AC 499386

04-01-2023 M/s. ARS Steels and Alloys International Pvt Ltd, Gummidipoondy

S. NOORULLA
STAMP VENDOR, HOSUR
L. No. 2/2021/KGI

AGREEMENT

This agreement is made on this First day of February Two Thousand and Twenty Three between **M/s. SUPREME PETRO PRODUCTS** (Used Oil), having its factory at S.F. No. 225/1A, 2J, 225/1A.2K, Eguvarpalayam Village, Gummidipoondi Taluk, Tiruvallore District, represented by its AUTHORISED SIGNATORY (herein after called ("SPP") of the FIRST PART (which expression include their successors and assigns, unless such inclusion is inconsistent with the context of meaning thereof)

AND

M/s. ARS STEELS AND ALLOY INTERNATIONAL PVT LTD, which is having its unit at B-1/S, SIPCOT INDUSTRIAL COMPLEX, GUMMIDIPOONDI-601201, represented by its **DIRECTOR. Mr. CVS. MOORTHY,** 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).

SUPREME PETRO PRODUCTS * Gummidipoondi

ARS STEELS & ALLOY INTERNATIONAL PVT. LTD. Gummidipoondi

WHEREAS the "SPP" is extending an engineered facility to collect Treat, Store and Disposal of Hazardous WASTE generated by the GENERATOR. The facility is situated at Address 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 "SPP".

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 "SPP" is limited to collect, Transport, Treat, Store and Disposal of Hazardous WASTE of the Generators.

02. The Generator's obligation for utilizing the facility are to:
Provide details about the WASTE and its characteristics regarding presence of Explosive / Ignitable / Corrosive / Toxic / Odour Compounds in the Transport Manifest (Form – 10) provided to the transporter for safe transportation and disposal and a TREM card (Form 9) as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016– provided by "SPP" at cost to the transporter of the WASTE.

03. The charges for Collection, Treatment, Storage and / or Disposal (herein after referred as USER CHARGE) will be applicable to Generators/ "SPP" Industries mutually agreed between Generator and "SPP".

04. "SPP" will collect the waste in barrels /containers and arrange the transport of such barrels /containers from the waste generator's premises.

05. "SPP" 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 10) and TREM Card (Form 9) for every WASTE as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. In the event of false information, all liabilities accrue to generators.

06. "SPP" indemnifies the Generator 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.

07. SPP will not collect the "Coolant oil mixed with water or the coolant water mixed with oil" at any circumstances. SPP will collect the Waste / used oil from DG Set, Compressor, Hydraulic oil, cutting oil from machines for reprocessing.

SUPREME PETRO PRODUCTS

ARS STEELS & ALLOY INTERNATIONAL PVT. LTD.

08. The prices, quantity and other charges mentioned in this agreement shall be valid for a period of one year from the date of agreement. Any revision shall be done as per guidelines arising out of discussion between "SPP" and Generator.

09. The Rate for Used / Spent oil shall be mutually agreed upon on time to time basis. The transport cost of Rs.3000/ trip shall be borne by the GENERATOR.

10. "SPP" and GENERATOR shall by mutual discussion preclose the agreement.

11. DECLARATION:

We, **M/s. ARS STEELS AND ALLOY INTERNATIONAL PVT LTD,** hereby declare that we shall be sending Hazardous Waste as per the following per year to M/s. "SPP".

Sl.No	Category No	Waste Type	Disposal Method	Accumulated Quantity (KL)	Annual Generation (KL/A)
1	5.1	Used / Spent oil	Re Processing	0.010	0.600

FOR SUPREME PETRO PRODUCTS,

SUPREME PETRO PRODUCTS
No.9, Eguvarpalayam Village-1,
Gummidipoondi Taluk,
Tiruvallur Dist-601201, Tamilnadu

(AUTHORISED SIGNATORY)

FOR ARS STEELS AND ALLOY INTERNATIONAL PVT LTD,

ARS Steels & Alloy International Pvt. Ltd.
B/1-S, SIPCOT INDL. COMPLEX,
GUMMIDIPOONDI-601 201
THIRUVALLUR DIST (TN)

(AUTHORISED SIGNATORY)
WASTE GENERATOR, THE SECOND PART.

In Witnesseth Thereof:

1.

2. M. SURESH BABU

M. Suresh Babu
9551692920