Executive Summary

For

Proposed Project of Manufacturing of 2400 TPA Manganese Oxide, 80 TAP Ferro Manganese M.C./L.C , 80 TPA Ferro Titanium OR 80 TPA Ferro Vanadium OR and 2400TPA Ferro Molybdenum (By Thermite Process)

At

Plot No. B17/1, MIDC, Butibori, Nagpur, Maharashtra

Project Proponent

M/s Vibhuti Alloys

Prepared By:

Pollution and Ecology Control Services

NABET No. : QCI/NABET/EIA/1720/RA010

pecs_nagpur@rediffmail.com,

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Introduction

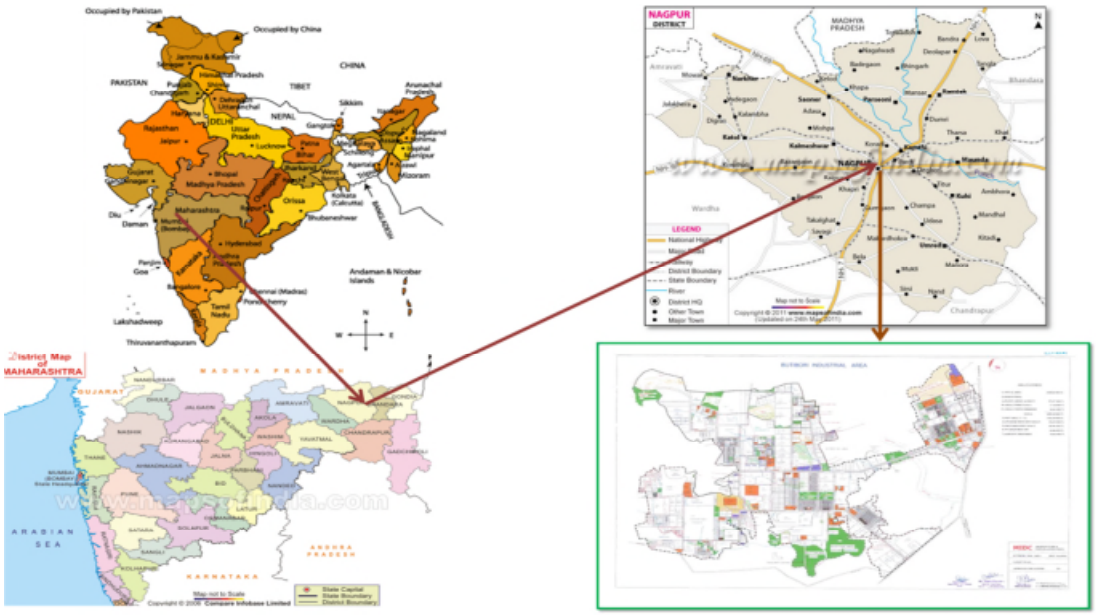
M/s. Vibhuti Alloys is registered as Small Scale Industry. M/s. Vibhuti Alloys has existing unit for Grinding of Manganese, Grinding of Silico Manganese, Grinding of Ferro Manganese and Grinding of Coal and now wish to establish manufacturing of Manganese oxide, Ferro Titanium, Low/Medium Carbon Ferro Manganese, Ferro Molybdenum, Ferro Vanadium etc. The project site is located at Plot No. B17/1 Butibori Industrial Area, District Nagpur, Maharashtra. The land earmarked for the proposed project is 0.1ha.

SITE SELECTION CRITERIA

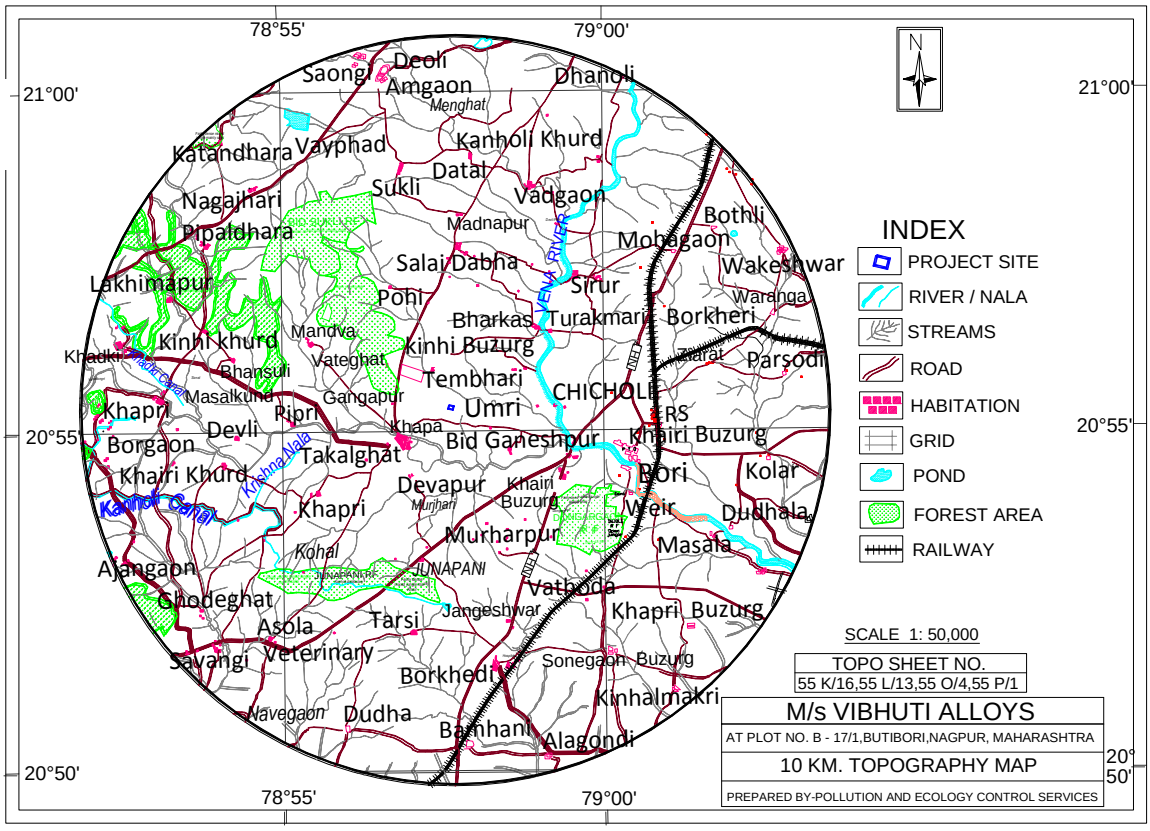
- ✓ The proposed project is in MIDC Butibori, which is Notified Industrial Area.
- ✓ No Rehabilitation/Resettlement issues.
- ✓ No nallah/water body, public roads, forests within the project site.
- ✓ Availability of Raw Material.
- ✓ Assured Water Supply from MIDC.
- ✓ Assured Power Supply.
- ✓ Market 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.

