Draft Environmental Impact Assessment Report

FOR

Proposed installation of 4x10T Induction Furnace & Rolling Mill for production of 1,32,000 TPA MS Billet and 1,05,600 TPA Rolling Mill Products

At

Plot No. A20, Panagarh Industrial Park,
Paschim Barddhaman ,West Bengal

Project Proponent

KAMALDEEP ISPAT PVT LTD

Prepared by

ENVIRONMENTAL CONSULTANCYAND LABORATORY

A QCI-NABET Accredited Environmental Consulting Organization

Unit No. 206, 224, 225 Jai Commercial Complex, Eastern Express Highway, Opposite Cadbury Factory, Khopat, Thane (West) – 400 061
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EIA execution Period: January, 2022 – May, 2022

Report Released By: Mrs. Anjali Singham

In the capacity of: EIA Coordinator

Signature:

Draft-EIA Report

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May 2022

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KAMALDEEP ISPAT PVT. LTD.

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TO WHOM IT MAY CONCERN

I, Sundip Kr Gupta, on behalf of M/s Kamaldeep Ispat Pvt. Ltd., hereby confirm that M/s. ULTRA- TECH (NABET Accredited EIA Consultants, NABET Certificate No. NABET/EIA/2023/RA0194) have prepared the Environmental Impact Assessment Report for " Proposed installation of 4x10T Induction Furnace & Rolling Mill for production of 1,32,000 TPA MS Billet and 1,05,600 TPA Rolling Mill Products at Plot No. A20, Panagarh Industrial Park, Paschim Barddhaman ,West Bengal

I hereby undertake the ownership of this EIA report on behalf of M/s. Kamaldeep Ispat Pvt. Ltd. I also confirm that the M/s. Kamaldeep Ispat Pvt. Ltd. shall be fully accountable for any misleading technical information in this report.

Yours sincerely,

For Kamaldeep Ispat **Pvt. Ltd.**

KAMAL-DEEP ISPAT PVT. LTD.
Director.

Sundip Gupta
Director

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EXECUTIVE SUMMARY

1.0 Introduction

Kamaldeep Ispat Private Limited (KIPL) was established in 16th October, 2007 involved in manufacture and supply of steel bars such as square steel billets, Carbon steel round bars, Carbon steel flat bars, Mild steel round bars and Mild steel flat bars, Angles channel, Joist etc.

Kamaldeep Ispat Private Limited has its registered office at Jalan Complex, NH-6, Jangalpur, Biprannapara, Begri, Dist. – Howrah, West Bengal.

Considering the future growth potential of steel market, M/s Kamaldeep Ispat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc.(1,05,600 TPA) at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal. Although the proposal is for hot charging, an additional Reheating furnace of 16TPH capacity is being proposed which will be used in case of breakdown of the Induction Furnace. The brief of the proposed project is mentioned in **Table E.1.**

Table E.1: Products and Major Installation

Production (Proposed)	
MS Billets	1,32,000TPA
Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc.	1,05,600TPA
Installation details	
Induction Furnace	4x10Ton
Continuous Casting Machine	1X2 Strand and 7 m Dia
Rolling Mill	1x16 TPH
Reheating Furnace	1 x 16 TPH

The proposed project is coming up within the land area of 10 Acres at Plot No A20 of Panagarh Industrial Park, which has been allotted to KIPL by West Bengal Industrial Development Corporation Ltd. The possession certificate is attached as **Annexure-II**. Total cost of proposed project is Rs. 63.50 Crores.

As per EIA notification dated 14th September, 2006 and its subsequent amendment, the project is categorized under sector 3 (a) and category "B1".

1.1 Project Location

The proposed project site is located at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan, West Bengal-713148.

The location map of the existing plant site is shown in Figure-E.1. Google Earth Image of 10KM Study Area is shown in Figure E-.2. The details of environmental setting are given in Table-E.1.

