

# Executive Summary

For

Proposed Expansion of billets from 30,000 TPA to 1,89,000 TPA and proposed hot charge rolling mill of 1,80,000 TPA (Brownfield Project)

At

Khasra No. 151/1,151/2, 152/1, 152/2,152/3,152/4, 152/7,152/8, 166/1, 166/2,167/3/167/4 & 167/5, village Charoda, Dharsiwa, Raipur, Chhattisgarh

**Project Proponent**

**M/s Shyam Steel Industries**

**Environmental Consultant**

**Pollution and Ecology Control Services**

Accreditation no: NABET/EIA/2023/SA 0165 valid upto 10<sup>th</sup> April 2023

**February 2023**

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## EXECUTIVE SUMMARY

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### 1.0 INTRODUCTION

The proposed expansion project attracts the provisions of EIA Notification, 2006 and its various amendments falling under Category “A” of Schedule, 3 (a) Metallurgical Industries (Ferrous and Non-ferrous). The project proponent made online application on 6th August 2022 along with Form-1, Pre-feasibility report and other documents for obtaining Terms of Reference (TORs) from concerned Regulatory Authority for undertaking detailed EIA study. The committee prescribed Standard ToRs for EIA study for the proposed Expansion of billets from 30,000 TPA to 1,89,000 TPA and proposed hot charge rolling mill of 1,80,000 TPA at Khasra No. 151/1,151/2, 152/1, 152/2,152/3,152/4, 152/7,152/8, 166/1, 166/2,167/3/167/4 & 167/5 , village Charoda, Dharsiwa, Raipur, Chhattisgarh . ToR was granted vide letter No. J-11011/307/2022-IA.II(I) dated 18.08.2022..

### 2.0 PROJECT DETAILS

M/s Shyam Steel Industries has proposed expansion of Ingot / Billet from 30,000 TPA to propose hot charged rolling mill of 1,80,000 TPA.

**Table 1: Production Scenario**

<b>Equipment</b>	<b>Existing capacity</b>	<b>Proposed capacity</b>	<b>Remark</b>
Induction Furnace	10TX1	10 T X2 15 T X2	10TX1 induction furnace as stand by.
Rolling Mill	5000 TPA	1,80,000 TPA (Hot Charged)	-

The total raw material requirement for project is given in table below:

**Table 2: Raw Material Required**

Sr. No.	Raw Material	Existing Requirement (TPA)	Proposed Requirement (TPA)	Total Requirement (TPA)	Proposed Source and distance
<b>Induction Furnace</b>					
1.	Sponge Iron	26350	134300	160650	Procured from the open market- by road in tarpaulin covered trucks
2.	Scrap	6430	50270	56700	Procured from the open market- by road in tarpaulin covered trucks
3	Ferro alloys	300	1590	1890	Procured from the open market- by road in tarpaulin covered trucks
<b>Rolling Mill</b>					
1.	Hot Metal	5000	184000	189000	Captive

### WATER REQUIREMENT

Total Water Requirement 384 KLD. Existing water requirement is 47 KLD. Permission for the supply water of 50 KLD requirement from CIBL has already obtained.

The breakup of water requirement for proposed plant is given below:

**Table 3: Water Requirement**

	Unit	Water Requirement m <sup>3</sup> /day		Wastewater Generation m <sup>3</sup> /day		Mode of disposal of wastewater
		Existing	Proposed	Existing	Proposed	
1	Industrial	43.0	330.0	1.2	36.0	Recycle and reused in process.
2	Domestic Purpose	4.0	7.0	3.0	6.0	The sewage generated will be treated in Packaged Type STP and treated water reused for plantation purposes.
	<b>Sub Total</b>	<b>47.0</b>	<b>337</b>	<b>4.2</b>	<b>42.0</b>	-
	<b>Total</b>	<b>384</b>		<b>46.2</b>		-

