

Executive Summary

SURYA ALLOY INDUSTRIES LIMITED

EXPANSION PROJECT

Installation of 1 x 8 Tonnes Induction Furnace

**WBIDC PLASTO STEEL PARK, VILL- KADASOLE,
P.O.- GHUTGORIA, P.S.- BARJORA, BANKURA-722202,
WEST BENGAL**

2020

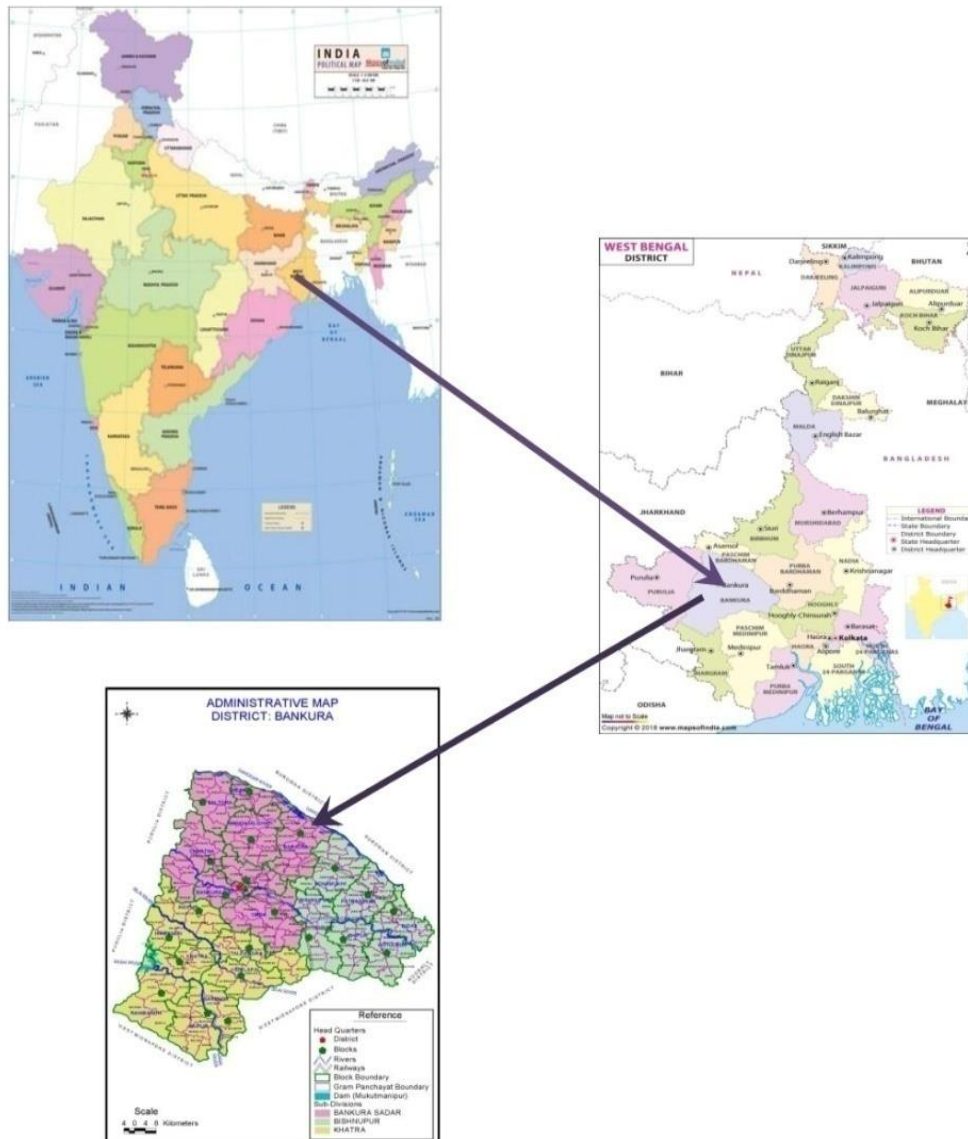
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1 Project Name and Location

M/s. **Surya Alloy industries Limited** is going to install 1x8 MT Induction Furnace at Plot No.1459, 1460, 1461, 1467, 1466, 1462, 2686, 2843, 2827, JL No.22, WBIDC Plasto Steel Park, Vill- Kadasole, P.O.- Ghutgoria, P.S.- Barjora, Bankura-722202, West Bengal. The latitude and longitude of the project site is 22°26'06"N and 87°15'38"E respectively.

Location of Project Site



Location of Project Site on Google Map



2 Products and capacities

Particulars	Existing	Subsequent Modification/Addition
Induction Furnace	1 no. 7 MT	1 no 8 MT
M.S. Ingot	18,000 Tonnes/ Annum	24,960 Tonnes/ Annum
Rolling mill	41,000 Tonnes/ Annum	-
Ladle Refining Furnace (LRF)	1x20 MT	-
Electric Arc Furnace	1 X 20 / 25 MT	-

Particulars	Existing	Subsequent Modification/Addition
Vacuum Degassing Unit (VD/VOD Plant)	1X20 MT	-
Continuous Caster	1 Nos. 2 strand	-
Submerged Arc Furnace	2 X 9 MVA	-
Railway Track Material	1500 Tonne/ Month	-

3 Requirement of land, raw material, water, power, fuel, with source of supply

- **Land:** The existing manufacturing unit is located at Plot No.1459, 1460, 1461, 1467, 1466, 1462, 2686, 2843, 2827, JL No.22, WBIDC Plasto Steel Park, Vill- Kadasole, P.O.- Ghutgoria, P.S.- Barjora, Bankura-722202, West Bengal on a land of 4.07 Acre (16470.71 sqm). Expansion will be on the said land.
- **Raw material:**

Induction (per MT of liquid metal)		
Sponge Iron	MT	} 0.8
Pig Iron	MT	
Scrap	MT	
Ferro Silicon	MT	} 0.015
Silicon Manganese	MT	

- **Water:** Water requirement in the plant is for cooling (make-up) and domestic & other purposes. The water is sourced from Barjora Panchayat Samiti, rain water harvesting and DVC. Unit wise water requirement is given below:

Particulars	Requirement for Existing Plant (KLD)	Requirement for Proposed Plant (KLD)
Water for cooling (Make up)	85	30
Domestic purposes & other uses	20	4
Total	105	34

1.6 KLD water will be available from Rain Water Harvesting (RWH) system.

- **Power:** Based on annual installed capacity of the plant; the estimated power requirement for smooth operation of the unit will be around 3 MVA electrical power. The company will drawn power from Damodar Valley Corporation (DVC).