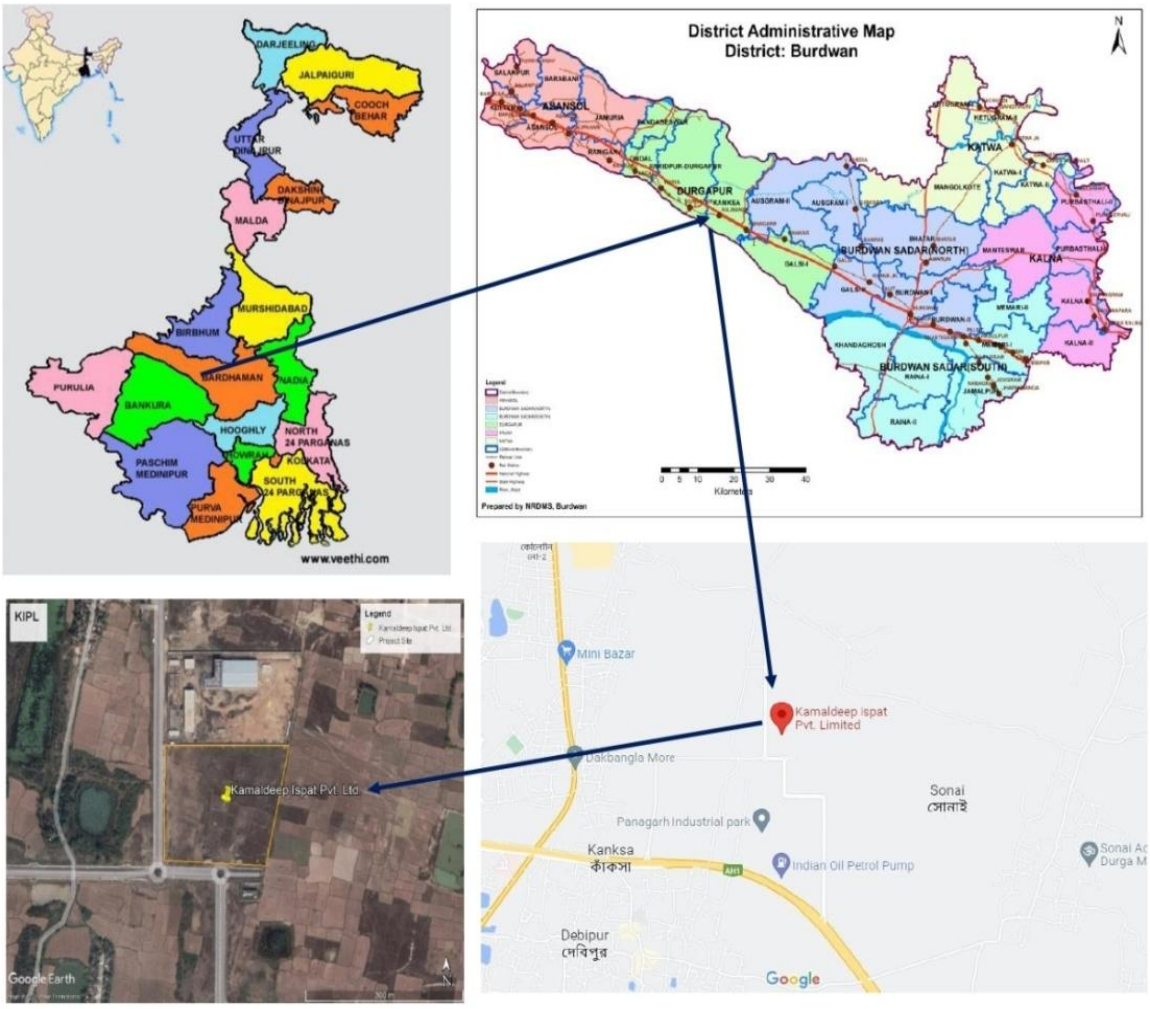

Figure E-1: Location map of the Project Site

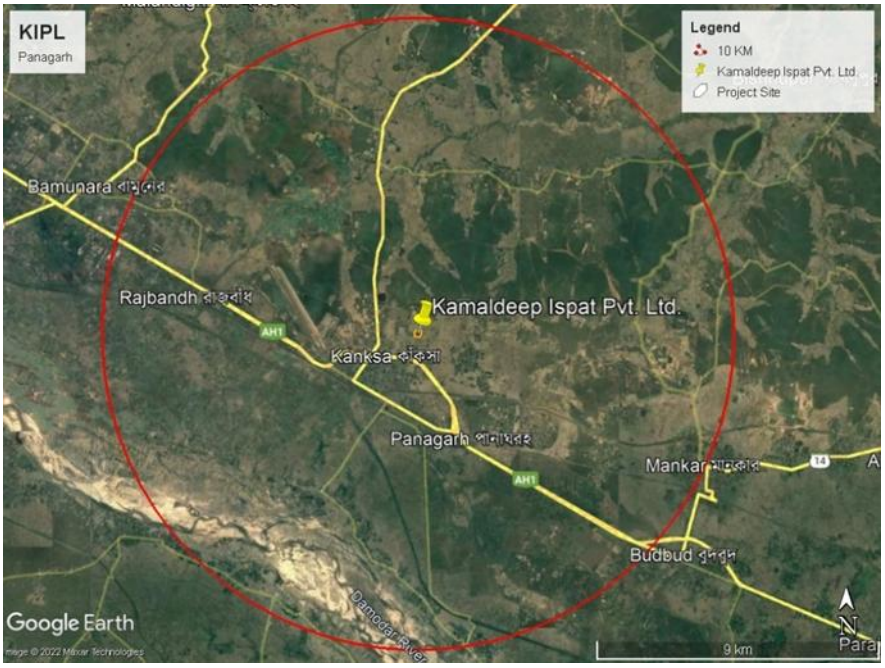

Figure E-2: Google Earth Image of 10 KM Study Area

The details of environmental setting are given below.

Table E.2: Brief of Project, Geographical Location and Environmental Setting around Project Site

Particulars	Details
Geographical Coordinates	**Point** / **Latitude** / **Longitude** A / 23°28'2.57"N / 87°27'53.18"E B / 23°28'2.55"N / 87°28'1.45"E C / 23°27'56.30"N / 87°27'59.91"E D / 23°27'56.60"N / 87°27'53.14"E
Topsheet No.	73 M/7
Production Capacity	1. MS Billets – 1,32,000TPA 2. Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.) – 1,05,600TPA
Estimated project cost	The expected capital investment for the proposed will be Rs.63.50Crores.
Man Power	Proposed -271; Total – 271
Elevation	Highest –71MSL; Lowest – 70 MSL
Land use	Industrial Land

<table>
<tr><td>Nearest Habitation/ Town</td><td>Durgapur- 16.5 km, WNW
District Head Quarter: Asansol – 56.5 km, WNW</td></tr>
<tr><td>Nearest Airport</td><td><u>Kazi Nazrul Islam Airport, Andal</u>
Aerial distance- 28.33 km, NW
Road distance – 39.3 km

<u>Netaji Subhas Chandra Bose International Airport</u>
Aerial distance - 134.7 km, SE
Road distance – 152 km</td></tr>
<tr><td>Nearest Highway</td><td><u>National Highway 19</u>
Aerial distance – 2 km, S
Road distance – 3.6 km

<u>State Highway 14</u>
Aerial distance – 1.4 km, W
Road distance – 1.4 km</td></tr>
<tr><td>Nearest Railway Station from project boundary</td><td><u>Panagarh Railway Station</u>
Aerial distance – 2.35 Km, S
Road distance – 4.9 km</td></tr>
<tr><td>Power supply</td><td><table><tr><th>Phase</th><th>Proposed</th><th>Source</th></tr><tr><td>Operational</td><td>Around 14000 KVA</td><td>DVC</td></tr></table></td></tr>
<tr><td>Nearest Dispensary, Govt. Hospital and Educational Facility</td><td><table><tr><th>Category</th><th>Name</th><th>Distance (Kms)</th><th>Direction</th></tr><tr><td>Hospital</td><td>Kanksa Primary Health Centre</td><td>1.9</td><td>WSW</td></tr><tr><td rowspan="2">School</td><td>Poral Para Primary School</td><td>0.9</td><td>SSW</td></tr><tr><td>Kanksa High School</td><td>1.25</td><td>SSE</td></tr><tr><td>College</td><td>Kanksa Academy of Technology & Management</td><td>1.76</td><td>W</td></tr></table></td></tr>
<tr><td>Water demand and supply</td><td>Total Water Requirement: 97KLD
Fresh Water: 43 KLD
Recycled Water: 54 KLD
[Water demand will be met from Ground Water at initial stage and latter the water will be supplied by PHE.]</td></tr>
<tr><td>Nearest tourist places</td><td>None within 10 Km study area</td></tr>
<tr><td>Defence installations</td><td>ICAO: VEPH (Air Force Base), Panagarh – 3.8 Kms, W</td></tr>
</table>

Archaeological Features	None within the study area.
Ecological Sensitive Zones	None within the study area.
Nearest Forests	Bilaspur Protected Forest - 0.7 Kms, N
Nearest streams/ rivers/ water bodies (from project boundary)	Damodar River – 7.5 Km, S
Seismic zone	As per the 2002 Bureau of Indian Standards (BIS) seismic zone map of India, categorized as Zone-III.
Nearby Industries	

Name of Industry	Distance (km)	Direction
Ashirvad Pipes Pvt. Ltd.	Adjacent	N
Matrix Fertilizers & Chemicals Ltd.	3.12 km	SE
IFB Agro Industry	4.25 km	SSE
Shaw Lightning Industry	3.19 km,	S

2.0 Project Description

Considering the future growth potential of steel market, M/s Kamaldeep Ispat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc. (1,05,600 TPA) at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal.

The details of production capacity of proposed project are listed in **Table E.3**.