**POWER REQUIREMENT**

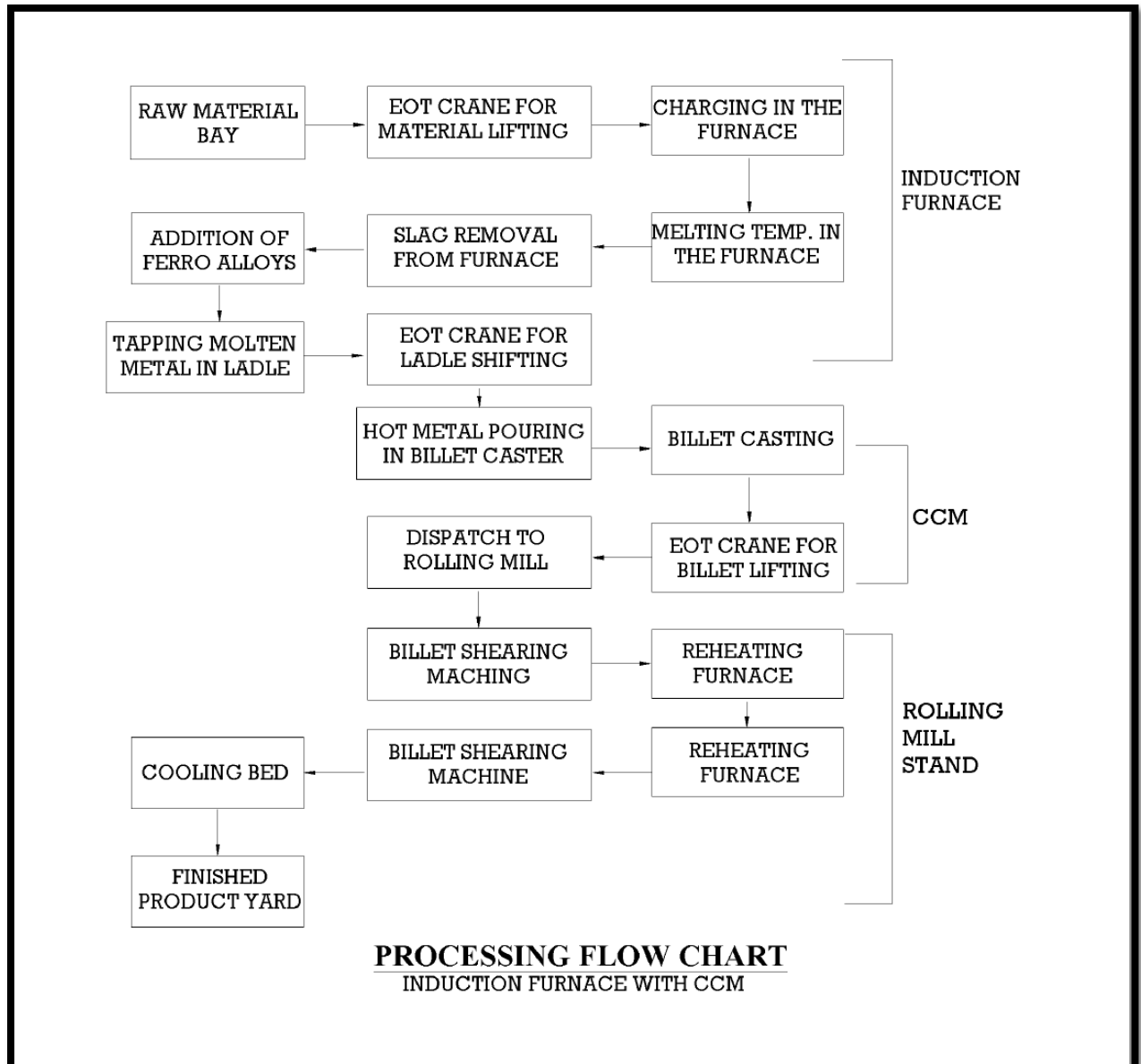
The total power required for the project will be 24.3 MW and it will be procured from State Electricity Board.

**TECNOLOGY AND PROCESS DESCRIPTION**

The induction furnace is used to melt many different sorts of metals, from common steel to more exotic alloys or precious metals. The greatest advantage of the induction furnace is its low capital cost, its easier installation, simpler operation, no noise generation and there is very little heat loss due to radiation from the furnace. The raw material (Sponge Iron, MS scrap, Ferro alloys) is charged into the induction furnace. As soon as the furnace is charged, the switches admitting power current to the induction coil are closed.

