

## Executive Summary

### 1.0 Introduction

Ferroalloy is an alloy of iron with some element other than carbon. Ferroalloy is used to physically introduce or "carry" that element into molten metal, usually during steel manufacture. In practice, the term ferroalloy is used to include any alloys that introduce reactive elements or alloy systems, such as nickel and cobalt-based aluminum systems. Silicon metal is consumed in the aluminum industry as an alloying agent and in the chemical industry as a raw material in silicon-based chemical manufacturing. M/s. Vibhuti Alloys is registered as Small Scale Industry.

The increasing demand of Ferro Alloys, which is used as raw material in steel and stainless steel industries, prompted M/s. Vibhuti Alloys to set up 2400 TPA Ferro Alloys and Manganous Oxide Project at B17/1 Butibori Industrial Area, Nagpur, Maharashtra.

The purpose of this Environmental Impact Assessment (EIA) study is to provide information on the surroundings and the extent of environmental impact likely to arise on account of the proposed expansion activities.

The objectives of the EIA study are:

- To assess the present status (baseline) of air, water, land, noise, biological and socio-economic components of environment including parameters of human interest;
- To identify and quantify significant impacts of various activities
- To evaluate existing pollution controls measures and suggest modifications, if required;
- To prepare Environmental Management Plan (EMP) outlining control measures for mitigation of adverse impacts; and
- To delineate post project environmental quality monitoring program for management of emissions from the plant with increased capacity.
- To prepare risk assessment and disaster management plan.