Table E.3: Details of Production Capacity

Production (Proposed)	
MS Billets	1,32,000TPA
Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.)	1,05,600TPA
Installation details	
Induction Furnace	4x10 Ton
Continuous Casting Machine	1X2 Strand and 7 m Dia
Rolling Mill	1x16 TPH
Reheating Furnace	1 x 16 TPH

2.1 Land Requirement

The total land available under the ownership of M/s. Kamaldeep Ispat Pvt. Ltd. is **40469.58** Sq.M. The proposed activities will be carried out within the proposed industrial premises itself. Hence no additional land will be required for the proposed project. The details of land-use breakup of the proposed project are given in **Table-E.4**.

Table E.4: Details of Land use Break-Up

Particulars	Area in sq.m	Area in %
Plant Shed Area	21468.21	53.05
Office Building	1184.05	2.93
Green Area	14864.49	36.73
Service Area	1555.96	3.84
Road & Paved Area	1396.87	3.45
Total Land Area	**40469.58**	**100.00**

2.2 Raw Material Requirement

The details of requirement of raw materials, sources and their mode of transport are given in **Table E.5**.

Table E.5: Details of Raw Material (TPA)

S. No.	Raw Material	Quantity Required in TPA Per Annum	Source	Distance from site (Kms)	Mode of Transport
For Rolling Mill Products					
1	MS Billets/ Ingot	1,32,000	In-house (captive consumption)	--	Truck
For Billets					
2	Sponge Iron	1,09,560	Durgapur	16 km	Truck
3	MS Scrap	6,468	Open market & in -house		
4	Ferro Silico Manganese	1,848	Durgapur		
5	Pig Iron	29,304	Open market		

Power and Fuel Requirement

The details of power and fuel requirement for proposed project are shown in **Table E.6** & **Table E.7** respectively.

Table E.6 Details of Power Requirement

Phase	Proposed	Source
Operational	Around 14000 KVA	DVC

Table E.7 Details of Fuel Requirement

Fuel (Any one)	Machinery	Max Quantity Per day
Furnace Oil	Re-heating Furnace	14.4KL
Grassfire Coal		44.8T
Pulverized Coal		32.0T

2.3 Water Requirement

The total water requirement will be around 97 KL per day, out of which 12 KL will be used for domestic purpose from where around 9 KL sewage water will be generated.For industrial cooling purpose, around 75 KLD water will be required from where around 54KL water will be recycled. Another 10 KLD water will be required for plantation and sprinkling purpose. For the cooling makeup water and other purpose, total fresh water requirement will be 43 KLD. The source of water is Ground water. The water balance of the project (proposed) is given in **Figure E-3**

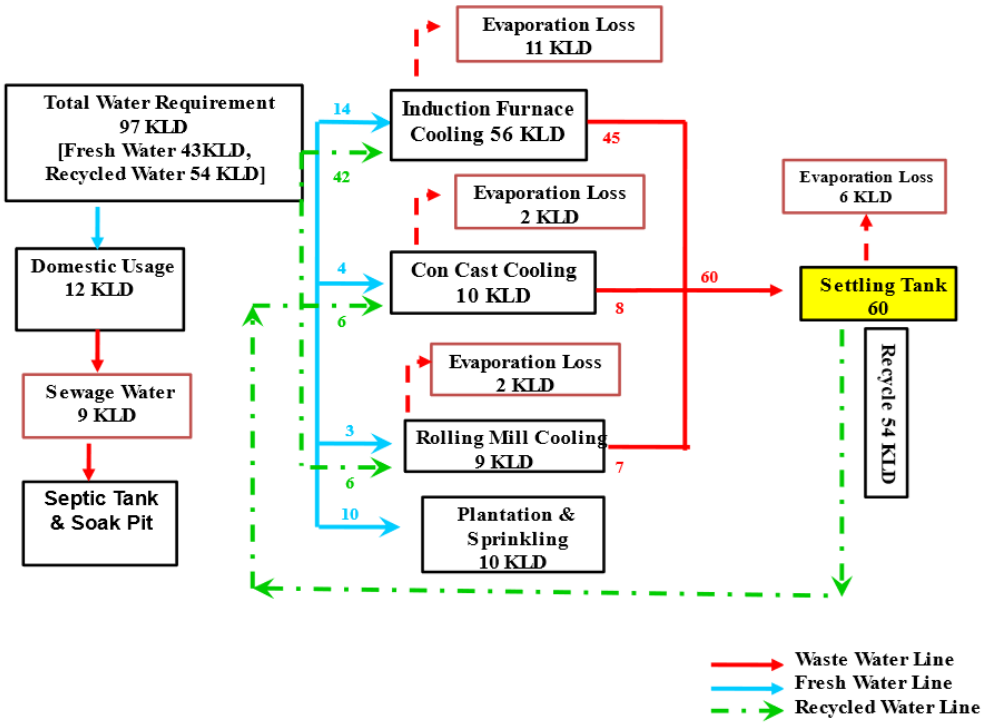

Figure E-3: Water Balance Diagram

2.4 Manpower Requirement

KIPL will generate direct employment of 271 employees and indirect employment of more than 200 personnel. This will improve employment statistic of the local area, their living standards and livelihood. Details of direct manpower requirement is as under-

Table E.8: Details of Manpower

Employee Category	Proposed
Administrative Staff	20
Production Staff	168
Other staff	8
Contract Labour	75
Total Employee	**271**

2.5 Manufacturing Process Description

❖ **Process description of MS Ingots &MS Billets**

The manufacturing process of MS Ingots & MS Billets involves the following steps in sequence.

MS Ingots &MS Billets manufacturing process

(a) The Preparation of Charge

MS Scrap & Sponge Iron form the major raw materials for steel making in the induction furnace. Selected scrap of consistent quality is to be used.

(b) Melting the Charge in Induction furnace

Working of Induction Furnace

After the furnace is switched on; current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. The induced magnetic fluxes thus generate cut through the packed charge in the crucible. As the magnetic fluxes cut through the scraps and complete the circuit, they generate an induced current in the scrap. This induced current, as it flows through the highly resistive path of the scrap mix, generates tremendous amounts of heat and melting of scrap starts. As soon as the charge has melted clearly, any objectionable slag is skimmed off, and the necessary alloying elements are added.

When these additives have melted completely, the power input may be increased to bring the temperature of metal up to the point most desirable for pouring.

The current is then turned off and the furnace is tilted for pouring into a ladle. As soon as pouring has ceased the crucible is cleaned completely from any slag or metal droplets adhering to the wall of the crucible and the furnace is now ready for charging again.

(c) Ingots/Billet manufacturing through Continuous con-cast machine

Liquid Metal from Induction Furnace is carried in a ladle over the Con-cast Machine. The liquid metal flows from the ladle through a slide gate system underneath it into water cooled copper mould tubes which solidifies the liquid metal into a square shaped mould which we call as M.S. Billets.

Continuous Casting Machine:

Liquid Metal from Induction Furnace is carried in a ladle over the Concast Machine. The liquid metal flows from the ladle through a slide gate system underneath it into water cooled copper mould tubes which solidifies the liquid metal into a square shaped mould which we call as M.S. Billets.