Power	Existing	Additional
Power From DVC	21 MVA	3 MVA
D.G.Set	1X500 KVA, 2X250 KVA	NIL

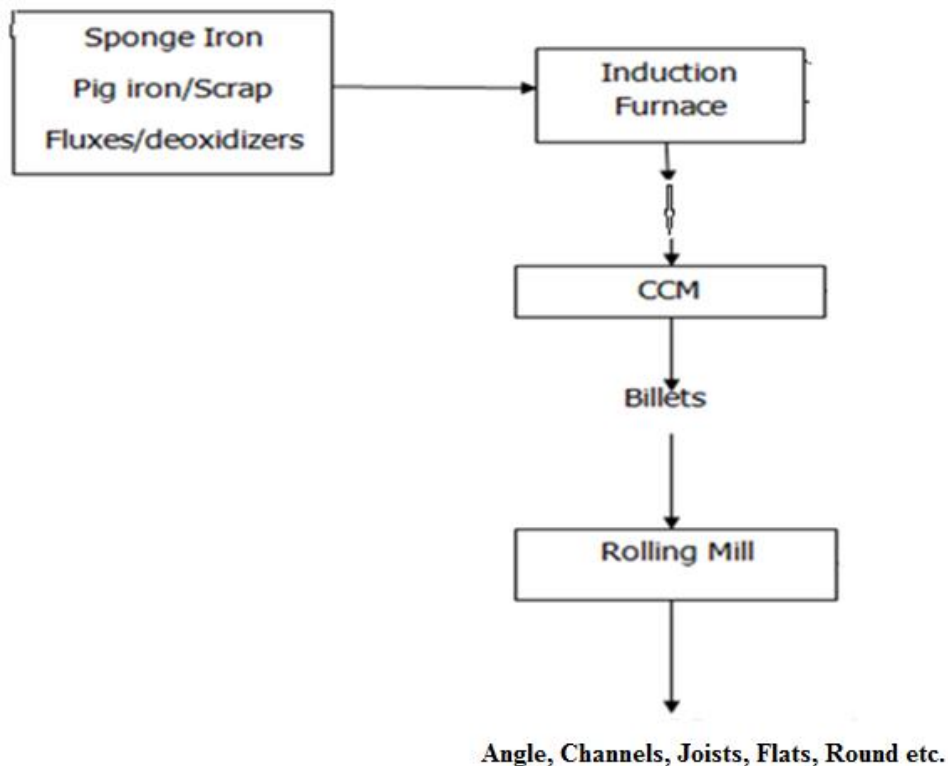
- **Fuel:** The only fuel required is Diesel. It will be used for D.G. sets @ 50L/hr.
- **Manpower:** About 100 people on daily wages basis will get employment during the construction stage. The total manpower required during operational phase for the proposed project is estimated at 84 numbers. The required manpower will be available locally. The implementation of industrial laws and regulations and locational factors of labour employment will also have to be considered.

Manpower	For Existing Project	For Proposed Project
Permanent	38	44
Contract	42	40
Total	Approx. 800 (80 for Induction Furnace)	84

4 **Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.**

The proposed project includes installation of 1 x 8 Tonnes Induction furnaces for production of 24,960 Tonnes/ Annum M.S. Ingot.

FLOW SHEET OF MANUFACTURING PROCESS AS A WHOLE



Gaseous emission: Air in and over the plant area and beyond its boundaries gets polluted with gases, fumes and dust particles emanating from the processes, chimneys, transfer points of conveying and handling equipment. The air pollutions in the steel plant are mainly dust & gases like sulfur dioxide, carbon monoxide, nitrogen oxide, etc.

Liquid effluent: There will not be any process waste water (or) cooling water blow down from the SMS as closed circuit cooling system will be adopted. Closed circuit cooling system will be adopted in cooling of Rounds/Angle/Channels/Flats/ Joists. Therefore there will not be any waste water generation from process and cooling in the steel plant. Only domestic wastewater will be generated. Sanitary waste water (approx. 5.5 KLD) will be treated in septic tank followed by soak pit.

Solid and hazardous waste: Solid waste will be generated from the following area.

Type of Solid Waste	Estimated Generation (Tonnes/month)	Process of Disposal
Slag from Induction Furnace (new project)	200	Slag will be crushed and after recovery of iron by magnetic separator, the inert material will be used in road construction and remaining amount is planned to be dumped in an environmental friendly manner in a separate area or used for road construction.
Dust from Air pollution control system	10	Land Filling, making of fly ash, bricks.
Scrap	5	Re-melted in the process.

5 Measures for mitigating the impact on the environment and mode of discharge or disposal

Air Pollution:

The sources of air pollution from the plant activities are as follows:

- a) The emission from Induction furnace during transfer of raw materials
- b) Fumes from the Induction furnace
- c) Fugitive emission during breaking of ferro-alloys and packing

Air in and over the plant area and beyond its boundaries gets polluted with gases, fumes and dust particles emanating from the processes, chimneys, transfer points of conveying and handling equipment. The air pollutions in the steel plant are mainly dust & gases like sulfur dioxide, carbon monoxide, nitrogen oxide, etc.

Existing and Proposed Air Pollution control devices: The performance of the existing APC has been discussed below.

Existing Stack No.	Stack Attached to	Stack height (m)	Dia of Stack (m)	Temp. (°C)	Velocity (m/s)	PM (mg/Nm ³)	APC System & Air Volume As given in Test Report
1.	1 Nos. 7 MT Induction Furnace	18.0	0.8	64	6.89	32.94	Spark Arrestor & Bag Filter Volume-11184.46 Nm ³ /hr
2.	1 X 20 / 25 MT Electric Arc Furnace	30.0	0.88	71	7.12	36.82	F. D. Cooler & Bag Filter Volume-13700.39 Nm ³ /hr
3.	Re-Heating Furnace	42	1.0	194	7.74	46.25	Nil

Existing Stack No.	Stack Attached to	Stack height (m)	Dia of Stack (m)	Temp. (°C)	Velocity (m/s)	PM (mg/Nm ³)	APC System & Air Volume As given in Test Report
4.	2x9 MVA Submerged Arc Furnace	30.0	2.4	50	8.46	3.55	F. D. Cooler & Bag Filter Volume-116328.01 Nm ³ /hr
5.	1X500 KVA DG	3.0	0.1	162	13.84	<75	Nil
6.	2X250 KVA DG	3.0	0.1	162	13.84	<75	Nil

For proposed Induction furnace (1x8T), there will be installation of one No. of APC system comprises of Bag filter, spark arrestor, ID Fan along with 30m high chimney for disposal of clean gas.