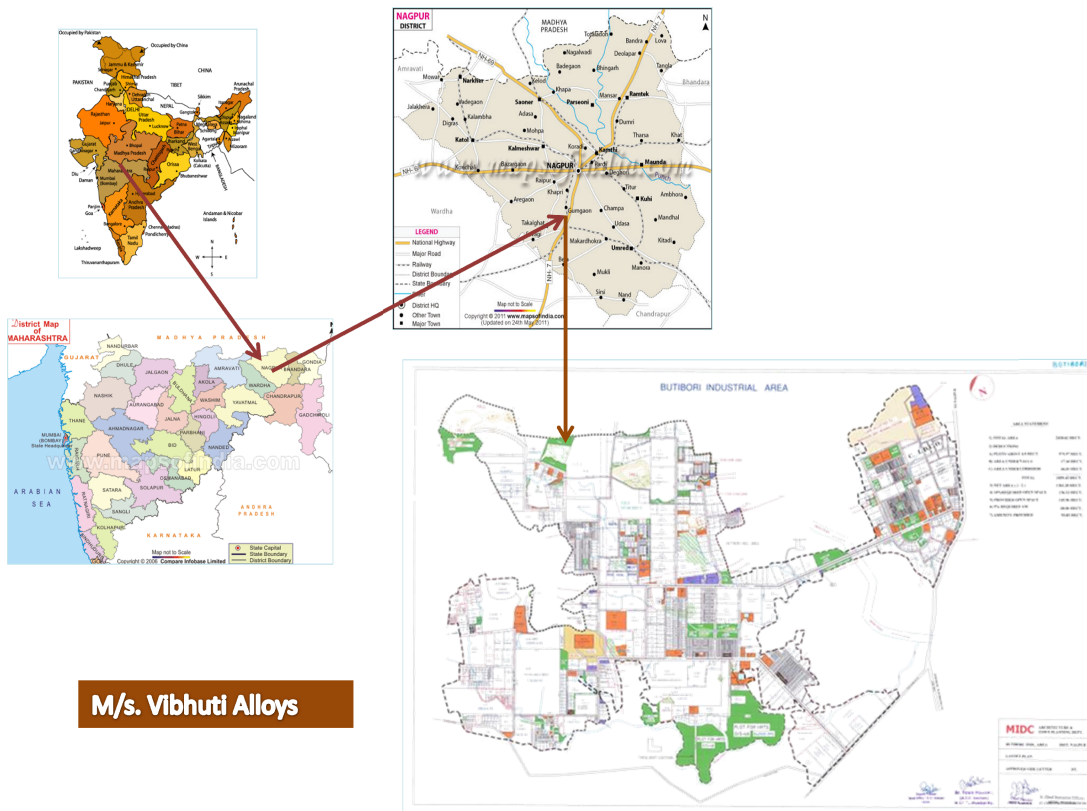
## 1.1 SITE SELECTION CRITERIA

- ✓ The proposed project is in MIDC Butibori, which is Notified Industrial Area.
- ✓ No Rehabilitation/Resettlement issues.
- ✓ No nallah/water body, public roads, forests within the project site.
- ✓ Availability of Raw Material.
- ✓ Assured Water Supply from MIDC.
- ✓ Assured Power Supply.
- ✓ Market available for finished products.
- ✓ Availability of man power.
- ✓ Availability of industrial infrastructure.
- ✓ No notified critically polluted area in 15 Km
- ✓ Access to developed areas with markets, schools, hospitals, and other social amenities.