The manufacturing process flowchart is depicted in **Figure E-4.**

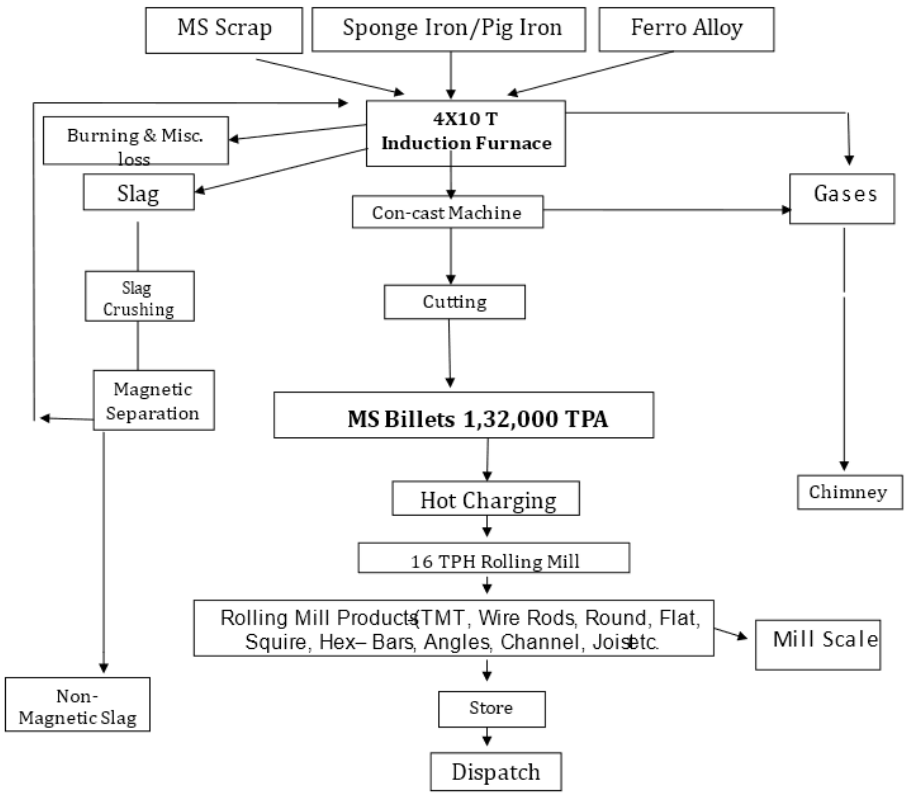

Figure E-4: Process flow chart

3.0 Description of Environment

The study area means villages in 10 km radius of the project site. Topographical map, Village Map Bhuvan portal and Google earth maps were used to identify the villages & wards in 10 km radius. A total of 108 rural and urban inhabitations falls within the study area.

Project site is near to Durgapur city area. Durgapur is a major city in West Bengal that s a major industrial city and a tier-II urban agglomeration in Paschim Bardhaman district in the Indian state of West Bengal. It is the fourth largest urban agglomeration after Kolkata, Asansol and Siliguri in West Bengal[7] and was planned by two American architects, Joseph Allen Stein and Benjamin Polk in 1955. Durgapur is the only city in eastern India to have an operational dry dock. Durgapur has been nicknamed the 'Ruhr of India'.[8]

3.1 Meteorology

The meteorological parameters were recorded on hourly basis during the study period near proposed project site and the summary of meteorological data generated at site is presented in following **Table E.9.**

Table E.9: Meteorological Data Recorded at study area

Period	Wind Speed (m/s)		Temp (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Max	Min	
January 2022	4.27	0.08	25.64	7.07	99.88	49.62	0
February 2022	6.13	0.06	28.88	8.23	99.88	36.06	0
March 2022	3.63	0.21	35.72	14.38	99.75	23.25	0

3.2 Air Environment

- Checking of vehicles and construction machinery to ensure compliance to Indian Emission Standards
- Transportation vehicles, and machineries to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NO_X and SO_X within the limits established by WBPCB
- Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow
- Use of good quality fuel and lubricants will be promoted.
- Water sprinkling shall be carried out to suppress fugitive dust during earthworks and along unpaved sections of access roads
- Attenuation of pollution/ protection of receptor through strengthening of greenbelt/ green cover
- PUC certified vehicles will be used to avoid the exhaust emission.
- However, the construction activities will be for temporary period and hence, its impact on the existing ambient air quality as well as vegetation will be reversible. Dust emissions are likely to be confined within the limited area.
- The hazardous material will be stored, handled & disposed of according to the guidelines of HWMR Rules 2016 and subsequent amendment.

3.3 Noise Environment

- No noise polluting work in night shifts

- Pumps – Enclosure in acoustic screen, allowing for engine cooling and exhaust, use of anti-vibration mounting, flexible couplings of hoses, maintaining adequate inlet pressure
- Provision of Intake mufflers, unidirectional fan for Cooling and enclosures for electrical motors
- Provision of ear plugs for labour in high noise area
- Provision of barricades along the periphery of the site
- All contractors and subcontractors involved in the construction phase shall comply with the CPCB noise standards
- Activities that take place near sensitive receptors to be carefully planned (restricted to daytime, taking into account weather conditions etc.)
- Vehicles and generator set to be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them
- Use of suitable muffler systems/ enclosures/ sound proof glass panelling on heavy equipment/ pumps/ blowers
- In case of steady noise levels above 80-85 dB (A), initiation of hearing conservation measures
- Strengthening of greenbelt for noise attenuation may be taken up, etc.

3.4 Water Environment

- Measures will be implemented to prevent seepage of liquid materials into ground where it could contaminate groundwater;
- Ensure prompt cleaning up of accidental spillages
- Measures will be followed to prevent the contamination of hydrological features by diesel, grease, oil, etc. derived from the working area.
- The machinery / equipment will be maintained in a good operating condition;
- Specially designated areas will be created for vehicle maintenance;
- Accidental spillages will be cleaned up promptly.
- Curing water will be sprayed and after liberal curing, all concrete structures will be covered with gunny bags this will conserves water
- Provisions will be made to ensure the construction vehicles stick to the access track to prevent mud & dirt being deposited on roads
- Fence will be constructed around the site to trap sediments whilst allowing the water to flow through.
- All mud & dirt deposited on the roads from the construction activities will be cleaned.
- Adopting good construction and engineering practices will help in mitigating the water pollution.

3.5 Soil Quality

- After completion of the construction phase, the surplus earth shall be utilized to fill up the low-lying areas, the rubble shall be cleared and all un-built surfaces will be reinstated;
- Greenbelt development and related activities shall be taken up during construction phase itself so that plantation will grow to adequate height by the time of plant commissioning.