DETAILS OF THE PROJECT SITE

Sr. No.	Particulars	Details
1	Project Site	Plot No. B17/1, MIDC, ButiBori Industrial area, District Nagpur, Maharashtra (Notified Industrial Area)
2	Latitude	$20^0$55'33.12"N
3	Longitude	$78^0$57'27.84"E
4	Elevation above MSL	310.5
5	Toposheet	55K/16, 55 L/13, 55 O/4, 55 P/1
6	Present landuse	Industrial
7	Nearest National Highway/State Highway	NH – 7 : 4 Km
8	Nearest Airport/ Air Strip	Nagpur : 20 Kms
9	Nearest Village	Tembhari : 0.8Kms : (NE) Khapa : 1.4Kms : (SW)
10	Forest	Reserve forest : Bid Sukli R.F. – 2 Kms (W) Dongargaon R.F. - 4.5Kms (SE) Junapani R.F. – 7 Kms (S)
11	Ecologically Sensitive Zones like wild life sanctuaries, national parks and biospheres	Archaeological structures, Historical places, Sanctuaries and Biosphere are not present within 10 km
12	Water Bodies	Vena river – 3.5 kms : (E) Krishna nala – 4.5 kms : (SW) Kanholi Canal - 6.0 km : (SW) Vadgaon lake - 9.6 kms : (SE)



Location Map of the Proposed Project Site



Source: SOI Toposheet

Topographical Map (10 KM)

PURPOSE OF EIA

The proposed expansion activities attract the provisions of EIA Notification, 2006 and falling under Category A of Schedule, 3 (a) Metallurgical Industries (Ferrous and Non-ferrous). Thus, proposed expansion requires prior Environmental Clearance from MoEF&CC as per the procedure laid down in the Notification.

The proponent made online application on 29th March 2019 along with Form-1, copy of pre-feasibility report and other documents for proposing Terms of Reference (TORs) for undertaking detailed EIA study. The proposal was appraised in the EAC (Industry-1) meeting held during 29th-30th April 2019 and the committee recommended for prescribing ToRs for undertaking EIA study for proposed project. Accordingly, the Ministry prescribed ToRs vide letter IA-J-11011/168/2019-IA.II(I). **(Annexure-I)**

In order to assist the M/s. Vibhuti Alloys for getting the Environmental Clearance, M/s Pollution and Ecology Control Services (PECS) Nagpur is entrusted the task of undertaking (EIA) study and prepare Environmental Impact Assessment report and Environmental Management Plan. The revised EIA report was prepared using the baseline data generated undertaken by PECS during 1st March to 31st May 2019.

PRCOESS DETAILS

SIZE OR MAGNITUDE OF OPERATION

The production scenario of the existing and proposed plant is given in **following Table**

Production Scenario

	Sr. No.	Product	Production
Existing Products	1	Grinding of Manganese	30000 TPA
	2	Grinding of Silico Manganese	24000 TPA
	3	Grinding of Ferro Manganese	24000 TPA
	4	Grinding of Coal	2400 TPA

	Sr. No.	Product	Production
Proposed Products	1	Manganese Oxide	2400 TPA
	2.	Ferro Manganese M.C./L.C OR	80 TPA
	3.	Ferro Titanium OR	80 TPA
	4.	Ferro Vanadium OR	80 TPA
	5.	Ferro Molybdenum	2400 TPA

Raw Material

The raw material requirement for the proposed unit is given as follow

Raw Material Required For Ferro Alloys Production (By Thermite Process)

Product Name	Raw Material	Quantity required (TPA)	Source
Low / Med. Carbon Fe. Mn.	Manganese Ore	2280	From DP Rai Mines /Local Procurement/MOIL
	Aluminium Scrap	410	Local Procurement / Imported
	Lime Powder/ Flourspar	548	From Rajasthan / Katni / Wani/ Local Procurement
	Silico Manganese	1416	Local Procurement/Raipur

Product Name	Raw Material	Quantity required (TPA)	Source
Ferro Titanium	Ilmenite	104	Kerala/Imported
	Aluminium Powder	47	Local Procurement / Imported
	Lime Powder	1	From Rajasthan / Katni / Wani
	Iron Ore	16	Orissa