After the furnace is switched on, current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. As the magnetic fluxes cut through the scraps and complete the circuit, they generate an induced current in the scrap which is known as eddy current, this eddy current flows through the highly resistive path of the scrap mix, generates tremendous amounts of heat and melting of scrap starts. Soon a pool of molten metal forms in the bottom causing the charge to sink. The induced current which is generated in the charge mixed and heated more homogenously. As soon as the charge has melted clearly, any objectionable slag is skimmed off, and the necessary alloying elements are added. When these additives have melted completely, the power input may be increased to bring the temperature of metal upto the point most desirable for pouring. The current is then turned off and the furnace is tilted for pouring into a crucible. As soon as pouring has ceased the crucible is cleaned completely from any slag or metal droplets adhering to the wall of the crucible and the furnace is now ready for charging again. The temperature of the furnace will be 1650<sup>0</sup>C. When the total scrap as per the capacity of the crucible is molten, the sample is taken from liquid steel and tested for the composition of steel and the carbon contents. Therefore some additives of ferro-alloys like Silico-managanese, silicon, aluminum shots and are added to the liquid steel to maintain the composition and quality. The billets in the molten stage are transferred to rolling line for the production of long product bypassing the reheating

furnace. The cooled products are then inspected and dispatched. The process flow chart is presented below:-



### Process flow Chart for Hot Billet Rolling Process

#### Advantages of Hot Billet Rolling Process

- ❖ Energy saving is the main benefit as it consists in avoiding the normal cooling of the billet down to room temperature and the reheating for initiating the rolling. Thus the process is of less energy and more environmentally friendly.
- ❖ Billets in molten condition will be directly fed to Hot Billet Rolling machine thus saving of fuel & electricity.

- ❖ No additional increment in GLC for PM& SO<sub>2</sub>.
- ❖ No generation of Fly Ash.
- ❖ No space will be required for storage of Billets and fly ash.
- ❖ Easy handling of Process.
- ❖ Low operational cost of rolled steel depending on unit costs
- ❖ Reduced civil works and infrastructure costs
- ❖ Reduced energy consumption
- ❖ Less man power required.

### 3.0 DESCRIPTION OF ENVIRONMENT

The baseline environmental quality for the period of 1<sup>st</sup> October 2022 to 30<sup>th</sup> December 2022 was assessed in an area of 10 km radius around the proposed project site.

#### Air Environment

The ambient air quality monitored at 08 locations selected based on predominant wind direction, indicated the following ranges:

PM<sub>10</sub>: 40.8 to 82.8 µg/m<sup>3</sup>

PM<sub>2.5</sub>: 22.2 to 50.2 µg/m<sup>3</sup>

SO<sub>2</sub>: 6.6 to 18.6 µg/m<sup>3</sup>

NO<sub>x</sub>: 14.8 to 36.4 µg/m<sup>3</sup>

Industrial Area Residential, Rural Area (CPCB Norms)	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>
	100 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>

The concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> were found within the National Ambient Air Quality Standards (NAAQ).

#### Water Environment

A total 16 samples including eight surface & eight ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (BIS 10500 – 2012). except high concentration of total coliform in surface water, which may be due to the human activities.

### Noise Environment

It has found that in the proposed expansion plant, noise levels are in the range of 30.0 – 73.0 dB (A) at all eight stations during day time. Maximum levels of noise have recorded in day hours which are natural as our most of activities have done in day hours.

Noise levels measured at all eight stations are well within limit of either 65.0 dB(A) for Residential Area or 75.0 dB(A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

Area Code	Category of Area	Limits in dB(A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

### Land Environment

Total eight samples were collected and analysed for physic-chemical characteristics at selected locations in the study area to assess the existing soil conditions around the proposed project site. The relevant parameters show the following characteristics:

- Texture of all soil samples are silty-Clay in Texture Classification.
- Colour of soil samples from agriculture is brown and Yellowish brown in color.
- The bulk density of soil samples is in the range of 1.11 to 1.52 gm/cc.
- Soil samples have pH values in the range of 7.0 to 7.5. The pH values are indicating nature of soil samples as neutral.
- Soil samples have conductivities between 294.2 to 432.8  $\mu\text{S/cm}$ .