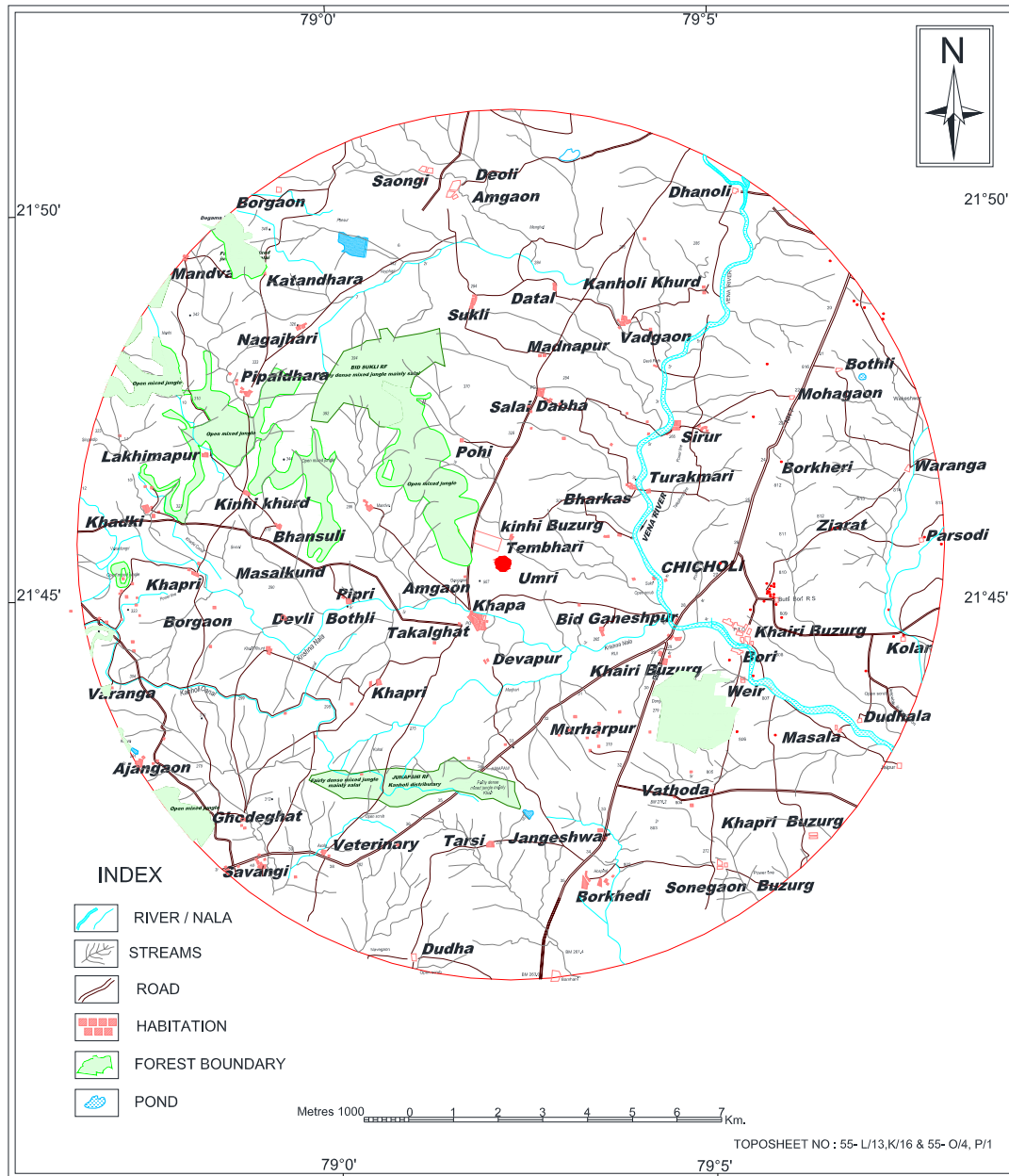
## 1.2 DETAILS OF THE PROJECT SITE

Sr. No.	Particulars	Details
1.	Project Site	Plot No. B17/1, MIDC, Butibori, Nagpur, Maharashtra
2.	Nearest major road	NH – 7 : 4 Km NH-204 : 4 Km
3.	Coordinates	Latitude : 20° 55' 33.12" N Longitude : 78° 57' 27.84" E
4.	Nearest railway station	Butibori railway station : 4 km
5.	Elevation above MSL	900
6.	Toposheet	55L/13,55K/16, 55 P/1, 55 O/4
7.	Present landuse	Industrial land
8.	Climatic conditions (Based on IMD)	Maximum : 47 <sup>0</sup> C Minimum : 4 <sup>0</sup> C Humidity : 20% Rainfall : 1101.4 mm
9.	Nearest Air Port	Dr. Babasaheb Ambedkar Airport, Nagpur : 15 km
10.	Nearest village	Tembhari : 0.78Kms : (E) Khapa : 1.4Kms : (N)
11.	Nearby Industries	1. KEC International

		2. Jayson Rolling Mills 3. Gammon Infrastructure Transmission Tower company 4. Indo worth Textiles
12.	Nearest major city	Nagpur : 27 km
13.	Nearest water body	Vena river : 2.5km : (E) Krishna nala : 3km : (ES) Wakeshwar lake : 9.6km Khadki lake : 10km : (WN)
14.	Sensitive locations	Archaeological structures, Historical places, Sanctuaries and Biosphere are not present within 10 km
15.	Nearest forest	<u>Reserve Forest :</u> Bid Sukli R.F. : 1km : (N) Dongargaon R.F. : 5 km : (SE) Junapani R.F. : 7 km : (S) Degma R.F. : 9.0 km : (NW) <u>Protected Forest:</u> Bid-Anjangao P.F. : 10 km : (NW)



Location Map of the Proposed Project Site



### 1.3 PURPOSE OF EIA

As per the Environmental Impact Assessment (EIA) Notification dated 14<sup>th</sup> September, 2006, Metallurgical Industries (Ferrous & Non Ferrous) falls under category ‘A’ which requires Environmental Clearance (EC) to be obtained from MoEF before the commencement of ground activity.

The application to prior EC (Form-1) for the proposed project was submitted to MoEF for approval of Terms of Reference (TOR). The proposal was considered by the Expert

Appraisal Committee (EAC) during its 15<sup>th</sup> meeting held during 29<sup>th</sup> – 30<sup>th</sup> January 2014 for the TOR for preparation of EIA report. The EAC has suggested TOR for preparation of the EIA report vide letter No. J-11011/347/2013-IA-II (I) dated March 31<sup>st</sup>, 2014 (**Annexure-I**). The EIA report for the proposed project is prepared as per the guidelines of MoEF and contains 11 chapters including Environmental Management Plan. It is requested to accord approval to environmental clearance by MoEF, Government of India and Consent for Establishment (CFE) from Maharashtra Pollution Control Board (MPCB) Mumbai.