Product Name	Raw Material	Quantity required (TPA)	Source
Ferro Molybdenum.	Moybdenum Concentrate	81	Imported
	Aluminium Powder	9	Local Procurement / Imported
	Lime Powder	8	From Rajasthan / Katni / Wani
	Mill Scale	45	Local procurement from wire drawing units
	Ferro Silicon	30	Assam/Bhutan

Product Name	Raw Material	Quantity required (TPA)	Source
Ferro Vanadium	Vanadium Pentoxide (flakes)	77	Mexico/Imported
	Aluminium Shots	40	Local Procurement / Imported
	Flourspar	5	From Rajasthan / Katni / Wani
	Iron Scrap	41	Local Procurement

Raw Material Required For Manganese Oxide

Product Name	Raw Material	Quantity required (TPA)	Source
Manganese Oxide	Manganese Ore	3000	From DP Rai Mines / Local Procurement/MOIL
	Coal	272	Local Procurement/ E-auction

Water Requirement

Water requirement for the project will be about 5 KLD for the process and it will be provided by MIDC and from Tube Well.

Mainly the water shall be required for Zigging Process as well as for Pollution control device, drinking and Plantation.

The raw water requirement for the entire unit during operation phase is given in following Table

Water Requirements during Operation Phase (m^3/day)

Sr. No.	Unit	Total Water Requirement m3/day	Wastewater Generation m3/day	Mode of disposal of wastewater
1	Industrial (Zigging Process)	3	2.5	Recycle and reused in process.
2	Domestic Purpose	1	0.8	The sewage generated will be treated in Packaged Type STP and treated water reused for plantation purposes.
4	Plantation	1	-	-

Wastewater from zigging process and from Pollution control device will be collected in collection tank which is further recycled and the domestic wastewater is treated in Packaged Type STP. Hence, the zero-wastewater discharge is proposed for the said project.

Power Requirement

The power required will be supplied by State Electricity Board. The power requirement for the proposed project will be 47 kW.

Land Requirement

The land required for the proposed project is 1000 sq mt. (0.1 Ha).

Employment potential

The proposed project creates employment for about 22 people.

TECHNOLOGY AND PROCESS DESCRIPTION

MANUFACTURING PROCESS OF MANGAESE DIOXIDE

After receipt of material it is tested for its impurities. After getting full information's about its impurities following processes are followed to remove impurities and improve the purity of Manganese Ore.

- **Screening:** The material is screened so that uniform sizes are obtained for further process.
- **Zigging:** Water jigging is done to separate and wash impurities.
- **Magnetization:** Different sizes of MnO_2 ore are feed to magnet where unwanted impurities get removed.

MANUFACTURING PROCESS OF MANGANESE OXIDE

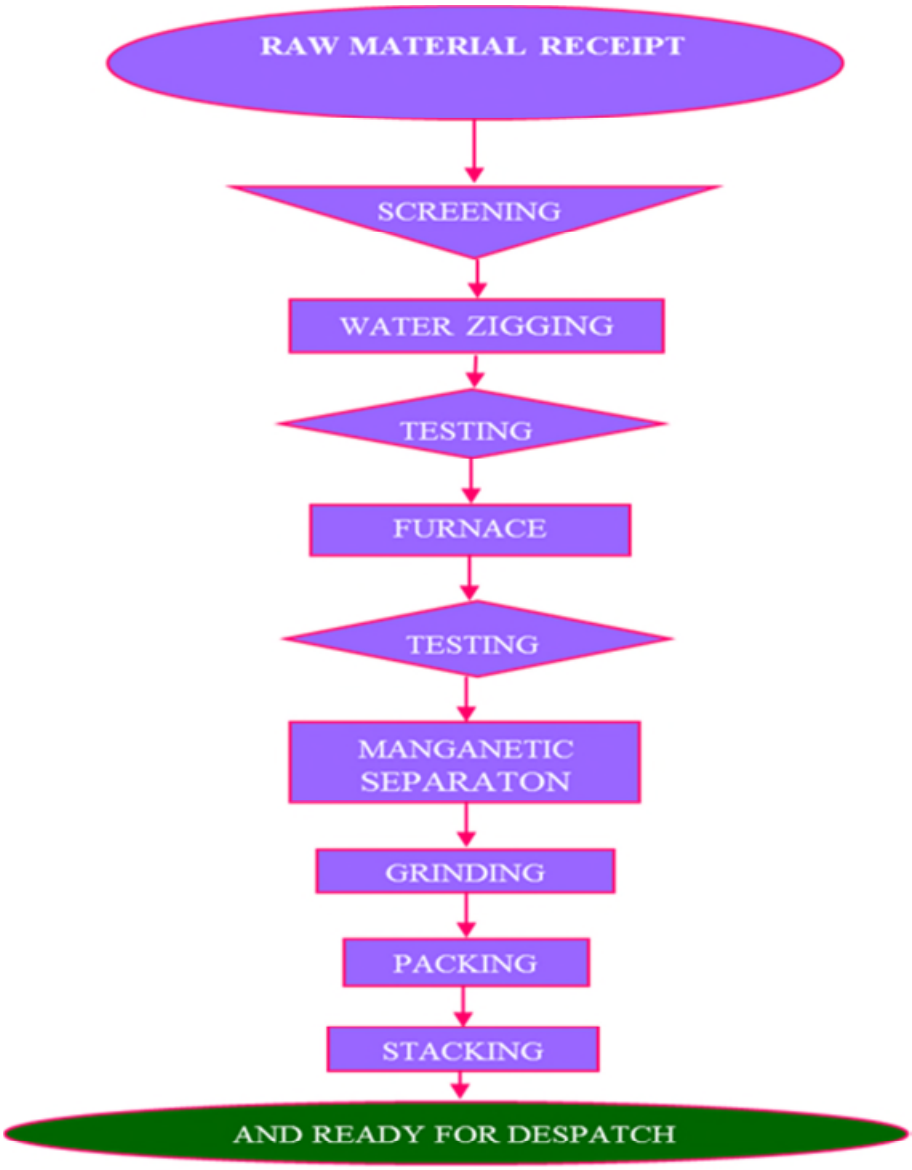
(A) After Raw Material receipt at the site it is tested for the contents of various elements and then the material is screened. After screening manual zigging is carried out.