Proposed Stack No.	Stack Attached to	Stack height (m)	Dia of Stack(m)	Temp. (°C)	Velocity (m/s)	PM (mg/Nm ³)	APC System & Air Volume As given in Test Report
1	1 No. 8 MT Induction Furnace	30	0.8	50	15	<50	One Bag Filter Volume-25000 m ³ /hr

Technical Details of Proposed APC:

I.D. Fan Unit		1x8 Ton Induction Furnace
Gas volume	:	25000 m ³ /hr.
Temperature	:	60 – 70 °C
Static pressure at operating temp.	:	250 mm of wc
Speed	:	1500 rpm
Power consumption at operating temp.	:	22 kw
Power consumption at 20 ⁰ C	:	25.0 kw
Recommended motor rating	:	30 kw, 4 pole
Mode of construction	:	Casting – 5 mm thk MS Steel Shaft – EN – 8 Impellers – 8 mm trnk. MS Steel

Bag Filter for Induction furnace	1x8Ton
Gas volume	25000 m ³ /hr.
Air to Cloth ratio	80.51 m ³ /hr/m ²
Total filtering area	312.50 m ²
No. of Filter Bag	180
No. of Module	1
No. of Filter Bag in each module	180
Bag size (dia x long)	150mm x 3660mm
Compressed air quantity	59 m ³ /hr at 6 – 8 kg/cm ² FAD
Pressure drop across the bag filter	125 -150 mm of wc
Size and qty. of solenoid valve	40 NB/ 15 nos.

Size of Rotary Air lock	250 x 250 mm (1 number)
Geared motor	0.37 KW, 31 rpm
Pulse duration	30 – 50 mili second
Pulse Interval	10 – 300 sec.
Inlet Particulate Matter	5 – 8 gm/m ³
Expected outlet Particulate Matter	<150 mg/m ³
Stack diameter (m)	0.8
Flue gas velocity (m/sec)	15.0

The dust concentration level in the chimney will be periodically monitored. Corrective steps will be taken, if the concentration is not as per the acceptable limits. The particulate concentration from the bag filters will remain within 50 mg/Nm³.

Raw material handling can cause dust generation at the point of storage and transportation. The fugitive dust can have adverse impact on air quality inside the plant and its immediate surroundings. This would be prevented by spraying water at storage yard area.

Ambient air quality monitoring stations in and around the premises will be done as per direction by West Bengal Pollution Control Board (WBPCB).

Water Pollution:

There will not be any process waste water (or) cooling water blow down from the SMS as closed circuit cooling system will be adopted. Closed circuit cooling system will be adopted in cooling of Billets and TMT Bars/ Rounds/Angle/Channels/Flats/ Joists. Therefore there will not be any waste water generation from process and cooling in the steel plant. Only domestic wastewater will be generated. Sanitary waste water (approx. 5.5 KLD) will be treated in septic tank followed by soak pit.

Solid waste:

The solid waste generated is in the form of slag. Slag is collected from the point of arising. Proper slag handling and disposal system is maintained.

Type of Solid Waste	Estimated Generation (Tonnes/month)	Process of Disposal
Slag from Induction Furnace (new project)	200	Slag will be crushed and after recovery of iron by magnetic separator, the inert material will be used in road construction and remaining amount is planned to be dumped in an environmental friendly manner in a separate area or used for road construction.
Dust from Air pollution control system	10	Land Filling, making of fly ash, bricks.
Scrap	5	Re-melted in the process.

Noise Pollution:

Many operations in the steel plant will produce objectionable level of noise which may not be practicable to eliminate entirely, by in most areas it can be brought down to the acceptable level. The major noise generating areas are power and blowing station, compressed air station, induction furnace plant, steel melting shop, etc. various measures proposed to reduce the noise pollution includes reduction of noise at source, provision of acoustic lagging for the equipment and suction side silencers, selection for low noise equipment, isolation of noisy equipment from working personnel, etc.

Monitoring of Noise will be carried out near the high noise generating areas inside the units. Beside this necessary precaution will be taken to minimize the noise generation.

Noise may be sourced from the following areas:

- Raw Material Handling Sections

- Charging operation, Product handling, Slag crushing
- Generator Area
- Compressor, Pumps, Fans
- Traffic Movement

Following mitigative measures will be taken to minimize the noise.

- ✓ Appropriate specifications of Equipment / Machinery.
- ✓ Proper and timely oiling, lubrication and preventive maintenance is carried out for the machineries and equipments.
- ✓ Well lubrication of the rotating equipments.
- ✓ Provision of enclosures to reduce noise transmission.
- ✓ Provision of vibration Isolators to reduce vibration.
- ✓ To minimize the adverse effect on the health, ear muffs/ earplugs are provided to the workers working under high noise area.
- ✓ Provide acoustic enclosure for rotating equipment, silencer for DG set.
- ✓ Proper maintenance – reduction of noise at source.
- ✓ Vehicle will be periodically serviced and maintained
- ✓ Housing of Blowers / Compressors in sound proof buildings
- ✓ Green belt area will be developed to prevent the noise pollution outside the factory premises.