## 2.0 PROCOESS DETAILS

### ➤ Production Scenario

Products	Quantity	Grade	Specification
Medium Carbon Ferro Manganese	200 MT / Month	70-75 % & 75-80 %	Manganese - 70-75 % & 75-80 %
			Carbon - 3 % Max
			Size 25 - 150mm or 10 -50mm
Low Carbon Ferro Manganese		75- 80 %	Manganese - 75-80 %
			Carbon - 1 % max
			Size : 25 - 150mm or 10 -50mm
Manganous Oxide (MnO)	200 MT / Month	55-62 %	Manganese - 55-62 %

### ➤ Raw Material Requirement

Sr. No.	Description	Grade	Unit	Quantity MT per Annum
1.	Manganese Ore	48-50 %	Metric Tonnes	7500
2.	Lime	85 % Cao	Metric Tonnes	780

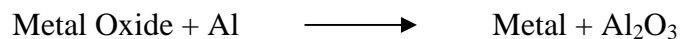
3.	Aluminium Powder/ turnings	95 % Al	Tonnes	1320
4.	Silico Manganese	58/16 % Si	Tonnes	2184
5.	Fluorspar	85 % CaF <sub>2</sub>	Tonnes	84
6.	Coal	40 % FC	Tonnes	600

- The total water required for the proposed plant will be 5 KLD. The water will be sourced by MIDC Butibori.
- The power required will be supplied by State Electricity Board. The power requirement for the proposed project is 125HP.
- The M/s. Vibhuti Alloys have procured 10000 Sq.Mtrs of land in which the 33% of the plot area have been identified for green belt.

## Process

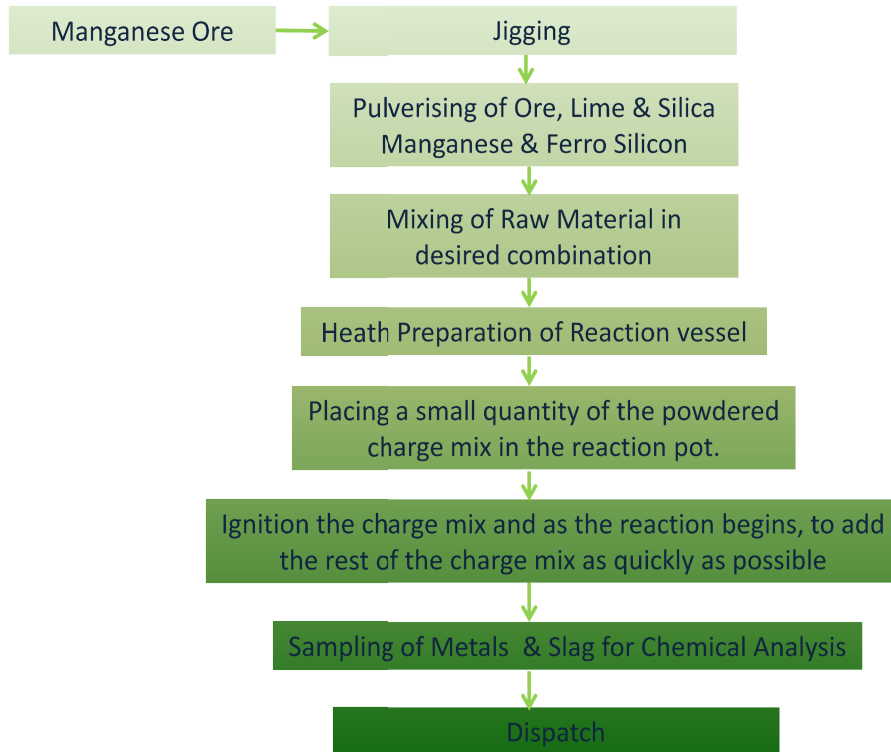
### Process for manufacturing of Ferro Alloys (Thermite Process)

Alumino-Thermic process aims at the production of Ferro Alloys from the oxides of elements by reduction with aluminium powder using exothermic heat of the reaction for smelting purpose. The highly exothermic reaction raises the temperature of the reaction to above 2000<sup>0</sup>C or even more.