(B) The material is then heated in coal fired furnace. From where it is transferred for drying and magnetic separation.

(C) Then the material is dried and after Magnetic Separation it is feed to grinding Machine, where it is powdered in the required mesh size.

(D) After grinding it is semi automatically packed in 25 kg/50 kg/ or 1000 kg HDPE Bags and kept ready for dispatch.

PROCESS FLOW CHART OF MNO PRODUCTION



Ferro Alloys / and Other Noble Ferro Alloys by Thermite Process

Manufacturing of Ferro Alloys through Thermite Process requires low capital investment & low operation cost in compare to Submerged Arc Furnace (SAF) Route.

Following activities are carried on:

(a) Powdering of different Alloys / Minerals.

(b) Mixing in blender in the required proposition

(c) Then a small fire is created (By aluminum powder) in the reaction vessel, where this blended material is added slowly. The powder starts melting inside the vessel and the Metallic contents are automatically separated which settles down and the sludge floats.

(d) Metal and Sludge are separated by manual processes.

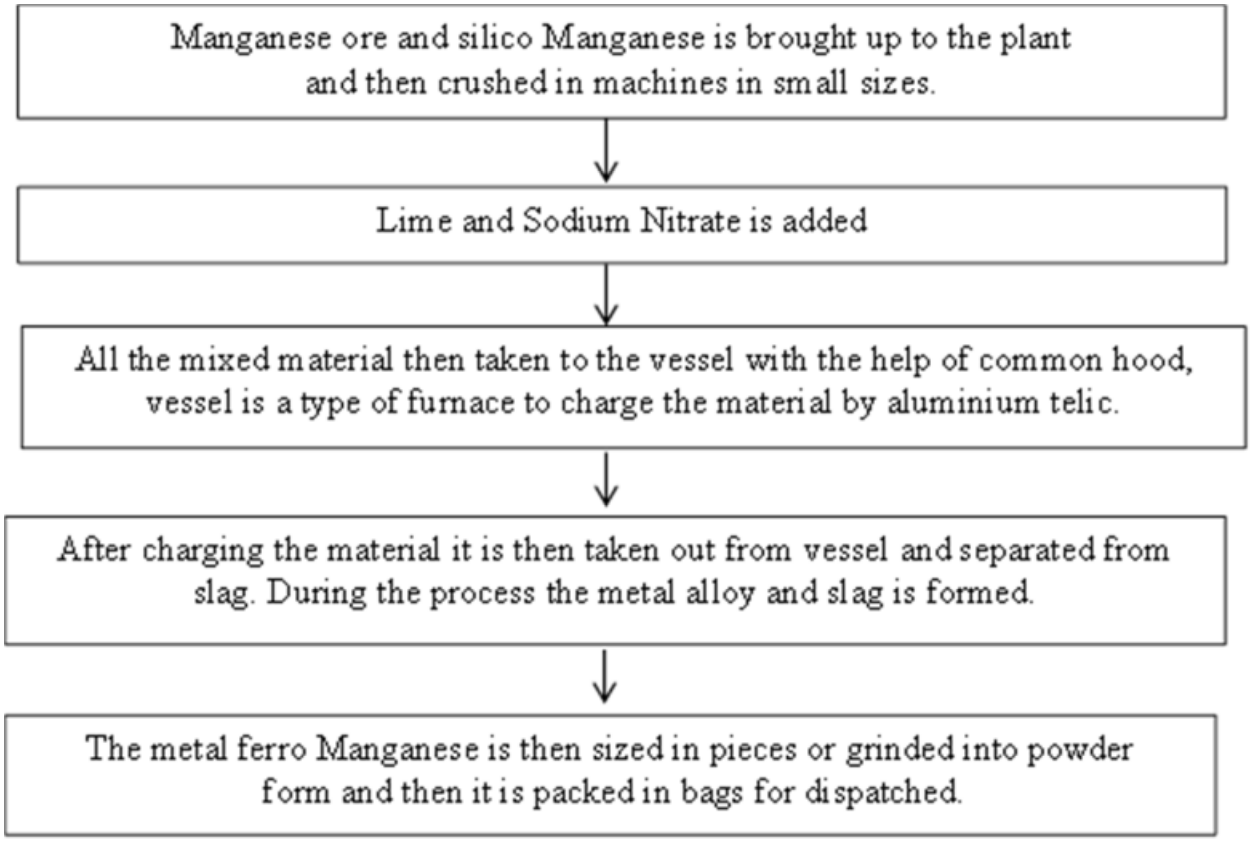
(e) Metal is crushed and for some customer it is powdered in Pulveriser.

(f) The Metal is crushed and packed in bags and kept ready for dispatches.