- f) Soil samples have Organic Matter between 1.13 to 1.62 %. These values represent average fertility of soils.
- g) Soil samples have concentration of Available Nitrogen values ranged between 263.2 to 364.8 kg/ha.
- h) Soil sample have concentration of Available Phosphorous values ranged between 23.4 to 58.6 kg/ha.
- i) Soil sample have concentration of Available Potassium values range between 352.8 to 562.6 kg/ha.

#### **4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIONS MEASURES**

##### **Impact on Air quality**

The impacts on air quality due to source of the air pollution in the proposed expansion activities have been identified.

The present baseline concentrations were monitored in the EIA study. The additional emissions are mainly from induction furnace during melting process.

The proposed project activity will result in air emissions from the following areas.

- a) Raw material Handling and storage area
- b) Induction Furnace
- c) Transportation

The atmospheric dispersion modeling and the prediction of ground level pollutant concentrations has great relevance in the following activities:

- Estimation of impact of industry on surrounding environment.
- Estimation of maximum ground level concentration and its location in the study area.

The mathematical model used for predictions on air quality impact in the present study area is AERMOD.

The predicted ground level concentrations obtained when superimposed on the baseline concentrations are within the prescribed NAAQ Standards for residential areas.



In point source emissions, the stacks are subjected to plume rise which again is dependent on force of buoyancy and momentum. The higher is the plume rise or stack, the lesser will be ground level concentrations (GLC's). The emissions when released into the atmosphere are subjected to transportation, dispersion, transformation, and fall out and wash out and finally reach the ground level at a particular distance. That's why the GLC is comparatively low at project site

### **Mitigation Measures**

- Company shall provide dust suction system which will control fugitive emission due to material and raw material handling.
- Regular monitoring of air quality parameters.
- The vehicles transporting raw materials will be covered with tarpaulin in order to prevent dust emission during the transport.
- It would be ensured that all the vehicles in the working zone are properly maintained to keep emissions within the permissible limits.
- At loading and unloading points, arrangement for Water sprinkling will be made so that dust generation during transportation of materials will brought down to minimal.
- The finished product will be transported by the same trucks carrying raw material.
- Plantation in the plant premises will be done in the 34% of the total land.
- All the internal roads shall be concreted / asphalted to reduce the fugitive dust due to vehicular movement
- Whenever, APCS is not working, then raw material feed will be stopped. Consequently, there will be no production in the unit till APCS is rectified.

### **Impact on Noise Levels**

During operation, the major noise generating sources are auto loading section, electric motors etc. These sources will be located far off from each other. Under any circumstances the noise level from each of these sources will not exceed 85 dB (A).

Noise levels generated in the project site will be confined to the noise generating plant units hence the impact of noise levels on surroundings will be insignificant

**Mitigation Measures**

The noise levels stipulated by Central Pollution Control Board at any point of time will not exceed the standards.

- By providing padding at various locations to avoid sharp noise due to vibration.
- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- All the openings like covers, partitions will be designed properly
- Inlet and outlet mufflers will be provided which are easy to design and construct.
- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission.
- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

**Impact on Water Environment**

Total Water Requirement 384 KLD. Existing water requirement is 47 KLD. Permission for the supply water of 50 KLD requirement from CIBL has already obtained. The additional water requirement for proposed expansion will be met from CIBL. Domestic waste water will be taken to adequately designed 15 KLD STP. The treated water will be recycled for utilization in Green Belt Development

**Impact on Terrestrial ecology**

There is no National Park, Wildlife sanctuary, Biosphere reserves and protected forest within 10 km of the plant area. No schedule- I species were recorded in the core and buffer zone of plant area during the biodiversity assessment. There may be an impact on the biological environment of the area due to operation of plant, if proper care will not be taken:

- Particulate matter emissions and fugitive emissions due to transportation activity & material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment.

- Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photosynthesis and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.

The present running plant has no significant impact on surrounding ecology and biodiversity as following mitigation measures have been / will be adopted:

- Greenbelt development and plantation in and around the plant site.
- Using paved roads for transportation to minimize fugitive emissions.
- Transporting material in truck covered with tarpaulin and storing it under covered facilities.
- Transport vehicles and machinery will be properly maintained and periodically checked for pollution level to reduce noise and gaseous emission in the surrounding environment.