Thus, greenbelt will be effective in containing the fugitive emissions during operation, if any;

- Species selected in this plantation shall be fast growing and they shall be adaptable to local conditions. Their ability to combat localized pollution is the prime factor for their selection and placement in the planting grid/pattern.
- Most of the varieties shall be eco-friendly i.e., generate lot of oxygen while helping reduce/absorb gases and dust; Entire plant shall be aesthetically landscaped and as much as possible natural gradient shall be maintained;
- There shall be minimum concreting of the top surfaces so that there is a scope for maximum groundwater recharge due to rainfall; and Plantation outside the plant premises, in the nearby villages shall be encouraged by supplying free saplings to the villagers.
- Usage of appropriate monitoring and control facilities for construction equipment's deployed
- All hazardous waste shall be securely stored, under a shed for eventual transportation and disposal to the authorized dealers
- The solid waste generation due to workers working at site will be segregated and will be transported and disposed of to waste disposal facility
- Chemicals/Paints etc. used during construction phase will be stored safely

3.6 Ecology and Biodiversity

The region does not have dense vegetation and land use is dominated by agricultural and industrial activities. Following environmental management measures are recommended to mitigate adverse impacts on biological environment during construction phase:

- Native species will be preferred for plantation in addition to beautification plants/species.

3.7 Socio Economics

Given that the project and related developments like construction camps will not be dependent on local resources (power, water), during both construction and operations, the only likely impact on infrastructure would be on the roads, during the construction phase. Considering the high traffic emanating during construction phase an effective traffic management scheme will be put in place to avoid congestion on the nearby and local roads. Local persons will get employment during Construction phase.

4.0 Anticipated Environment Impacts and Environment Management Plan

Impact on Soil

The soil quality remains the same as the proposed project does not involve a change in land use pattern. The airborne fugitive dust from the plant is likely to be deposited on the topsoil in the immediate vicinity of the plant boundary. However, the fugitive emissions are likely to be controlled to a great extent through pollution control measures like water sprinkling and the greenbelt development

Impact on Air Quality

The fugitive emissions from the plant operations will be controlled through the following control measures:

Raw material handling areas are major source for fugitive emissions. Most of the time, sources of fugitive emissions will be the transfer and junction points, product hopper area and loading points. Bag filter will be provided with appropriate suction devices to control the fugitive emissions. In areas where provision of bag filter and other control device is not feasible, water spraying arrangements will be made, particularly in coal storage yard, wagon tipple and truck tippler; Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission. The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions; and Usage of respiratory protective equipment by all employees to be ensured.

The impact of fugitive emissions from the proposed project on air quality of the region is insignificant.

Gaseous Emission Control Measures: A 360° swing suction hood is provided just above crucible at required height to have effective suction of gases and fumes. Flue gases from the furnace will be passed through hood into duct and through duct to spark arrestor. The exiting pollution control equipment of Wet scrubber will be replaced by bag filters to remove the pollutants from the proposed induction furnaces and for reheating furnace, the wet scrubber provided will be remain the same.

Impact on Water Quality & Management

The total water requirement will be around 97 KL per day, out of which 12 KL will be used for domestic purpose from where around 12 KL sewage water will be generated which will be treated in Septic Tank followed by soak pit. For industrial cooling purpose, around 75 KLD water will be required from where around 54 KL water will be recycled. Another 10 KLD water will be required for plantation and sprinkling purpose. For the cooling makeup water and other purpose, total fresh water requirement will be 43 KLD. The source of water is Ground water.

Impact due to Solid Waste Generation

The quantity of Industrial and Municipal solid waste to be generated by the manufacturing process and its management is described in **Table E.10**.

Table E.10: Details of Solid Waste Generation & its management

Industrial Waste		
Type of Waste	**Proposed**	**Treatment/Disposal**
Slag	1140 TPM	Slag will be crushed and metal part will be recovered by magnetic separator and rest part will be used for

		road construction.
Mill Scale	2640 TPA	Sold to contractor for sinter plant
Sludge from Settling tank	1.88 TPA	WBPCB authorized/approved site
Dust from APC System	128TPM	Dust will be packed in HDPE bags and stored in godown and the same is to be used in land filling/sold to authorized vendor for production of fly ash bricks
Municipal Solid Waste (MSW) -Kg/Day		
Type of Waste	**Quantity**	**Treatment/ Disposal**
Wet Garbage	16.26	To be disposed off as per MSW Rules
Dry Garbage	10.84	To be disposed off as per MSW Rules

Impact on Noise levels

The major noise generating sources are from cooling tower, Air Compressors, Transformer, TMT cutting machines, loading & unloading operation.

Noise Attenuation Measures

The following control measures will be implemented for the proposed project:

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures;
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, DG sets, transformer will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units;
- Furnace operators will be protected by enclosing the source of noise with sound deadening material or by providing sound-proofed shelters.
- Construction of noise protection wall at the scrap yard; and
- Adequate greenbelt is also being developed in the plant boundary of the steel plant.

Impact on Ecology

There are no trees, shrubs, herbs and climbers on project site. Due to lack of proper habitat, animal biodiversity, including insects, is meagre.

Impact on Public Health

The discharge of waste materials (stack emission, wastewater and solid wastes) from process operations could have some adverse impact on public safety and health in the surrounding area, if appropriate treatment procedures are not followed. As the plant pollution control equipments will be designed as per the modern available technology for controlling the impacts, no adverse impacts on public health in the area are anticipated.

5.0 Environmental Monitoring Programme

The environmental monitoring program is important in terms of evaluating the performance of pollution control equipment's installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/WBPCB. The frequency of air, noise, surface water and ground water sampling and location of sampling will be as per the directives of West Bengal Pollution Control Board.

Budgetary Allocation for Environmental Protection

The total project cost for the proposed project is about Rs. 63.50 Crores. An initial budget of Rs. 12 Lacs to be made on the following heads as included in the project cost in the proposed project. The recurring cost is estimated to be around Rs. 1 lakhs per annum.

Table E.11: Expenditure Proposed for Environmental Protection Activities

S. No.	Activities	Capital Cost (Rs. In Lacs)	Recurring Cost (Rs. In Lacs)
1.	Health Facility	4	0.3
2.	Drinking Water	3	0.2
3.	Sanitation Facilities	2	0.3
4.	Education	3	0.2
Total		**12**	**1.0**

6.0 Disaster Management Plan

In the past there have been various disasters which had caused loss of human life, other living beings, property, nature, etc. in various parts of the world. These disasters include those which are naturally occurring, like the earthquake that struck Latur district in Maharastra State in 1993 where loss of human life to the extent of 3000 was recorded or industry related events that cause serious damage to human life, property and environment. These past situations call for well-co-ordinated actions of individuals and institutions from the local community and this can be achieved only if there is awareness in the community of the possible hazards and the need for mutual preparedness to cope with their consequences. Considering this, the Industry & Environment Office of United Nations Environment Programme has formulated a process known as APELL (Awareness and Preparedness for Emergencies at Local Level).

Main Objectives

- Prevent loss of life or damage to health, social well being, avoid property damage and ensure environmental safety, in the local community
- To localize the emergency
- To minimize the consequences
- To ensure that following concepts are considered, namely rescue, first aid,
- Evacuation, rehabilitation, spreading the information.