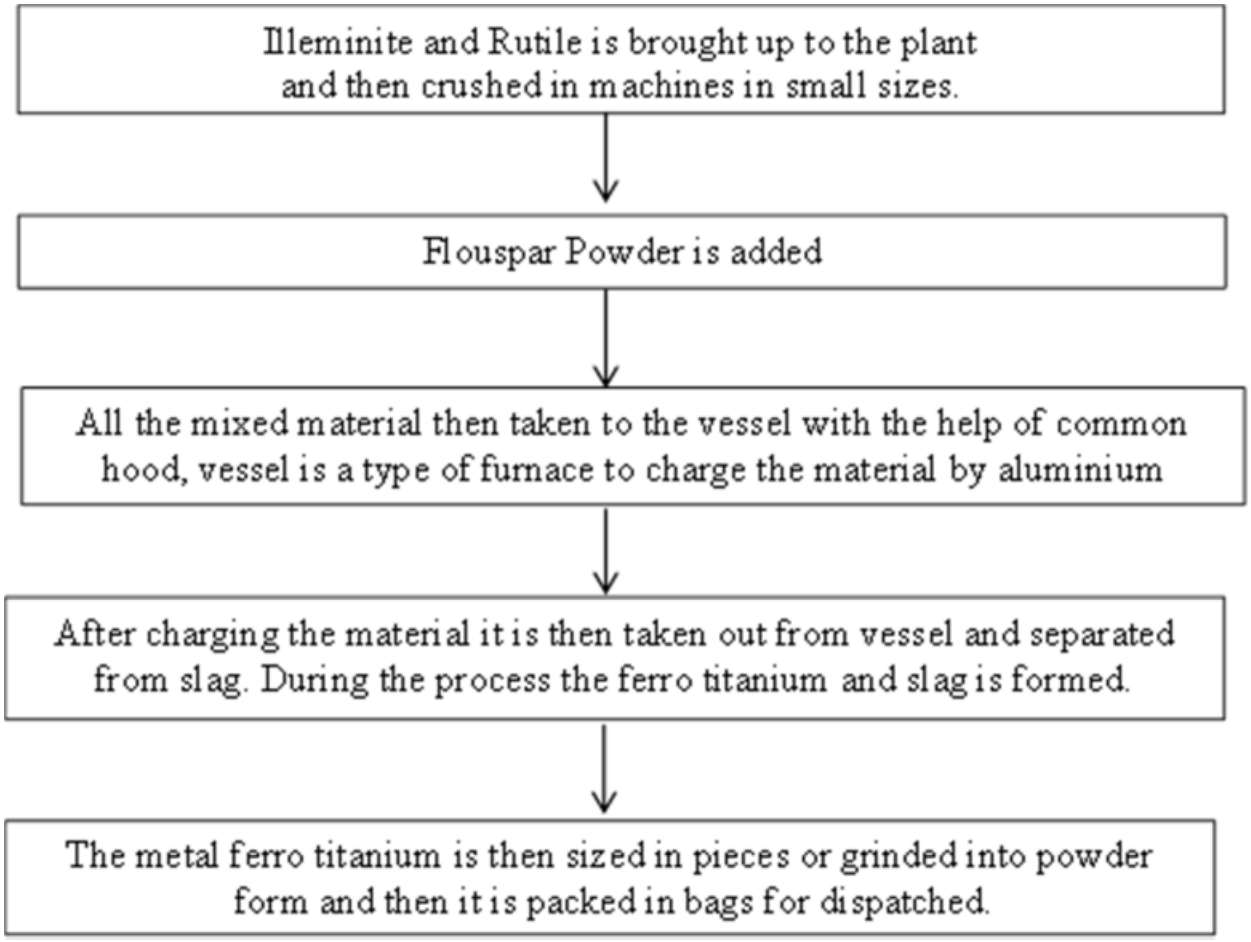
PROCESS FLOW CHART

Given below is the flow chart for the manufacturing of Ferro Alloys, such as Low, Medium Carbon Ferro Manganese, Ferro Titanium, Ferro Molybdenum and Ferro Vanadium.