6 Capital cost of the project, estimated time of completion

The expected cost of the proposed project will be **600 Lakhs**. The cost of the project and means of finance is proposed to be as follows:

Fund Allocation for the proposed project

Item	Cost (Rs Lacs)
Land & Site Development	0.00
Shed & Building	50.00
Plant & Machinery	350.00
Other Fixed Assets	100.00
Cost of Fixed Assets	500.00
Prel. & Pre operative exp	20.00
Provision for Contingencies	30.00
Capital Cost	550.00
Margin Money for W/Capital	50.00
Project Cost	600.00

- Time of completion:

Activity	Commencement	Completion
Land acquisition and development	Acquired and developed land	
Civil works, Buildings, Foundation of Machineries	April 2020	August 2020
Structural fabrication and erection of technological structures	July 2020	October 2020
Placement of Orders of Plant and Machinery	September 2020	December 2020
Erection of Equipments	November 2020	February 2021
Trial Run and Commissioning	March 2021	April 2021
Commercial Operation Date	May 2021	

7 Site selected for the project

01.	The proposed project site is located as Latitude of 22°26'06"N and a Longitude of 87°15'38"E. The 10 km radius of the proposed site is bounded by Latitude 23°20'43" to 23°31'32" North and Longitude 87°09'46' to 87°21'31" East.
02.	Proposed project is at a distance of 2.5 Km from SH-9. Proposed project is located at a distance of 11.2 Km (Approx.) from NH-2.
03.	WBIDC Plasto Steel Park, Vill- Kadasole, P.O.- Ghutgoria, P.S.- Barjora, Bankura-722202, West Bengal
04.	Total area 4.07 Acre (16470.71 sqm) of land. The total project will be done within this acquired area.
05.	The nearest town Barjora is located at about 2.5 km distance from the Project site. Bankura, the District Head Quarter is located at around 34.0 km distance from the project site and Kolkata is located at 150 km (Approx.) distance from the proposed site.
06.	The nearest Railway Station is Durgapur Railway Station, which is located about 8.7 km distance from the project site.
07.	The above site is well connected with the National Highway NH 2 .
08.	Protected forest area is around 1.0 Kms from the project Site; No Reserve forest is involved in the project site.
09.	Damodar river is 5.0 Km (Approx.) from the proposed site.

Within 10 km other industries:

FACTORY NAME	PRODUCTION
DIMENSION STEEL & ALLOYS PVT. LTD	SILICO MANGANESE
B.D G. METAL & POWER LTD.	SILICO MANGANESE, TMT
EMBEE FERRO ALLOYS PVT. LTD.	SILICO MANGANESE
MB ISPAT CORPORATION LTD.	SPONGE IRON
SHREE AMBEY ISPAT PVT. LTD.	SILICO MANGANESE
SHIRSTI ISPAT & ALLOYS LTD.	TMT
ARJUN DAS & SONS PVT. LTD.	INGOT
SONIC THERMAL PVT. LTD.	SILICO MANGANESE
H.P. ISPAT PVT. LTD.	TMT, INGOT
STEELEX ELECTROCAST PVT. LTD.	MS BILLET

8 Baseline environmental data

The study area comprises an area of about 10 km around the proposed project site at Plot No.1459, 1460, 1461, 1467, 1466, 1462, 2686, 2843, 2827, JL No.22, WBIDC Plasto Steel Park, Vill- Kadasole, P.O.- Ghutgoria, P.S.- Barjora, Bankura-722202, West Bengal. Geographical position is 22°26'06"N latitude and longitude 87°15'38"E in the District of Bankura, West Bengal. The 10 km radius of the proposed site is bounded by the geographical grids of approx. Latitude 23°20'43" to 23°31'32" North and Longitude 87°09'46' to 87°21'31" East.

Map of Project Site



Climate

The climate of the district is of tropical dry subhumid. The mean daily minimum temperature ranges from 12°C (in winter) to the maximum of 46°C (in summer). March to May is dry summer intervened by tropical cyclonic storms. June to September is wet summer while October is autumn. Winter season starts from about the middle of November and continues till the end of February. The total average rainfall is 1,400 millimetres. From the beginning of March to early June, when the monsoon sets in, hot westerly winds prevail. The westerly winds die down around sunset and allow cool winds to blow from the south. Nor'westers are frequent during this period and help to mitigate the excessive heat.

On-site meteorological study was done for three month i.e., October, 2019 to January, 2020.

Weather summary during study period

1	Predominant Wind direction	:	FROM NORTH EAST
2	Average Wind Speed	:	0.92 m/s
3	Minimum Temperature	:	8.0°C
4	Maximum Temperature	:	35.0°C
5	Mean Temperature	:	20.42°C
6	Minimum Humidity	:	20
7	Maximum Humidity	:	100
8	Mean Humidity	:	57.27
9	Total Rainfall	:	432.5 mm

Land use

The proposed project area and about 10 Kilometer radius of the project site encompassing a total area of 31600.52 ha comes in the vicinity of village Barjora, Dist: Bankura of West Bengal. The longitude and latitude of the project area are 87°15'38"E and 22°26'06"N respectively.

Land Use Details

Categories of Landuse units	Area in sq km	Area in hectare	% Area
Agriculture land	165.09	16508.71	52.24
Brickklin	0.12	12.35	0.04
Bridge	0.10	9.98	0.03
Canal	0.73	73.47	0.23
Habitation with Vegetation	49.50	4950.19	15.66
Industrial area	6.89	688.79	2.18
Open/ Vacant land	5.22	521.83	1.65

Categories of Landuse units	Area in sq km	Area in hectare	% Area
Plantation	1.93	193.45	0.61
Protected Forest	46.98	4697.62	14.87
River	10.51	1051.39	3.33
Sand/ Char	12.76	1276.37	4.04
Stony waste	4.17	417.01	1.32
Terrestrial vegetation	0.25	25.32	0.08
Waterbody	11.74	1174.03	3.72
Total (Area)	316.01	31600.52	100.00

Ambient Air Quality

The ambient air quality data for that season, as obtained from all the ambient air quality stations have been furnished in Annexure 4 of EIA report. The summarized result is given in table below.

In the project site it is seen that average value of PM10 and PM2.5 is 86.17 and 52.35 $\mu\text{g}/\text{m}^3$ respectively. The maximum value of PM10 and PM2.5 in the project site has been found to be 96.20 and 56.80 $\mu\text{g}/\text{m}^3$ respectively.

Ambient Air Quality

Stations		PM10 ($\mu\text{g}/\text{m}^3$)	PM2.5 ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)
Project Site	Mean	86.17	52.35	7.73	24.90

It is observed that the concentration of SO₂ and NO_x at the different monitoring stations are below permissible limit i.e. 80 $\mu\text{g}/\text{m}^3$ as per MoEF, Part II, Sec.3, 2009.

Concentration of CO at the different monitoring stations is also below permissible limit i.e. 2 mg/m^3 as per MoEF, Part II, Sec.3, 2009.

From the above observation it can be said that PM10 and PM2.5 value for all monitoring stations are below permissible limit of MoEF, Part II, Sec. 3, 2009.