6.1 Occupational Health & Safety Measures

- The movement of heavy equipment will be undertaken with proper precaution to prevent any accidents on the road. Occupational risk shall be minimized at the project site through implementation of a full proof safety system. Speed limit set for movement of vehicles with 20 km/hr on village roads to reduce risks of accidents or injuries.
- Safety training shall be provided to all construction workers on operation of equipment. Security shall also be extended during non-working hours to ensure there is controlled access to the machinery and equipment.
- The contractors shall also be vigilant to detect workers showing symptoms of communicable diseases. Health checkup of the contract labors shall be done/ recorded at times. All illness and incidents shall be reported and recorded.

7.0 Project Benefits

The Proposed project will have indirect positive impact on surrounding area which is as mentioned below:

- The proposed project will be carried out on the existing land of M/s Kamaldeep Ispat Ispat Pvt. Ltd.; hence no displacement of people is required
- Substantial Socio-economic benefits
- Good Techno-commercial viability
- Around the project site semi-skilled and unskilled workmen are expected to be available from local population in these areas to meet the manpower requirement during construction phase.
- Infrastructural facilities will be improved due to the project
- Secondary employment will be generated thereby benefiting locals

Thus a significant benefit to the socio-economic environment is likely to be created due to the project.

8.0 Corporate Environment Responsibility

Kamaldeep Ispat Pvt. Ltd. not only carries out business but also understands the obligations towards the society. The unit is aware of the obligations towards the society and to fulfill the social obligations unit will employ semi-skilled and unskilled labor from the nearby villages for the proposed augmentation project as far as possible. Unit will also try to generate maximum indirect employment in the nearby villages by appointing local contractors during construction phase as well as during operation phase. The Project Proponents will contribute reasonably as part of their Corporate Environmental Responsibility (CER) in and will carry out various activities in nearby villages.

The total estimated cost of the proposed project is 63.50 Crores. The project Proponent will allot 1.5% of the project cost i.e. around 95.25 Lacs towards the CER activity.

9.0 Conclusions

The proposed project will have certain level of marginal impacts on the local environment. However, it would also generate indirect employment generation, improve the social and economic environment in the vicinity and meets the need of the state.

CHAPTER 1: INTRODUCTION

1.1 Introduction

Kamaldeep Ispat Private Limited (KIPL) was established in 16th October, 2007 involved in manufacture and supply of steel bars such as square steel billets, Carbon steel round bars, Carbon steel flat bars, Mild steel round bars and Mild steel flat bars, Angles channel, Joist etc.

Kamaldeep Ispat Private Limited has its registered office at Jalan Complex, NH-6, Jangalpur, Biprannapara, Begri, Dist. – Howrah, West Bengal.

Considering the future growth potential of steel market, M/s Kamaldeep Ispat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc. (1,05,600 TPA) at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal.

The company will aim for efficient management of the unit, which will require judicious manpower planning, selection of qualified and experienced personnel and also appropriate organizational structure, clearly defining the functions and responsibilities of the managerial and supervising staff.

The proposed project capacity is due to increase in market demand. The proposed project is coming up within plant area 10.00 Acres at Plot No A20 of Panagarh Industrial Park, which has been allotted to KIPL by West Bengal Industrial Development Corporation Ltd. The possession certificate is attached as **Annexure-II**. Total cost of proposed project is Rs. 63.50 Crores

This chapter describes the purpose of the report, identification of the proposed project, project proponent, brief description of nature, size and location of the project and importance to the region and country. This chapter also describes the scope of the study and details of regulatory scoping carried out as per Terms of Reference (TOR) issued by SEIAA, West Bengal.

1.2 Purpose of the Report

As per Environmental Impact Assessment Notification dated 14th September 2006, the proposed project comes under Item No. 3(a) of Category ‘B’ for which Environmental Clearance (EC) from SEIAA is necessary.

The application for TOR (Form-1 and PFR) was submitted to MOEF&CC Portal on 07.04.2022 and Standard TOR has been issued by SEIAA, West Bengal vide letter No. EN/T-II-1/025/2022. A copy of the letter giving the details of the TOR and its compliance is enclosed as **Annexure-I**. This EIA report is prepared in line with TOR conditions issued by WBSEIAA

M/s Kamaldeep Ispat Private Limited has appointed M/s. ULTRA-TECH (Environmental Consultancy & Laboratory) as a NABET Accredited Environmental consultant to undertake the Environmental Impact Assessment (EIA) study considering various environmental components, which may be affected due to the proposed project for obtaining Environmental Clearance from SEIAA, West Bengal. The process for obtaining the Environmental clearance is depicted in **Figure 1.1**