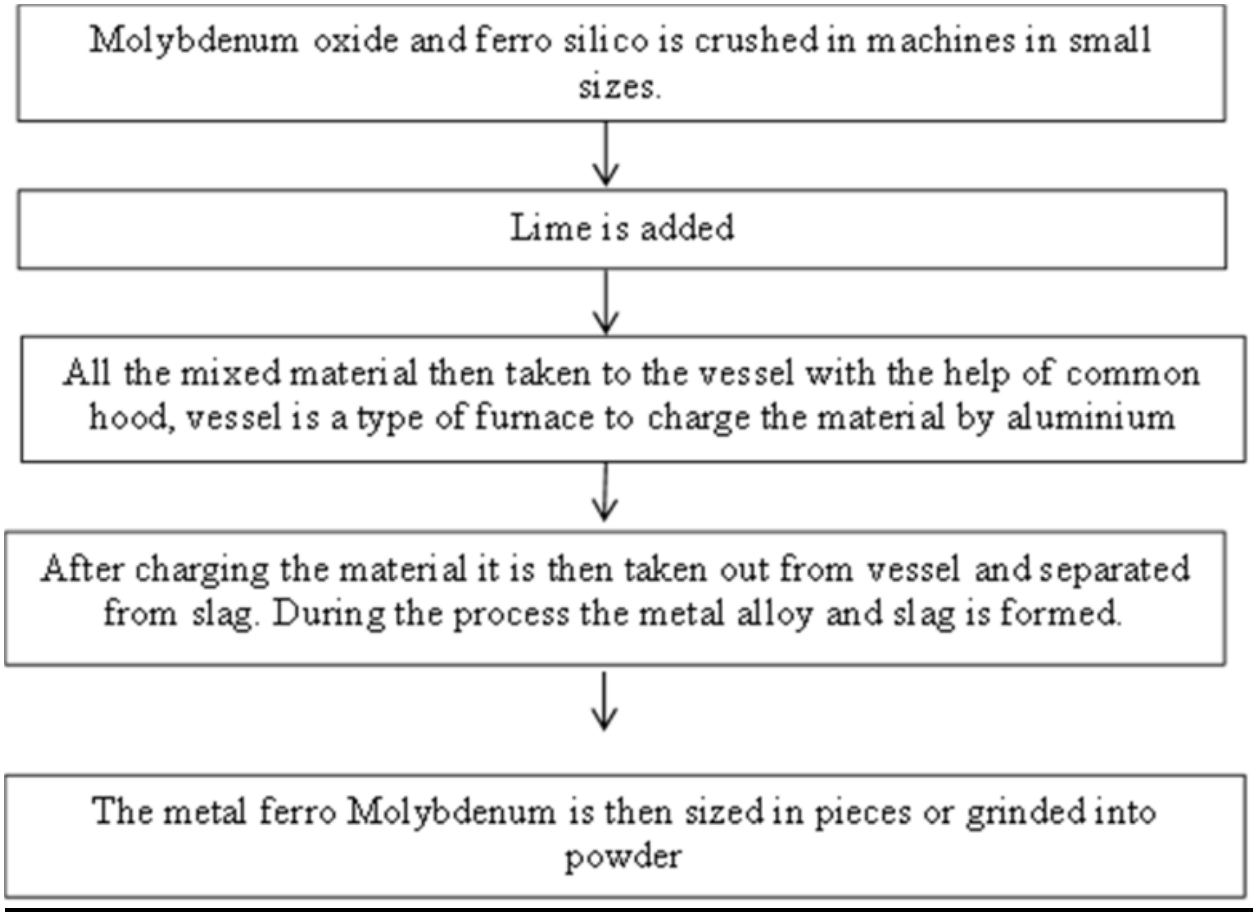
FLOW CHART FOR MEDIUM/LOW CARBON FERRO MANGANESE **FLOW CHART FOR MEDIUM/LOW CARBON FERRO MANGANESE**



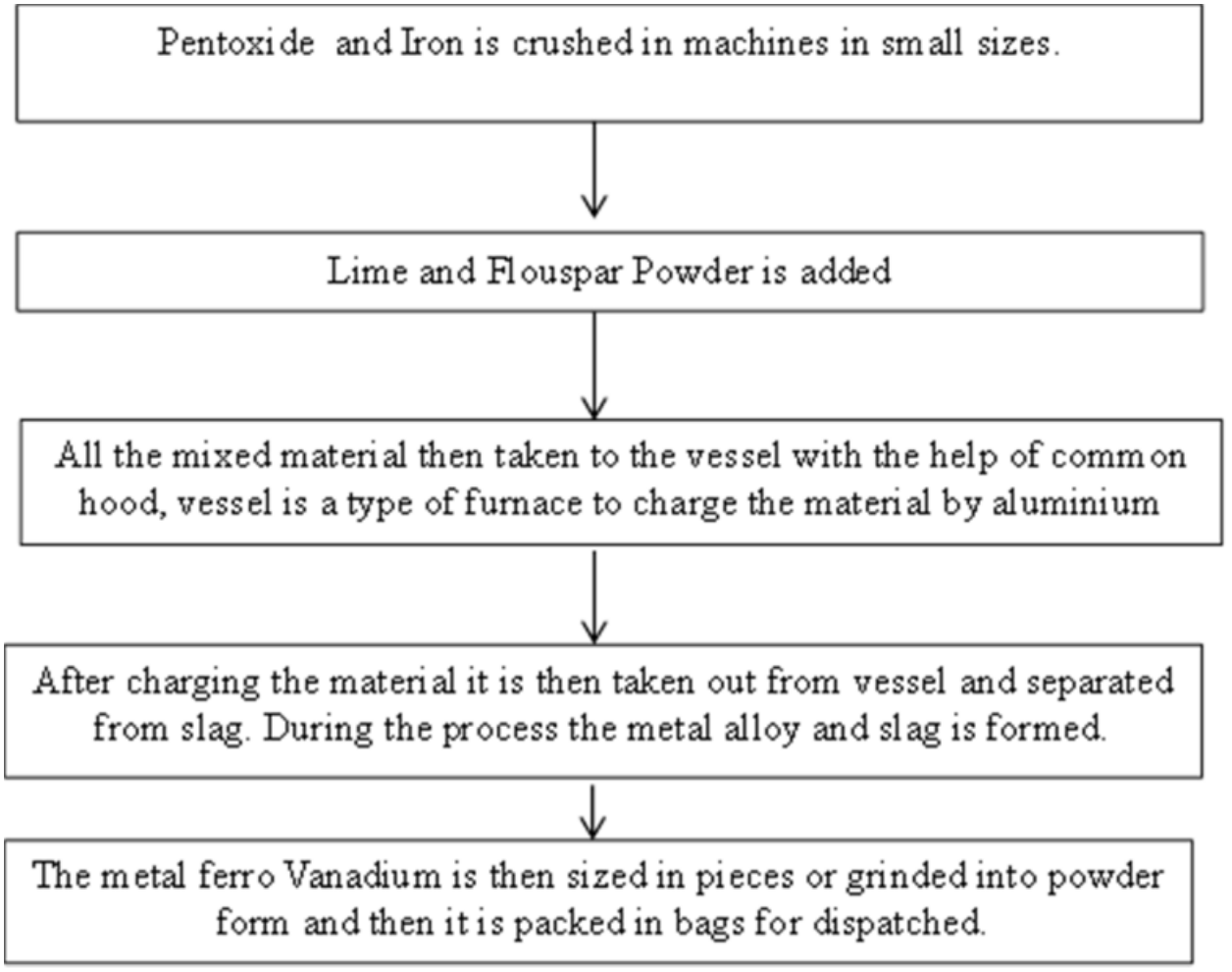
FLOW CHART FOR FERRO TITANIUM



FLOW CHART FOR FERRO MOLLYBDENUM



FLOW CHART FOR FERRO VANADIUM



MITIGATION MEASURES

Air Environment

In the proposed project the source emission is envisaged from furnace during roasting of manganese ore with coal and grinding of Manganese Ore and during thermite process in the reaction vessel.