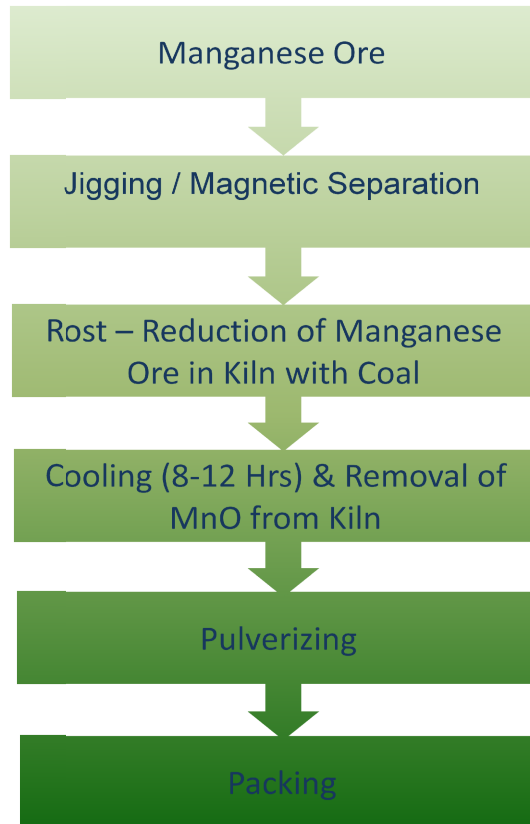
On ignition of the reaction mixture consisting of the oxide ore whose metal is to be obtained with aluminium powder, aluminium readily reacts with the oxygen of the metal oxide liberating heat, which raises the temperature of reaction substance and reacts thereby yielding the Ferro Alloys slag. Alumino-Thermic process is known for its versatility for making almost all the Ferro Alloys and can be made on short notice from

few kilograms to several tones a day depending on the requirement of the materials. The low capital cost scores an edge over the electro thermal process.



### Process for manufacturing Manganous Oxide (MnO)

- After Raw Material receipt at the site it is tested for the contents of various elements and then the material is screened. After screening you get different sizes, which are jigged in automatic water jigging.
- Then the roasting – reduction of manganese ore is done in a kiln with coal.
- Then the material is cooled for 8 to 12 hours and after cooling it is pulverised, packed and kept ready for dispatch.



### 3.0 Description of the Environment (Baseline Data)

#### 3.1 Air Environment

The baseline environmental quality for the January, February, March and April 2014 was assessed in an area of 10 km radius around the proposed project site.

The predominant wind directions were from **N** (16.8%), from **NNE** (14.5%) and from **NNW** (10.2%). Average wind speed was 5.9 km/hr during monitoring period and most of the time wind speed was between 1 to 5 km/hr.

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM <sub>10</sub>	-	31.2 to 61.1 µg/m <sup>3</sup> .
PM <sub>2.5</sub>	-	15.2 to 41.5 µg/m <sup>3</sup>
SO <sub>2</sub>	-	7.5 to 33.8 µg/m <sup>3</sup>
NO <sub>x</sub>	-	9.9 to 36.1 µg/m <sup>3</sup>



Industrial Area Residential, Rural Area (CPCB Norms)	100 $\mu\text{g}/\text{m}^3$	60 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$
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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).

### 3.2 Water Environment

A total 5 samples including two surface & three 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 (IS 10500 – 1993 except high concentration of total coli form in surface water, which may be due to the human activities.

### 3.3 Noise Environment

Recorded Noise Levels in the core zone of proposed project site, are in the range of 35.4(night time) to 53.5 dB (A) (day time) at all eight monitoring stations. 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 (N-1, N-2, N-3, N-4, N-5, N-6, N-7 and N-8) are very low and well within limit of either 55.0 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.

### 3.4 LAND ENVIRONMENT

Three soil samples were collected from agriculture, waste land and barren land in order to assess the existing soil conditions around proposed project site.

The observations of soil characteristics are discussed parameter wise below;