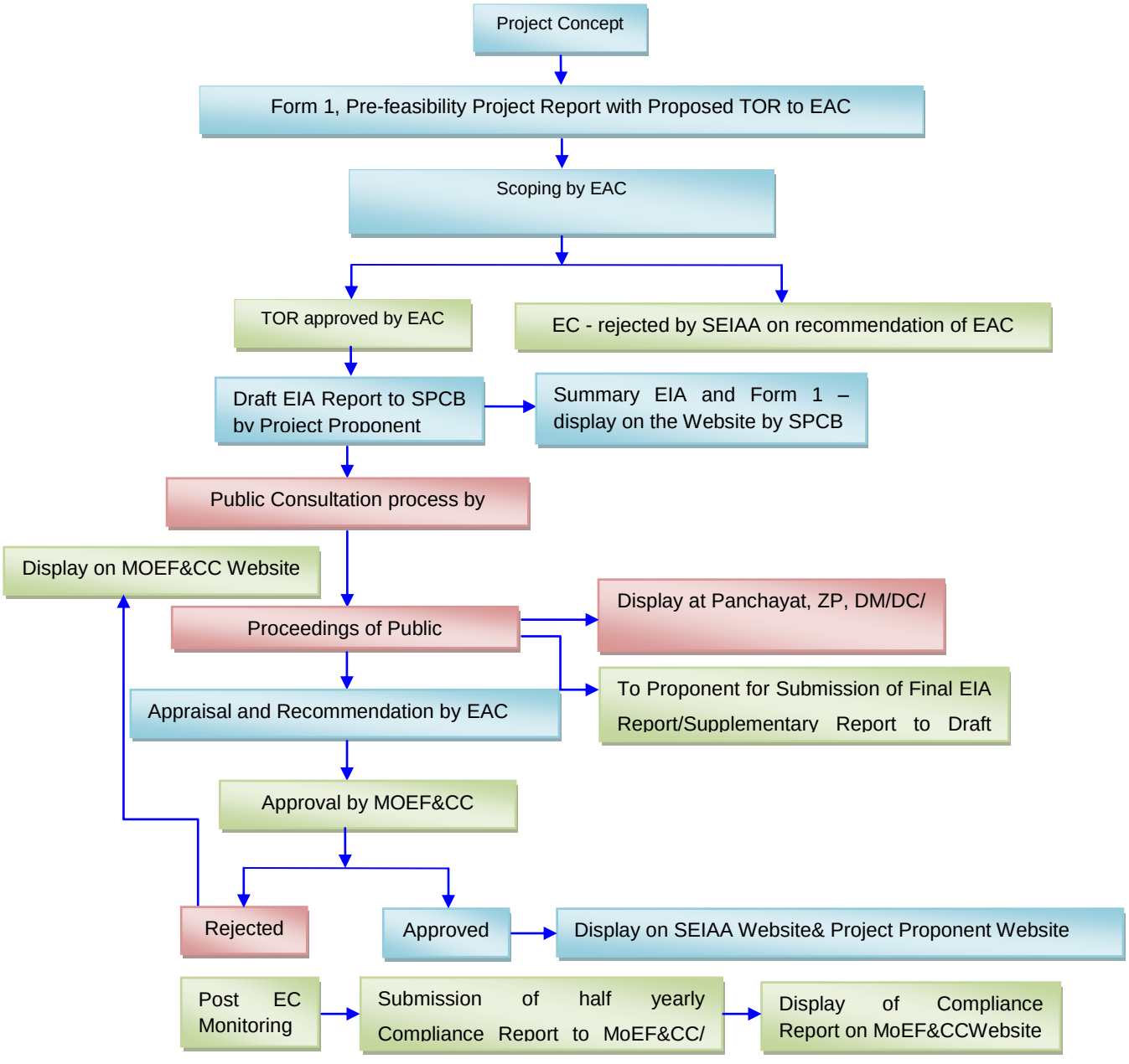

Figure.1.1. Steps for obtaining Environmental clearance

1.3. Identification of Project and Project Proponent

Proposed Project

Considering the future growth potential of steel market, M/s Kamaldeep Ispat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc. (1,05,600 TPA) at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal. Although the proposal is for hot charging, an additional Reheating furnace of 16TPH capacity is being proposed which will be used in case of breakdown of the Induction Furnace.

The proposed project capacity is due to increase in market demand. The proposed project is coming up within plant area 10.00 at Plot No A20 of Panagarh Industrial Park, which has been allotted to KIPL by West Bengal Industrial Development Corporation Ltd. The possession certificate is attached as **Annexure-II**. Total cost of proposed project is Rs. 63.50 Crores.

As per EIA notification dated 14thSeptember, 2006 and its subsequent amendment, the project is categorized under sector 3 (a) and category "B1".

About Project Proponent

Kamaldeep Ispat Private Limited (KIPL) was established in 16th October, 2007 involved in manufacture and supply of steel bars such as Square steel billets, Carbon steel round bars, Carbon steel flat bars, Mild steel round bars and Mild steel flat bars, Angles channel, Joist etc.

Kamaldeep Ispat Private Limited has its registered office at Jalan Complex, NH-6, Jangalpur, Biprannapara, Begri, Dist. – Howrah, West Bengal.

Considering the future growth potential of steel market, M/s Kamaldeep Ispat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc.. (1,05,600 TPA) at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal.

1.4 Brief Description of the project

The proposal is for installation of 4X10T Induction Furnace for Manufacturing of M.S. Ingot/Billet (1,05,600 TPA) and Rolling Mill (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc.) at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan, West Bengal. Although the proposal is for hot charging, an additional Reheating furnace of 16TPH capacity is being proposed which will be used in case of breakdown of the Induction Furnace. Details of product and major machineries have been given in Table No.2.2

Table 1.1: Product & Installation Details

Production (Proposed)	
MS Billets	1,32,000TPA
Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, Joist etc.	1,05,600TPA
Major Installation details	
Induction Furnace	4x10 Ton
Continuous Casting Machine	1X2 Strand and 7 m Dia
Rolling Mill	1x16 TPH
Reheating Furnace	1 x 16 TPH

1.5. Location of the Project:

The proposed project site is located at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan,West Bengal-713148.

The details of environmental setting are given in Table 1.2. The location map of the plant site is shown in Figure 1.2. Similarly, the toposheet of the study area within 10 km radius shown in Figure 1.3. Google map of 10 km radius is shown in Figure 1.4 and the connectivity map is shown in Figure 1.5.

Table 1.2: Brief of Project, Geographical Location and Environmental Setting around Project Site

<table>
<tr><th>Particulars</th><th>Details</th></tr>
<tr><td>Geographical Coordinates</td><td>
<table>
<tr><th>Point</th><th>Latitude</th><th>Longitude</th></tr>
<tr><td>A</td><td>23°28'2.57"N</td><td>87°27'53.18"E</td></tr>
<tr><td>B</td><td>23°28'2.55"N</td><td>87°28'1.45"E</td></tr>
<tr><td>C</td><td>23°27'56.30"N</td><td>87°27'59.91"E</td></tr>
<tr><td>D</td><td>23°27'56.60"N</td><td>87°27'53.14"E</td></tr>
</table>
</td></tr>
<tr><td>Topsheet No.</td><td>78M/7</td></tr>
<tr><td>Production Capacity</td><td>
<table>
<tr><th>Name</th><th>Config.</th><th>Production Capacity</th></tr>
<tr><td>Reheating Furnace</td><td>1X16TPH</td><td rowspan="2">Rolling Mill Products 1,05,600TPA</td></tr>
<tr><td>Rolling Mill</td><td>1X16TPH</td></tr>
<tr><td>Induction Furnace</td><td>4X10T</td><td rowspan="2">MS Billet/Ingot 1,32,000TPA</td></tr>
<tr><td>Continuous Casting Machine (CCM)</td><td>1X2 Strand</td></tr>
</table>
</td></tr>
<tr><td>Estimated project cost</td><td>63.50 Crores</td></tr>
<tr><td>Man Power</td><td>Proposed - 271; Total – 271</td></tr>
<tr><td>Elevation</td><td>Highest – 71 MSL; Lowest – 70 MSL</td></tr>
<tr><td>Land use</td><td>Industrial Land</td></tr>
</table>