- 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.
- Regular monitoring of air polluting concentrations, etc.

- A common Stack of 30 mt ht will be attached to both reaction vessel (Ferro Alloys) and furnace (MnO) with movable hood attached to cyclone separator and bag filters followed by stack to minimize the concentration of pollutants which is mainly PM_{10}, $PM_{2.5}$.

Noise Pollution & control measures

In plant, workers particularly working near higher noise sources, may be exposed to higher level upto 75 dB(A) for longer durations. However, provision of ear plugs or ear muffs shall be made for in-plant workers working at such locations in order to avoid exposure to high levels whenever they come near the high noise generating sources.
The employees shall be trained in the mitigation measures and personal protection measures to be taken to prevent noise related health impacts.

Impact on Water

The total water requirement for the proposed activities is 5 KLD. 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 process. The sewage will be treated in Packaged Type STP.

Solid Waste Generation

The solid waste generation in the proposed plant is given in table below

Table: Solid Waste Generation & Mitigation Measures

Waste	**Quantity**	**Mitigation Measures**
Slag (Cumulative)	1927 TPA	Slag will be reused for lining & earth preparation of reaction vessels & will be sold to silicone Manufactures
Ash	50 TPA	Will be sold to brick manufacturers

Description of the Environment (Baseline Data)

Air Environment

Baseline Environmental status in and around the proposed activities indicates the existing quality of Air, Noise, Water, Soil and Socio-economic environment. The baseline environmental quality for the study period of April, May and June 2019 was assessed within 10 km radial distance from the project site

The predominant wind directions were from E, ENE & ESE. Average wind speed was 10.8 km/hr during monitoring period .

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

PM_{10} - 31.2 to 56.5 µg/m^3.

$PM_{2.5}$ - 15.2 to 39.6 µg/m^3

SO_2 - 7.5 to 29.3 µg/m^3

NO_x - 9.8 to 30.0 µg/m^3

Industrial Area Residential, Rural Area (CPCB Norms)	100 µg/m^3	60 µg/m^3	80 µg/m^3	80 µg/m^3

The concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

The water quality data was generated for April-2019. The water quality monitoring stations were selected with a view to represent the surface and ground water sources in and around 10 kilometer radius of the study area of proposed Project site. Sampling stations for water samples were selected taking all water sources into account, as per MOEF norms. A total number of 14, including 6 surface water &8 ground water samples were collected and analyzed. These tables have desirable as well as permissible limits of Indian Standard for each parameter. It was observed that the characteristics of the surface

and ground water samples were found to be within the permissible limits of Indian Standards except the total coliforms in surface water samples which may be due to the human activities observed during sampling and requires disinfection before use for drinking purpose.

Noise Environment

Recorded Noise Levels in the core zone of proposed project site, are in the range of 35.5(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.

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.

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_X 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
- Installation of windscreens to break up the wind flow.
- Provision for masks when dust level exceeds, *etc*.

Installation of Bag Filters followed by Stack of 30 m height

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 2.5 KLD 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 waste water generated from the toilets and bathroom in the proposed plant will 0.8 KLD which will be treated in packed type STP and treated water will be use for plantation purpose

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

Solid Waste Generation & Mitigation Measures

Waste	Quantity (TPA	Mitigation Measures
Slag	1927	Slag will be reused for lining & earth preparation of reaction vessels & will be sold to silicone Manufactures
Ash	50	The ash generated will be sold to brick manufacturers
Used oil	-	Used spent oil will be sold to registered vendors only

- **Impact on Socio-Economic Environment**

The impacts of the proposed project, during its operation, on demography and socio-economic condition can be identified as follows.

- Negative impacts can be depletion of natural resources like water and land. The impact on the air quality will be marginal.
- Increase in employment opportunities and Reduction in migrants to outside for employment.
- During operation phase 22 technical and nontechnical people will be employed.
- Increase in consumer prices of indigenous produce and services, land prices, house rent rates and Labour prices.
- Improvement in socio-economic environment of the study area.
- Improvement in transport, communication, health and educational services.
- Increase in employment due to increased business, trade commerce and service sector.
- The overall impact on the socio economic environment will be beneficial.

  The management of M/s. Vibhuti Alloys has proposed to give preference to local people for recruitment in semi-skilled and semi-skilled category.

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. Vibhuti Alloys is proposed to manufacture Manganese Oxide and Medium Carbon Ferro-Manganese & Low Carbon Ferro-Manganese OR, Ferro Molybdenum OR, Ferro Vanadium OR, Ferro Titanium by Thermite Process at Plot No. B17/1 Butibori Industrial Area, District Nagpur, Maharashtra

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.

Environmental Budget

Total cost of the project will be Rs. 3.00 Crore. The budgetary provision for EMP will be as Rs 55 Lakhs.