Ground water Quality

- GW1 : Tubewell water near Project site, Kadasole
- GW2: Tubewell water at Dejuri village
- GW3: Tubewell water near Saharjora
- GW4: Tubewell water near Borjora Bus stand
- GW5 : Tubewell water at Pratappur
- GW6: Tubewell water near Maliara village
- GW7: Tubewell water at Dethol
- GW8: Tube well water at Gangadharpur

Ground Water sampling Locations are:

Ground water quality for chemical parameters of eight locations around the proposed factory site has been measured as per APHA (23rd Edition), 2017. Ground water analysis report is given in Annexure 4.1.

Surface water Quality

Surface Water sampling Locations are:

- SW1: Damodar river (Methyali)
- SW2: Damodar river (Pratappur)
- SW3: Outlet from Damodar river (Tarasingha village)
- SW4: Pond near Kadasol
- SW5: Pond at Bara Pukuria
- SW6: Pond at Saharjora
- SW7: Reservoir at Dethol
- SW8: Pond at Sarali

Sampling and analysis of eight numbers of surface water samples was done to assess the surface water quality for this study. The method for sampling & analysis was followed as per APHA (23rd Edition), 2017. The results are furnished in Annexure 4.2.

Noise Level Survey

Noise levels were measured in different category of area surrounding the proposed project site. Some sensitive areas were also covered to assess the existing noise level in day & night. The noise report prepared by Envirocheck laboratory is depicted at Annexure 4.3 of EIA.

Outside Ambient noise level during day time is expected to be within 55 dBA and during night time to be 45 dBA (EPA (GSR 1063(E), 1989). The noise results show that due to traffic and other noise sources, it cannot be maintained at a number of places.

Soil Quality

In order to assess the quality of soil in the study area, three numbers of soil samples were collected during the field survey. The results of soil analysis are presented in Annexure 4.4 of EIA.

The soil in the proposed project site is mainly grayish loamy sand and Sandy Loam. Soil for agricultural land is fertile and suitable for crop production.

Ecology study (Flora and Fauna)

a) Flora

The most common natural tree species found within the study area are Sal (*Shorea robusta*), Radhachura (*Peltophorum pterocarpum*), Eucalyptus (*Eucalyptus globules*), Mahua (*Madhuca indica*), Devdaru (*Polyalthia longifolia*), Segun (*Tectona grandis*), Arjun (*Terminalia arjuna*), Guava/Peara (*Psidium guajava*), Date palm/Khejur (*Phoenix sylvestris*), Babool (*Acacia arabica*), Palm Tree/Taal (*Borassus flabellifer*) etc.

There are also several natural species of shrubs, herbs and climbers observed within the study area.

The list of plant is given in Annexure –5.0 & 5.1.

A full checklist of vascular plant species as recorded during the field survey has been made. The growth form of the plant species as categorized are big trees, medium trees, small trees, thorny trees, tall palm, herbs, small herbs, aquatic herbs, shrubs, small shrubs, under shrubs, climbing shrubs, lianas and climbers.

b) Rare and Endangered Plant Species

The International Union for Conservation of Nature and Natural Resources (IUCN) designated the term "rare" and 'endangered' plant species in the "Red Data Book". As per IUCN's "Red Data Book", none of the taxa are found in this region could be marked as rare or endangered plant species.

c) Medicinal Plant Species

It was observed during the field survey of the study area, that the medicinal plant species occurred in a sporadic manner and only a few number of medicinal plant species could be identified and the list of the medicinal species are presented in *Annexure – 5.2*.

d) Agricultural Crops

The study area is under the sub region of fairly hot and moist climate with sandy loam and medium water holding capacity. The annual rainfall is 1400 mm and length of growing periods for crops is 150 – 180 days. Rice is the most important crop. Wheat, Oil seeds, pulses are the main commercial crop. Other main crops are sugarcane, potato, chillies, ginger etc.

Fruit trees are – Mango, Jackfruit, Tamarind, Banana, Kul, Bel, Nona, Ata etc. The garden vegetable are Alliums, Bet, Cucurbita, Tomato, beans, pea, potato etc.

e) Plan of Genetic and Economic Importance:

A large number of plant species of the study area have economic utility like timber, medicine, food, fuel wood. Such plant species may be used for afforestation programme under "social forestry". It was also observed during the sample survey that none of the species could be considered as unique to this place, whose germplasm needs to be conserved in the region under ex-situ condition.

Faunistic Status of the Study area

A faunistic checklist of the study is presented in *Annexure – 6.0*.

Few wild animals like Fox, Jackal, monkey, Wild cat etc. could be seen in the study area occasionally.

The faunistic species as reported by the local people are mostly of V categories. A few species come under Schedule II category of Indian Wild Life Act are sometimes observed. The core area is free from any faunistic species.

Aquatic Status of the Study area

List of aquatic, semi aquatic, macrophytes along with list of fishes in Damodar river near project site are given in *Annexure – 6.1*.

Socio-economic condition

The District Bankura can be described as the “connecting link between plains of Bengal on the east and Chhotanagpur plateau on the west”. The areas to the east and north-east are low lying alluvial plains predominated by great paddy field of Bengal plain. According to the Census of 2011 it has a population of 3,596,674, while in 1961 total population of the District was 1,664,513, so the population became more than double in 50 years.

The concerned CD Block Barjora had a population of 176263 in 2011 of which 90624 were males and 85639 were females; hence the sex ratio was 945. Population growth in the last decade was 8.9%. SC and ST population were 33.9% and 1.6% respectively. Population density in 2011 was 448 per sq km.

The Project Influenced Area (PIA) is mainly rural in nature and it encompasses 84 villages and two census towns within 10 km radius from the existing plant site. The total population of the PIA is around 123367 in 26724 households as per 2011 Census. The household size is 4.6, decadal population growth rate in the CD Block (Barjora) was 12.54% in 2001 and 8.91 in 2011. Of all 33.4% SCs and 1.3% STs existed in 2011. There were 63.3% literates and 38.3% workers in the PIA as per Census 2011.

9 Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk

The hazards identified for the proposed project activities are presented below.

Potential Hazard Identification

Group	Item	Nature of Hazard	Hazard Potential	Remarks
Induction Furnace	Hot metal & slag Handling	Heath	Major	Fire hazard
	Molten Metal Explosions	Fire	Major	Flammable, Burn
	Heat Stress	Heath	Moderate	Fire & personal injury
	Mechanical Hazards	Heath	Moderate	personal injury
	Recirculating cooling water coming in contact with the molten iron or slag, Leakage of water from the refractory walls	Heath	Major	Spurting of metal/slag. Explosion under extreme cases.
Rolling Mills	Gas firing	Fire	Major	Fire hazard
Electric Power supply	Short circuit	Fire	Major	Fire hazard
Hydraulic oil and lubricants	Accidental discharge of hydraulic oil under pressure	Fire & Toxic	Moderate	Fire & personal injury

- *Molten Metal Explosions:*

The explosions in an induction furnace can be due to steam entrapment or any other chemical material during heating process.