- a) Texture of soil samples from agriculture land and waste land are silty loam and sample from barren land are clay-loam in Texture Classification.
- b) Colour of soil samples from agriculture and barren lands are gray and sample from waste land are dark grey in colour.
- c) The bulk density of soil samples from barren land are in the range of 1.64 to 1.93 g/cc and sample from agriculture land are in the range of 1.85 to 1.88 g/cc and sample from waste land are in the range of 1.68 to 1.75 g/cc.
- d) Soil samples from barren land have pH values between 8.03 to 8.12 and sample from agriculture land have 8.15 to 8.20 and sample from waste land have 7.83 to 7.90 ranges of pH values. The pH values are indicating nature of soil samples is neutral to alkaline.
- e) Soil samples from barren land have conductivities between 0.148 to 0.185 mmhos/cm and conductivities of soil sample from agriculture land ranges between 0.260 to 0.292 mmhos/cm and conductivities of soil sample from waste land ranges between 0.125 to 0.162 mmhos/cm.
- f) Soil samples from barren land have Organic Matter between 0.24 to 0.56 % and sample from agriculture land have between 1.97 to 2.16 % Organic Matter and sample from waste land have between 1.13 to 1.65. These values represent good fertility of soils.
- g) Soil samples from barren land have concentration of Available Nitrogen values ranged between 95.5 to 229.1 kg/ha and samples from agriculture land range between 801.1 to 878.2 kg/ha and samples from waste land range between 458.2 to 668.2 kg/ha Available Nitrogen value.
- h) Soil sample from barren land have concentration of Available Phosphorous values ranged between 6.6 to 8.2 kg/ha and soil samples from agriculture land have concentration values ranges from 34.5 to 45.1 kg/ha and samples from waste land have concentration values ranges from 7.4 to 10.7 kg/ha.
- i) Soil sample from barren land have concentration of Available Potassium values range between 209.3 to 239.6 kg/ha and sample from agriculture land

concentration of Available Potassium as its values range between 989.7 to 1482.4 kg/ha and sample from waste land have values range between 245.4 to 286.0 kg/ha.

- j) Characteristic of barren and Waste land soil is a little deficient in nutrients concentration. Whereas, agricultural land soils are moderately suitable for cultivation of climatic crops and have good fertility.

#### **4.0 Anticipated Environmental Impacts & Mitigation Measures**

##### **➤ Impact on Air Quality**

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

##### **Sources of Emissions**

Emissions released from the stack during operation phase will get dispersed in the atmosphere and finally reach the ground at a specified distance from the sources. From the proposed activities the possible environmental impact on air quality has been envisaged due to the following sources.

##### **Raw Material Handling / Transport System**

The possible pollutants are fugitive dust emissions from raw materials handling areas viz. loading / unloading, fuel stockyard, crushing units etc. Raw materials will be fed to hopper with the help of pay-loader / tipper. The major sources of pollution from proposed units can be classified under the following heads:

- Pollutants in the waste gases namely, suspended particulate matter (SPM), sulphur dioxide, NO<sub>x</sub> and Carbon monoxide, etc.
- Fugitive dust generated during vehicular movement

##### **Mitigation Measures**

- M/s. Vibhuti Alloys shall provide dust suction system which will control fugitive emission due to material and raw material handling.
- Dust suppression system will be provided in the form of water sprinklers.

- All vibrating screens and weigh feeders below the hopper; day bins etc are totally covered to prevent leakages of dust.
- All bins are packed and covered so that there is no chance of dust leakage.
- All discharge and feed points wherever the possibility of dust generation, is provided with dust suppression system.
- All material transfer points are connected with dust suppression water nozzles to avoid air pollution.
- Regular monitoring of air polluting concentrations, *etc.*
- Wetting of roadways to reduce traffic dust and re entrained particles
- Provision for masks when dust level exceeds, *etc.*
- Installation of Bag Filters followed by Stack.

Predictions have been carried out using AERMOD for study period. The predicted ground level concentrations obtained when superimposed on the baseline concentrations are within the prescribed NAAQ Standards for residential areas.

#### ➤ **Noise Environment**

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.

Noise levels will be attenuated by providing encasement of noise generating equipment, noise proof cabins to operators, noise generating sources will be insulated by providing suitable enclosures, Inlet and outlet mufflers will be provided which are easy to design and construct and all the rotating items will be well lubricated.

#### ➤ **Water Environment**

- The total water requirement for the proposed activities is 5 KLD. During plant operation 1 m<sup>3</sup>/ day of waste water will be generated from the zigging process. The wastewater generated in this process and in cooling process will be treated in the settling tank and will be reused.
- The sewage generated from the toilets and bathroom in the proposed plant will 1 m<sup>3</sup>/day which will be disposed through septic tank.

➤ **Impact on Flora Fauna**

Project site has been identified in the notified industrial area. The reserved forest in the study area is in patches. There is no designated ecological park or Bio Reserve/Wild life sanctuary in the 10 km radius of the proposed plant site. The impact on terrestrial ecology will be negligible in the first instance and shall be insignificant.