### **Solid Waste Generation**

The solid waste generation in the existing and proposed expansion activities are given in following table

#### **Solid Waste Management**

<b>S.N.</b>	<b>Solid Waste</b>	<b>Existing Quantity (TPA)</b>	<b>Proposed Quantity (TPA)</b>	<b>Total Quantity (TPA)</b>	<b>Method of Disposal</b>
1.	Slag	3600	19080	22680	Slag will be utilized for road base making, or sold to cement/brick manufacturers.
2.	Tail Cuttings	200	7200	7400	Will be Recycled back as raw material in own induction Furnaces

### **Impact on Socio-Economic Environment**

The impact of the proposed plant on socio economic conditions of the local people of the study area is expected to be positive during construction phase.

- ❖ The local population will have employment opportunities due to the proposed project. The local people will be preferred during the construction phase.

**Biological Environment**

Proposed project located on non-forest land within notified industrial area. The existing plant is already in operation thus, no significant tree cutting was involved during the construction phase.

**Control Measures for Ecology**

The land is an industrial land already developed by M/s Shyam Steel Industries. Local and fast-growing plant species is being/will be planted under greenbelt development programme to enhance green cover in the area as per CPCB guidelines during the construction phase.

**5.0 ENVIRONMENTAL MONITORING PROGRAMME**

M/s Shyam Steel Industries is carrying out the Environmental Monitoring on regular basis. The methodologies adopted for environmental monitoring are in accordance with the CPCB guidelines.

The environmental monitoring points is done considering the environmental impacts likely to occur due to the operation of existing and proposed project as the main scope of monitoring program is to track, timely and regularly, the change in environmental conditions and to take timely action and adopt mitigation measures for protection of environment.

**Ambient Air Quality Monitoring**

Ambient air quality monitoring in and around the plant is also being carried out by NABL accredited lab Ultimate Environlytical Solutions on regular basis and reports are being submitted to CECB regularly.

**Water and Waste Water Quality Monitoring**

Surface and Ground water quality samples are being collected and analyzed by NABL accredited lab, samples are collected from different locations on quarterly basis and analyzed. Reports are being submitted to CSPCB, CPCB and MoEF.

The plant is maintaining zero liquid discharge and as per guidelines issued by CPCB.

**Monitoring of Rain Water Harvesting**

Piezometer with Telemetry shall be provided within 100 m of water extraction structure on existing and on-going rain water harvesting locations.

**Noise Environment**

Noise levels are being monitored at various locations of the plant premises for day and night time as per the CPCB guidelines.

**Fugitive emission**

Monitoring of ground level dust concentration/Fugitive emission along with gaseous pollutants viz SO<sub>2</sub>, NO<sub>x</sub> are being carried out periodically. Dust concentration and gaseous emission levels from all the fugitive sources being regularly monitored.

Necessary control measures are being adopted to keep the secondary fugitive emission within limits.

Same practice will be continued after proposed expansion project.

**6.0 ADDITIONAL STUDIES**

The additional studies as per the ToR issued by MoEF&CC are Public Consultation, Social Impact Assessment, Risk Assessment, & Disaster Management Plan.

**7.0 PROJECT BENEFITS**

Total cost of the project of the proposed expansion project is Rs. 11.76 Crores. The budgetary provision for EMP is Rs. 65 Lakhs.

**8.0 ENVIRONMENTAL MANAGEMENT PLAN****Environmental Management Cell**

An environmental monitoring and control cell has been established. The Environmental Cell is functioning under the control of the General Manager along with the EMS team of the company to monitor the environmental measures. The Environmental Management cell for M/s Shyam Steel Industries.

The cell is responsible for monitoring ambient air quality, stack emission, ambient noise in the plant and vicinity, waste water quality and discharge, quality of water bodies receiving effluent, workplace air quality and maintenance of analytical instruments. Additional responsibilities of the cell include the following:

- Conducting annual environmental audit and submit audit report to State Pollution Control Board
- Submission of all statutory reports and returns

- Conduct regular training programs to educate plant personnel on environmental awareness
- Inform the management regularly about conclusions/results of monitoring and recommend environmental protection measures