Steam Explosions: Causes of Steam explosions include:

- a) During pouring of molten metal into refractories containing moisture.
- b) Due to moisture present within the molten metal.

To minimize the risk, following safety measures will be taken.

- ❖ Preheating of raw material before feeding into induction furnace.

- ❖ Preheating of refractories before pouring of molten mass.
- ❖ Use Moisture free raw material.
- ❖ Removal of possible sources of moisture that could come into contact with molten metal.
- ❖ Keep the Equipment and tools free from rust, and preheated before use.
- *Mechanical Hazards:*

Machine and Equipment used may create mechanical hazards. Mechanical handling devices like cranes, hoists, forklifts and conveyors etc. used within Induction Furnaces may generate hazard.

To minimize the risk, following safety and control measures will be taken.

- Care should be taken for:
 - a) Increase stress on fittings and components
 - b) Excessive heat
 - c) Extreme vibration
 - d) Machine lubricant contaminants
 - e) Airborne & machine lubricant contaminants
- Regular inspection is necessary, so that it remains safe to use.
- Plant should be well maintained.
- To avoid undesirable Problems or accidents in the factory premises, Personal Protective Equipment (PPE) for the workers is necessity.
- Following Personal Protective Equipments during factory operations shall be provided:
 - a) Goggles: Goggles should be used by the workers who work on feeding the charge in the furnace or furnace related works.
 - b) Face Shield Helmet: The person involved for welding work will be provided with face shield helmet.
 - c) Insulation Gloves: During raw materials handling, gloves should be used by the workers.

- d) Rubber Gumboots: Workers working close to high temperatures should use to protect the skin from burns.
- e) Medical Facilities: The Factory will provide the medical facilities to handle any emergency.
 - Chemical Explosions:

During heating process, chemical explosions take place due to the presence of chemicals/substances in the molten metal which cause pressure buildup in the molten mass.

To minimize the risk, following safety and control measures will be taken.

- Efficient raw material storage systems.
- Labeling the Raw materials.

- *Heat Stress:*

Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress.

Effects of heat stress:

- ✓ Heat stress can also affect behavior and judgment.
- ✓ Discomfort, heat cramps or heat rash to heat exhaustion or heat stroke can cause permanent injury or death.
- ✓ It affects concentration, perception and decision making.

To minimize the risk, following safety and control measures will be taken.

- Shielding radiant heat emissions from process plant.
- Installing spot coolers, blowers, fans or air-conditioning to relieve heat and circulation of air.
- Using ventilation to draw in cooler air.
- Provide respite areas for workers.
- *Burns:* Burns are major source of injury in molten metal processes and are usually caused by touching hot surfaces, radiation or splashing of molten metal.

Following safety and control measures will be taken to minimize the risk.

- Control and Design the processes to prevent unpredicted reactions occurring.
- To prevent exposure to heat, protective barriers should be provided e.g. screens around the pouring station.
- Manual handling of casting will be avoided.
- To minimize the risks, automating machinery will be used.
- Separating workers not directly involved in casting operation from the casting area.
- Task-specific PPE should be provided in addition to other control measures.
- Always Safe distance should be maintained.
- *Using high currents:* Exposure to high current may be hazardous to people with heart pacemakers and cause burns.

To minimize the risk, following safety and control measures will be taken.

- Sources of electrical risk in the workplace should be removed.
- Safety switches should be installed and test of switches should be done regularly.
- The workers should wear task-specific protective clothing in the industry.
- Tagging and testing should be done on all plant at least within the last 12 months.
- Effectively rated quick-response circuit breakers should be incorporated, supported by reliable, selective digital/microprocessor-based electro-magnetic protective relays in the electrical system design.
- To identify electrical faults or hazards, thermal imaging or infrared scanning should be used.
- Damaged coils should be replaced before the operation of the furnace.
- Access to high-voltage areas should be restricted.

Some important critical safety measures are provided within the process technology/equipment itself for the safety in production area & continue efforts should be given for developing new technology/equipment.

10 Likely impact of the project on air, water, land, flora-fauna and nearby population

Construction phase

Activity	Environmental attributes	Cause	Impact characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
Site clearing	Air quality (SPM & RPM)	Dislodging of particles from the ground	No Impact	No Impact	No Impact	Insignificant
	Noise levels	Noise generation from earth excavating equipment	No Impact	No Impact	No Impact	Insignificant
	Land use	Agricultural & Residential area	No Impact	No Impact	No Impact	Insignificant
	Ecology	Removal of vegetation and loss of flora & fauna	No Impact	No Impact	No Impact	Insignificant
Transportation of construction materials	Air quality (SPM & RPM)	Transportation of construction material in trucks & exhaust emission from vehicles	Direct Negative	Short Term	Reversible	Medium, Regular emission checks are performed.
	Noise levels	Noise generation from vehicles	Direct Negative	Short Term	Reversible	Insignificant, if regular vehicle maintenance is done.
	Risk	Risk of accidents during transit	Direct Negative	Long Term	Irreversible	Insignificant, if safety measures are taken to prevent

Activity	Environmental attributes	Cause	Impact characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
						accidents.
Construction activities / laying of roads	Air quality (SPM & RPM)	Operation of construction machinery, welding & others	Direct	Short Term	Reversible	Insignificant, if PPE is used by workers.
			Negative			
	Noise levels	Generation from use of machinery	Direct	Short Term	Reversible	Insignificant, if PPE is used by workers.
			Negative			
	Land use	Setting up of project	Direct	Short Term	Reversible	Insignificant, The Site is well connected by road.
			Negative			
	Ecology	Loss of vegetation	Direct	Short	Reversible	Insignificant, No cutting of trees and green belt development is envisaged.
			Negative	Term		

Operational phase

Activity	Environmental Attribute	Cause	Impact Characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
Raw material Handling & Transportation	Air	Transportation of raw material to the Site. (Dust Emission)	Direct Negative	Short Term	Irreversible	Using of covered dumper and engagement of trained transporter /driver for raw materials transportation.