➤ **Solid Waste Generation**

The solid waste generation in the proposed activities is given below.

**Solid Waste Generation & Mitigation Measures**

Waste	Quantity	Mitigation Measures
Slag	100 Mt/Month	Shall be reused for lining & Earth Preparation of Reaction vessels. Any excess slag shall be dumped in low lying area.
Ash	210 TPA	Reused and recycled in cement industry and manufacturing of bricks.

➤ **Impact on Socio-Economic Environment**

- ✓ The impact on socio-economic environment will be positive due to the increase in employment, opportunities to the local people, during operation phase 40 technical and nontechnical people will be employed and improvement in transport, communication, health and educational services.
- ✓ M/s Vibhuti Alloys is equally conscious for the all round socio-economic development and is committed to raise the quality of life and social well being of communities where it operates. Its CSR initiatives will be prioritized on local needs, which focus on Health, Education, Sustainable Livelihood, Social Mobilization, Infrastructure Development and Environment Conservation.

## 5.0 ENVIRONMENTAL MONITORING PROGRAM

The environmental monitoring is important to assess performance of pollution control equipment installed in the proposed project of M/s. Vibhuti Alloys. The proposed project is for manufacturing of 2400 TPA Metallothermic Ferro Alloys and 2400 TPA Manganous Oxide. The sampling and analysis of environmental attributes including monitoring locations will be as per the guidelines of the Central Pollution Control Board / State Pollution Control Board.

Environmental monitoring will be conducted on regular basis by M/s. Vibhuti Alloys to assess the pollution level in the proposed plant as well in the surrounding area. Therefore, regular monitoring program of the environmental parameters is essential to take into account the environmental pollutant of the study area.

The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments;
- To follow the trend of parameters which have been identified as pollutants;
- To check or assess the efficiency of the controlling measures;
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical due to the commissioning of proposed 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 new projects.

The attributes, which needs regular monitoring, are specified below:

- Air quality
- Water and wastewater quality;

- Noise levels;
- Soil quality;
- Ecological preservation and afforestation; and
- Socio Economic aspects and community development

### **Environmental Budget**

Total cost of the project will be Rs. 3.00 Crore. The budgetary provision for EMP will be as Rs 15 Lakhs.

## **6.0 ENVIRONMENTAL MANAGEMENT PLAN**

### **➤ OPERATION PHASE**

#### **Air Environment**

The following Environmental Management Plan will be implemented to control air emissions from Induction Furnace.

- ✓ Bag Filters followed by a stack will be installed.
- ✓ Fugitive emission from material unloading operations, material transfer points will be controlled fully with total enclosure.
- ✓ 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 (PM10 100µg/m<sup>3</sup>, PM2.5 60µg/m<sup>3</sup> SO<sub>2</sub> 80µg/m<sup>3</sup>, NO<sub>x</sub> 80µg/m<sup>3</sup> and CO 04µg/m<sup>3</sup>) prescribed by CPCB.
- ✓ The monitoring frequency of air quality shall be as per the consent issued by State Pollution Control Board and reports shall be submitted as part of compliance. The records will be maintained.
- ✓ Regular Stack Monitoring will be done. All the emissions from the plant will be controlled to meet the relevant standard set by CPCB/State Pollution Control Board

- ✓ Details regarding volumetric flow, temperature and emission rate of pollutants from different stacks shall be collected and compiled regularly
- ✓ Effective steps shall be taken to control fugitive emission inside the plant. All internal roads will be Tar Roads. Efficient arrangements will be provided to control fugitive dust emission during handling/transportation of Raw materials / finished product etc
- ✓ Avenue plantation will be strengthen further to control fugitive emissions & gaseous pollutants to keep clean and healthy environment.