ENVIRONMENTAL MANAGEMENT PLAN

- **OPERATION PHASE**

Air Environment

The sources of air pollution are raw material handling system, materials transportation, raw materials feeding to the operating equipments. The automatic process equipments will be employed for the raw material feeding system. Stacks of adequate height of 30 m is proposed for proper dispersion of flue gases from induction furnaces. The following Environmental Management Plan will be implemented to control air emissions from Induction Furnace.

Action Plan to Control of fumes

- Bag Filters/scrubber 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 (PM_{10} 100μg/m^3, $PM_{2.5}$ 60μg/m^3 SO_2 80μg/m^3, NO_x 80μg/m^3 and CO 04μg/m^3) 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 carried out in premises 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. About 2.5 KLD 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.
  - 0.8 KLD Domestic wastewater will be treated in Packaged Type STP and treated water reused for plantation purposes

- **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.

  - Rainwater harvesting is a mechanism involved in collecting, storing and putting rainwater to use when it is most needed. A rainwater harvesting system comprises of various stages of transporting rainwater through pipes or drains, filtration, and storage in tanks for reuse or recharge.

Rainfall Intensity for the region:

Average Rainfall per year is 1110 mm. No historical rainfall available at site.

Co-efficient and Factor Adopted:

Runoff Co-efficient

Surface Type	Run off Co efficient
Roof top area of building/sheds	0.85
Road and Paved area	0.5
Green belt area	0.2
Open land	0.2

(Source: Concepts & Practices for Rain Water Harvesting CPCB)

Retention Time in Recharge Well

(10 - 15) min per hour

Volume of Harvesting Pit

Q * Retention Time

Where,

Q = Catchment Area x Harvesting Factor x Rainfall intensity (mm/ hour)

The proposed design for the recharge pit is shown in below figure.

Rainwater harvesting Quantity

Rainwater Harvesting at Site

Description	Area	Rain fall in Meter	Run off Co efficient	Total in M3
Roof top area of building/sheds	485	1.11	0.85	457.59
Road and Paved area	100	1.11	0.5	55.55
Green belt area	330	1.11	0.2	73.26
Open land	85	1.11	0.2	18.87
Total	1000	-	-	605.22

The RWH have potential of water storage of capacity 605.22 m3 of water

Land Environment

Green belt

The plantation will helps to capture the fugitive emissions and attenuate the noise apart from improving the aesthetics quality of the region.

Adequate green belt will be provided all around the plant and inside the plant premises. Locally available types of trees which are resistant to pollutants are planted. M/s Vibhuti Alloys will be developed Green Belt over 330 Sq. m area

The plant species recommended for strengthening the existing plantation are presented in following **Table** However the selection of the species will be finalized in consultation with the local Forest Department.

The species identified will be planted using pitting technique. The pit size will be either 45 cm X 45 cm X 45 cm or 60 cm X 60 cm X 60 cm .Bigger pit size will be preferred. Soil used for filling the pit will be mixed well with decomposed farm yard manure or sewage sludge at the rate of 2.5 kg (on dry weight basis) and 3.6 kg (on dry weight basis) for 45 cm X 45 cm X 45 cm and 60 cm X 60 cm X 60 cm pit respectively. The filling of soil will be completed at least 5-10 days before actual plantation.

PLANT SPECIES SUGGESTED FOR GREEN BELT DEVELOPMENT

Sr. No	Botanical name of the plant	Size of the grown up tree	Type and suitable site, where the plants are to be plotted
1	Acacia auriculaeformis	Medium	Semi-evergreen fragrant white flowers suitable in green belts and on road sides
2	Adina corodifolia	Large	Deciduous, a light demander, suitable on open areas and near flares
3	Aegle marmelos	Medium	Deciduous, good for green belts.
4	Anogeissus latifolia	Medium	Deciduous, Suitable for green belts
5	Artabotrys hexapetaius	Small	Evergreen shrub with fragrant flowers good for gardens and inside boundary wall and long canals
7	Azadirachta indica	Large	Evergreen, suitable in green belts along the boundary and outside office & sensitive buildings like hospitals.
8	Bauhinia variegate	Medium	Deciduous, good in green belts in garden and as a second row avenue tree
9	Borassus flabellifer	Large	A tall deciduous palm can be used as wind break when of different age.
10	Boswellia serrata	Medium	Deciduous suitable on green belt on willow soils
11	Caesalpinia pulcherrima	Small	A large shrub, suitable for gardens outside offices and along channels
12	Callistemon lanceolatus	Medium	Deciduous for some time, ornamental plant in garden
13	Careva aroborea	Large	Deciduous, good in green belts
14	Cassia fistula	Medium	Deciduous, good ornamental tree in green belts.
15	Cassia siamea	Large	Evergreen, good as an avenue tree.
16	Ficus religiosa	Large	Deciduous, widely spaced avenue tree also as a single tree in isolated sites.
17	Maduca indica	Medium	Deciduous, good in green belts.

Sr. No	Botanical name of the plant	Size of the grown up tree	Type and suitable site, where the plants are to be plotted
18	Peltophorum inerme	Medium	Semi evergreen, suitable on road sides, in gardens and outside office buildings.
19	Saraca indica	Medium	Evergreen tree good on road sides within campus
20	Tamarindus indica	Large	Evergreen tree good along boundary and road sides.
21	Terminalia catappa	Large	Deciduous tree
22	Terminalia arjuna	Large	Evergreen tree for road sides and in green belts
23	Zanthoxyium	Medium	Deciduous in green belts

Management Plan of Solid waste

- Process needs refractory lining and is being changed every month.
- Solid waste of slag generation will be about 1927 TPA. The Fly ash generated will be 50 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 22 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.

- **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.