Activity	Environmental Attribute	Cause	Impact Characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
	Air	The raw material is emptied to the storage yard. So, dust emission during unloading of Raw material.	Direct Negative	Long Term	Reversible	The unloading will be done in covered area. Water sprinkling system will be applied. So dust emission will be minimum. The Impact will be insignificant. The management will also ensure proper usage of the personal protective equipments for the workers.
	Land	Spillage of raw material on the land	Direct Negative	Long Term	Reversible	The raw material storage yard will be made of RCC. Thus no contamination of the land is envisaged.
Operation of the Induction furnace	Air quality	Dust emission from Stack, Fugitive emission	Direct Negative	Long Term	Reversible	Stack will be provided with suitable APC system. So, the impact will be insignificant. If no APC system is installed there will be

Activity	Environmental Attribute	Cause	Impact Characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
						high impact. If proper water sprinkling system is installed then the impact due to fugitive emission will be insignificant.
Domestic Activities	Water & land	Water Consumption	Negative Impact	Short Term	Reversible	Insignificant
	Water & land	Waste Water Generation and Disposal	Negative Impact	Short Term	Reversible	Insignificant
Green belt Development	Land , Air Ecology	Greenbelt development within the premises and peripheral area	Positive Impact	Long Term	Irreversible	significant
Rain Water Harvesting	Water	Collection, storage and utilization/recharging of rainwater	Positive Impact	Long Term	Irreversible	significant
CSR Activities	Socio Economic	Employment generation and other social welfare activities	Positive Impact	Long Term	Irreversible	significant

11 Emergency preparedness plan in case of natural or in plant emergencies

Elements of On-Site Emergency Plan are given below:

- Assess the size of event.
- Plan formulation and liaison.
- Actions like: Raise alarm, communication within and outside.
- Appoint key personnel.
- Emergency Control Center
- Action on-site
- Action off-site.
- Alarm and visual signals at strategic points, first alert sent to Incidence Controller.

Following steps can be involved in Management Plan:

- i. Minimize risk occurrence (Prevention)
- ii. Rapid Control (Emergency response)
- iii. Effectively rehabilitate damaged areas (Restoration)

Following points are important during preparation of Disaster Management Plan:

- a. Types and causes of disaster
- b. Technical know-how
- c. Resource availability

Types of Disaster:

- a. Due to Fire and Explosion
- b. Due to Vapor Cloud
- c. Due to Toxic Gas Release from:
 - Within the Unit
 - External Sources
- d. Hurricane, Flood, Cyclone and other Natural Calamities

The primary purpose of the on-site emergency plan is to control and contain the incident and so as to prevent from spreading to nearby plant. It is not possible to cover every eventuality in the plan and the successful handling of the emergency will depend on appropriate action and decisions being taken on the spot. Onsite emergency plan prepared by the unit is described hereunder.

This plan is developed to make best possible use of resources to:

- Contain the incident and control it with minimum damage.
- Safeguard others.
- Rescue the victims and treat them suitable. Identify the persons affected/ dead.
- Reduction of accident.

- Preserve relevant records and equipment needed as evidence in case of any inquiry.
- Rehabilitate the affected areas.

Emergency Facilities:

- a) Emergency Control Centre: Make Emergency Control Centre (ECC) with intercom, telephone, safe contained breathing apparatus, fire suit, hand tools, hand bell, telephone directories, factory layout, site plan, emergency lamp, hazard chart, emergency shut-down procedures etc. and key personnel, emergency coordinator, and essential employees should be involved.
- b) Assembly Point: Number of assembly point depending upon the plant location would be identified with emergency breathing apparatus; minimum facilities like water, etc. would be organized.
- c) Emergency Power Supply: Water pumps, lighting of plants, administrative building emergency control center, and other supplementary services are connected to emergency power supply.
- d) Fire Fighting Facilities: First Aid and Fire Fighting equipments should be available.
- e) Location of Wind Sock: To indicate direction of wind, wind socks would be installed for emergency escape on the top of the administration block / security block / production blocks.
- f) Emergency Medical Facilities: Apart from plant's first aid facilities, external facilities would be augmented. Names of medical personnel, medical facilities in that particular area would be prepared and updated. An ambulance with driver would be available in all the shifts.
- g) Emergency Warning: An emergency warning system would be established.
- h) Mock Drills: Emergency preparedness is a vital aspect of planning in Industrial Disaster Management. Personnel would be trained suitably and prepared mentally as well as physically in emergency response.

Key Persons and their role:

- Site Controller is the person who determines the action necessary to control the Emergency. The General Manager will be the site controller.
- Incident Controller is the person who goes to the sight of emergency and supervises the actions taken at the incident to overcome the Emergency. Shift Manager will act as Incident Controller.
- Security In-Charge will actuate the Emergency Siren, if not done already and will direct all security operations.

- General employees who have not been specified a duty in case of emergency should proceed to/contact the Emergency Assembly Point in their area. Designated persons will carry out the actions detailed in the Individual Plant Emergency Procedure.
- First Aid boxes will be provided in specific locations including at the Assembly point for administering preliminary treatment. A number of employees are trained for first aid use.

Off Site Emergency Plan

The Off site emergency plan is prepared based on events, which could influence people and Environment outside the premises. Actually, when the consequences of an emergency go beyond the plant boundaries, it becomes an off-site emergency. The off site plan is basically an issue of ensuring the co-ordination of proposed services and their readiness as much as possible, for the specific problems and hazards, which may arise in as incident. The off-site plan should be found on those events, which are most likely to occur, but other less likely events, which have severe consequence, should also be considered. An early decision will be needed for the people living within the range of the accident. It is not possible for single factory to handle the situation during major emergencies. However, the off-site plan could be planned as a Composite Off Site Emergency Plan with the aid of the local district authorities and the nearby industries in the Industrial Estate.

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

- Organizational set up- Incident controller /Site main controller, Key personnel, etc. should be available.
- Communication - List of important telephones should be kept.
- Specialized emergency equipment - Firefighting equipment must be available.
- Specialized Knowledge - Trained people should be involved.
- Voluntary Organization - Details of organizers, telephone numbers, resources, etc.
- Meteorological information - Weather forecasts like Weather condition, Wind velocity etc.
- Humanitarian arrangement - Transport, First aid, Ambulance must be available.
- Public Information - Understandings for dealing with the media press office; and informing relatives.
- Assessment - Gathering information on the causes of the emergency and evaluate the efficiency and effectiveness of all features of the emergency plan.