### **Noise Environment**

- ✓ The industry will take care while procuring major noise generating machines/equipment to ensure that the manufactures have taken adequate measures to minimize generation of noise.
- ✓ The areas where noise levels are high will be partitioned off, noise levels will be minimized at the source, and noise reflection and transmission will be minimized.
- ✓ The workers working in the high noise areas will be provided with ear muffs/ear plugs.
- ✓ Acoustic laggings and silencers will be provided in equipment wherever necessary. Ventilation fans shall be installed in enclosed premises.
- ✓ Supply ducts and grills on the ventilation and air conditioning system will be suitably sized for minimum noise level.
- ✓ The silencers and mufflers of the individual machines shall be regularly checked
- ✓ The noise level shall not exceed the limit 75 dB (A) during the day time 70 dB (A) night time within the plant premises.
- ✓ Provision of insulating caps and lids at the exit of noise source and providing polystyrene, etc. as noise insulation material will be adopted. All the openings will be covered and partitions will be acoustically sealed.



- ✓ Avenue plantation around the plant area will reduce the noise level further. Training of personnel is recommended to generate awareness about damaging effects of high noise levels.

➤ **Water Environment**

- ✓ During plant operation waste water will be generated from the zigging process. The wastewater generated in this process will be treated in the settling tank and will be reused in the zigging process.
- ✓ Close circuit system will be provided in cooling process; here the water is evaporated in the process of cooling. Hence there will not be any waste water generation from the process and cooling in the proposed plant.
- ✓ The necessary design parameters and material of construction for cooling system including cooling towers will be selected in such a way that they are able to utilize water from the clarifier. Provision for oil/grease separators will be made to skim oil / grease, if any in the waste water. After skimming of the oil water will be stored in guard pond.
- ✓ Domestic waste will be disposed through Septic Tanks along with soak pits.

➤ **Rain Water Harvesting System (RWH)**

RWH structures will be provided to harvest the rain water around the plant area and roof top. The collected rain water shall be utilized for plant uses to minimize the raw water requirement from the source. The surface water run-off from the main plant area would be led to a sump for settling and the over flow would be collected in the common water basin for further uses in the plant to optimize the raw water requirement of the plant.

➤ **Land Environment**

**Strengthening of the existing green belt**

The plantation will help to capture the fugitive emissions and attenuate the noise apart from improving the aesthetics quality of the region. Avenue plantation within the plant and green belt development area will be further strengthened. The selection of the species will be finalized in consultation with the local Forest Department.

➤ **Management Plan of Solid waste**

- Process needs refractory lining and is being changed every month.
- Solid waste of slag generation will be about 100 Mt/Month. The Fly ash generated will be 210 TPA
- Solid waste is non hazardous and non-toxic in nature.
- Slag generated shall be reused for lining & Earth Preparation of Reaction vessels. Any excess slag shall be dumped in low lying area.
- Fly ash generated will be reused and recycled in cement industry and manufacturing of bricks
- Temporary Landfill will be designed for slag and dust as per the guidelines of MoEF New Delhi for unused slag.

➤ **Socio Economic Environment**

M/s Vibhuti Alloys would aid in the overall social and economic development of the region. The plant will give employment to about direct employment to 40 people of local area. In order to mitigate the adverse impacts likely to arise in the proposed project activities and also to minimize the apprehensions to the local people, it is necessary to formulate an affective EMP for smooth initiation and functioning of the project. The suggestions are given below:

- Communication with the local people will be established regular basis by project authority to provide an opportunity for local youth.
- Project authorities will undertake regular environmental awareness program on environmental management.
- Job opportunities are the most demanding factor, the local people as per their education will be employed.
- For social welfare activities to be undertaken by the project authorities, collaboration should be sought with the local administration, gram panchayat, block development office etc for better coordination.

### **Occupational Safety & Health Management**

M/s Vibhuti Alloys will provide all necessary provisions under Factory Act. In addition a Safety committee will be formed and manned by equal participants from Management and Workers. All personal protect equipments like Safety shoes, helmet & uniform will be issued to each employee based on the nature of job involved. In case a person inhales fumes, he should be removed to fresh air and given oxygen through a mask for 30 minutes and if required cardiopulmonary resuscitation should be performed.

➤ **Conclusion**

The potential environmental, social and economic impacts have been assessed. The proposed activities will have the marginal impacts on the local environment. With effective implementation of proposed environment management plan and mitigation measures, these impacts will be insignificant. Implementation of the project has beneficial impact in terms of providing direct and indirect employment opportunities. This will be a positive socio-economic development in the region.