### **Air pollution**

- ❖ The emission from induction furnace area will be extracted and treated in a fume extraction system
- ❖ Bag Filters with fume extraction system will be installed followed by stack
- ❖ Fugitive emission from material unloading operations, material transfer points will be controlled fully with total enclosure
- ❖ Water spraying will be done inside and around the factory premises for dust suppression
- ❖ Proper maintenance and clearing of the roads inside the plant to avoid excess fugitive dust generation
- ❖ Plantation along the internal roads in the plant premises will be strengthen
- ❖ All the internal roads shall be concreted / asphalted to reduce the fugitive dust due to vehicular movement
- ❖ The emissions from the stacks shall be regularly monitored for exit concentration. Sampling ports shall be provided in the stacks according to CPCB guidelines.
- ❖ Fugitive as well ambient air quality monitoring shall be carried out on regular basis to ensure the compliance with National Ambient Air Quality Standards (NAAQS). The ambient air quality within the factory premises shall not exceed the standards prescribed by CPCB
- ❖ Raw materials and product disposal of the roads inside the plant to avoid excess fugitive dust generation.

### **Water Environment**

Total Water Requirement for the proposed project is 337 KLD. The source of water is drawl from Chhattisgarh Ispat Bhumi Limited (CIBL). The additional water requirement for proposed expansion will be met from CIBL. Domestic waste water

will be taken to adequately designed of 15 KLD STP. The treated water will be recycled for utilization in Green Belt Development.

### **Noise Environment**

The general mitigation measures are to be adopted in the proposed project are given below:

- The major plant equipment or machines while purchasing; these machineries and equipment must meet the CPCB and MoEF&CC standards. Proper care must be taken at the time of installation to insulate/enclose all the noise sources to avoid occupational exposure to the workers and also to minimize the generation of excess noise level.
- In the plant, workers particularly working near higher noise sources may be exposed to higher level for longer durations. However, as an extra safety measure provision of ear plugs or ear muffs will be made for such in-plant workers in order to avoid exposure to high levels whenever they come close to high noise generating sources.
- Greasing and regular maintenance of equipment and machineries will further reduce the noise level inside the factory periphery.
- All noise generating equipment will be housed in acoustic enclosure (wherever possible), to ensure attenuation of noise

### **Solid Waste Management**

The Slag of 3600 TPA from existing Induction Furnace and 19080 TPA from proposed expansion will be sold to authorized vendors/brick manufacturing unit. Total Tail cutting of 7400 TPA will be generated from rolling mill after expansion and reused in induction furnace.

### **Green belt Development**

The plantation helps to capture the fugitive emissions and attenuate the noise apart from improving the aesthetics of the region Avenue plantation within the plant and green belt development has been done. Plantation will be done in 40 % of the total plant area. The total area of the project is 5.15 ha. Out of this, green belt is 2.06 ha (40%) of plant area. Adequate plantation will substantially abate the dust pollution,

filter the polluted air, reduce the noise and ameliorate the plant environment. Major tree species will be planted inside the plant premises is as follows:

**Major tree species planted inside the plant premises**

<b>S. No.</b>	<b>Common name</b>	<b>Scientific Name</b>
1.	Karanjee	<i>Pongamia pinnata</i>
2.	Ashoka	<i>Saraca indica</i>
3.	Gulmohar	<i>Delonixregia</i>
4.	Neem	<i>Azadirachta indica,</i>
5.	Awala	<i>Phyllanthus emblica</i>
6.	Banayan Tree	<i>Ficus benghalensis</i>
7.	Pipal	<i>Ficus religiosa</i>
8.	Jarul	<i>Lagerstroemia speciosa</i>
9.	Mango	<i>Mangifera indica</i>
10.	Jam	<i>Acacia acuminata</i>
11.	Papayi	<i>Carica papaya</i>
12.	Kawath	<i>Limonia acidissima</i>
13.	Bel	<i>Aegle marmelos</i>
14.	Jambhul	<i>Syzygium cumini</i>
15.	Other flowering plants etc.	

The green belt has been developed in the existing land of 5.15 ha. 2000 trees are already planted and about 3000 more trees will be planted to attain the green belt of 40%.

## **9.0 CONCLUSION:**

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on the various environmental components, that the project activities will not have any major adverse effect on the surrounding environment.

To mitigate any impacts due to the operation activities, a well-planned EMP and detailed post project monitoring system is provided for continuous monitoring and immediate rectification at site. Due to the project activities, Socio - economic condition in and around the project site will improve more substantially.