Role of the factory management

The onsite and offsite plans come together so that the emergency services are called upon at the suitable time and are provided with accurate information and a correct assessment of situation. In the event of an accident, the factory inspector will assist the District Emergency Authority for information.

Sufficient fund will be allocated to ensure occupational health and safety purposes.

Role of local authority

An emergency planning officer (EPO) will be appointed to prepare whole range of different emergency within the local authority area.

Role of fire authority

The fire control is normally the responsibility of the senior fire brigade officer who would take over the handling of fire from the Incident Controller on arrival at the site.

Role of police

Total control of an emergency is normally assumed by the police with a senior officer designated as emergency coordinating officer. Duties of the police during emergency include protection of life and property and control of traffic movements.

Role of health authorities

Health authorities, including doctors, surgeons, hospitals, ambulances etc. have essential role to play following a major accident and they should form an integral part of the emergency plan.

Role of the "mutual aid" agencies

Some types of mutual aids are available from the neighboring factories, as per need, as a part of the onsite and offsite emergency plan.

Details of emergency that occur will be recorded by the Unit. Corrective preventive measures will be taken. Unit will display the details like list of assembly points, name of the persons involve in the safety team like site controller, incident controller etc.

12 Issues raised during public hearing and response given

The Company is located at Plot No.1459, 1460, 1461, 1467, 1466, 1462, 2686, 2843, 2827, JL No.22, WBIDC Plasto Steel Park, Vill- Kadasole, P.O.- Ghutgoria, P.S.- Barjora, Bankura-722202, West Bengal. As per TOR, Public Hearing will be carried out for the expansion project.

13 CSR plan with proposed expenditure

The Industry intends to undertake CER activities in and around their Plant. A total amount of Rs. 6,00,000/- (Rs. Six lakhs only) would be utilized for CER program over a period of 5 years. The said amount is 1.0% of the total project cost. XZ

Financing plan for CER Activities

5 YEARS CER PLANNING							
	Project Cost	Rs. 600,00,000.00					
	Budget for CER (1%)	Rs. 6,00,000.00					
SL. No.	CER DETAILS	5 YEAR CER PLANNING (RS.)					TOTAL (Rs.)
		1 ST YEAR	2 ND YEAR	3 RD YEAR	4 TH YEAR	5 TH YEAR	
1	Improvement and beautification of road and other infrastructure in vicinity	10,000	10,000	10,000	10,000	10,000	50,000.00
2	Help to Forest Department and local authority for tree plantation in the area	10,000	10,000	10,000	10,000	10,000	50,000.00
3	Donation to locality Schools for construction of Toilets, School Building and drinking water facility,	10,000	10,000	10,000	10,000	10,000	50,000.00

	gardening						
4	Installation of solar street lights in local area	40,000	40,000	40,000	40,000	40,000	2,00,000.00
5	Health camp (Blood donation, eye checkup, child health etc.)for the local people	10,000	10,000	10,000	10,000	10,000	50,000.00
6	Slum community development	40,000	40,000	40,000	40,000	40,000	2,00,000.00
TOTAL COMMITMENT (1.0% OF TOTAL BUDGET)							6,00,000.00

14 Occupational Health Measures

Following are the key safety measure which will be recommended updated timely;

- An Amount of Rs. 1Lakh per Annum has been kept for Occupational Health Related Matters.
- A written process safety information document should be compiled for general use.
- Display various instruction boards, cautionary notices etc. at different locations.
- Provision of suitable personal protective equipment like safety gloves, helmets, safety belts etc. to personnel in the plant and compulsory use of these PPEs for all workers.
- Personnel at the proposed plant and public in surrounding area should be made aware about the hazardous substance stored at the plant and risk associated with them.
- On site and off site emergency response plan should be prepared and circulated to concern persons.
- Provision of ear muffs/ ear plugs to the workers exposed to higher noise level.
- First-Aid boxes (Containing Tincture iodine, Eye Drops, Burnol, Soframycin (ointment), Sterilized cotton wool, Band-aid, Antiseptic Solution (Sevlon), Bandage, Rose Water, etc.) should be available at various places in the premises.
- Organize training program on first aid training and safe material handling practices.

- Installation of fire hydrant system and fire extinguishers at required places.
- Regular monitoring of work area to measure airborne contamination and to control fugitive emissions and Protection of storage area with Dyke wall.
- Monitoring of occupational hazards like noise, ventilation, chemical exposure at frequent intervals.
- Made necessary tie-up with nearby hospital for the medical assistance in case of any emergency. Appointed Medical officers for the periodical health check-up of the employees. Periodical health check-up reports of all the employees will be maintained.
- Availability of proper sanitary facilities for the employees so that they do not suffer from any health ailments.
- The plant should check and ensure that all instruments provided in the plant are in good condition, regular preventive maintenance must be carried out and records of preventive maintenance should be maintained.
- Training program should be organized for proper control and maintenance of equipment, gathering information on accident prevention.
- Adequate ventilation in process area.
- In addition to the above, unit will maintain health records as per the factory act. All are contractual workers and they are covered by ESI.

15 Post project monitoring plan

	Components	Locations	Parameters	Frequency
1	Water Quantity	Intake Source	Daily & Monthly Consumption of Water	Regular
2	Water Quality	Raw water supply	As per IS 10500	Twice a year
3	Waste water Quality	Raw Waste water generation line, It is kept to taken care of runoff water. Ultimately the runoff water will be taken in rain water harvesting system.	General Parameters	Quarterly

	Components	Locations	Parameters	Frequency
4	Flue Gas Stack	Induction Furnace and DG	PM, SO ₂ , NO _x	Quarterly
5	Ambient Air	3 Locations in the premises	PM10, PM2.5, SO ₂ , NO _x and as specified by WBPCB	Quarterly
6	Work Area	2 Locations within the plant area	VOC and Other parameters as specified by WBPCB	Quarterly
7	Noise	All prominent locations within the premises	Noise Levels	Quarterly
8	Soil	1 Sample within the premises and 1 near the facility	As per norms	Once a Year

16 Conclusion

It can be concluded that on positive implementation of mitigation measures and environmental management plans, the project activities during the construction and operation phase would have manageable & largely have reversible impacts on the environment. Therefore, there will be negligible impact on the environment and on balance; the project would be favorable to surrounding communities and the region. Thus the project is environmentally sustainable.