<table>
<tr><td>Nearest Habitation/ Town</td><td>Durgapur- 16.66 km, WNW
District Head Quarter: Asansol – 56.50 km, WNW</td></tr>
<tr><td>Nearest Airport</td><td>Kazi Nazrul Islam Airport, Andal
Aerial distance- 28.33 km, NW
Road distance – 39.3 km
Netaji Subhas Chandra Bose International Airport
Aerial distance - 134.71 km, SE
Road distance – 152 km</td></tr>
<tr><td>Nearest Highway</td><td>National Highway 19 – 2km (S)
State Highway 14 – 1.4km (W)</td></tr>
<tr><td>Nearest Railway Station from project boundary</td><td>Panagarh Railway Station – 2.35km (S)</td></tr>
<tr><td>Power supply</td><td>14000 KVA ; Source: DVC / WBSEDCL</td></tr>
<tr><td>Nearest Dispensary, Govt. Hospital and Educational Facility</td><td>
<table>
<tr><th>Category</th><th>Name</th><th>Distance (Kms)</th><th>Direction</th></tr>
<tr><td>Hospital</td><td>Kanksa Primary Health Centre</td><td>1.88</td><td>WSW</td></tr>
<tr><td rowspan="2">School</td><td>Poral Para Primary School</td><td>0.93</td><td>SSW</td></tr>
<tr><td>Kanksa High School</td><td>1.25</td><td>SSE</td></tr>
<tr><td>College</td><td>Kanksa Academy of Technology & Management</td><td>1.76</td><td>W</td></tr>
</table>
</td></tr>
<tr><td>Water demand and supply</td><td>Total Water Requirement: 97KLD
Fresh Water: 43 KLD
Recycled Water: 54 KLD
[Water demand will be met from Ground Water at initial stage and latter the water will be supplied by PHE.]</td></tr>
<tr><td>Nearest tourist places</td><td>None within 10 Km study area</td></tr>
<tr><td>Defence installations</td><td>ICAO: VEPH (Air Force Base), Panagarh – 3.81 Kms, W</td></tr>
<tr><td>Archaeological Features</td><td>None within the study area.</td></tr>
<tr><td>Ecological Sensitive Zones</td><td>None within the study area.</td></tr>
<tr><td>Nearest Forests</td><td>None within the study area.</td></tr>
<tr><td>Nearest streams/ rivers/ water bodies (from project boundary)</td><td>Damodar River – 7.31 Km, S</td></tr>
<tr><td>Seismic zone</td><td>As per the 2002 Bureau of Indian Standards (BIS) seismic zone map of India, categorized as Zone-III.</td></tr>
</table>

Nearby Industries		**Name of Industry**	**Distance (km)**	**Direction**	
		Ashirvad Pipes Pvt. Ltd.	Adjacent	N	
		Matrix Fertilizers & Chemicals Ltd.	3.12 km	SE	
		IFB Agro Industry	4.25 km	SSE	
		Shaw Lightning Industry	3.19 km,	S	

1.6 Capital investment

The project cost for the proposed project is 63.50 Crores.

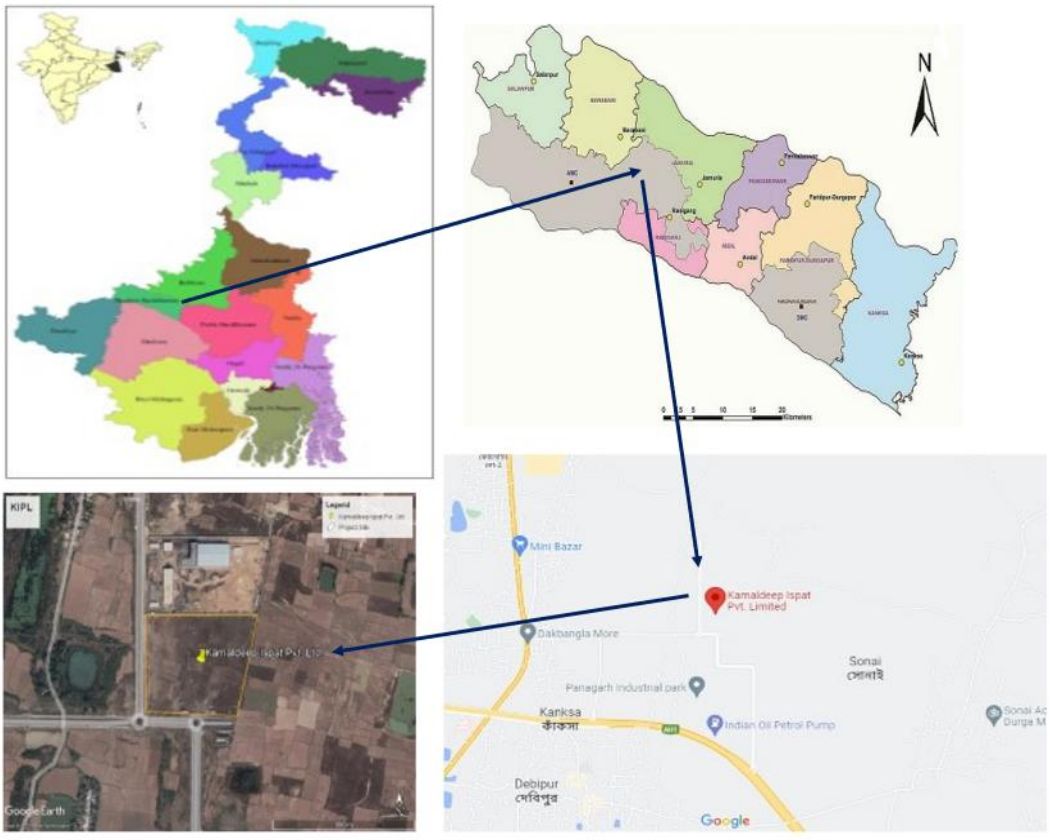

Figure 1.2: Location Map

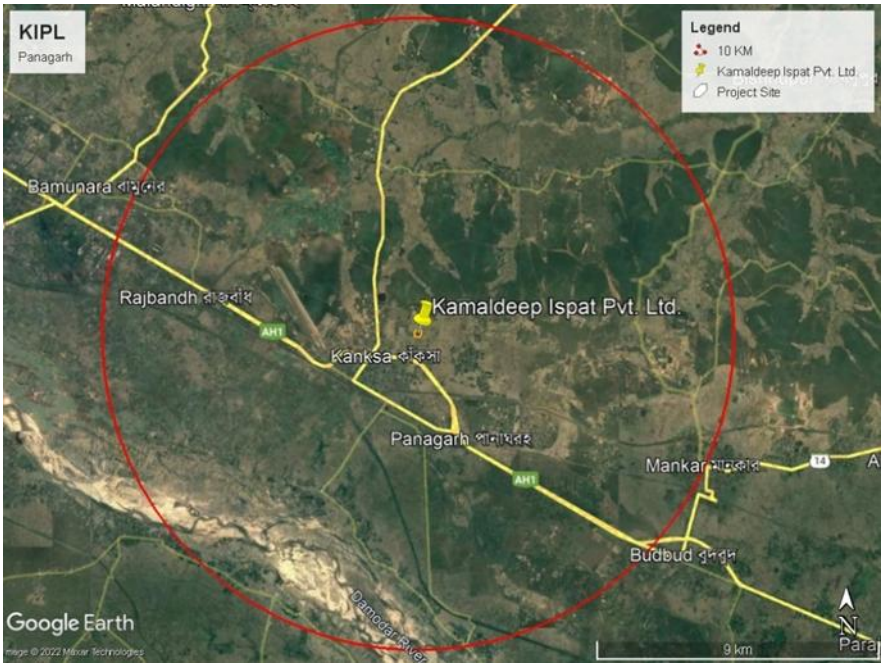

Figure 1.3: 10 Kms around the Project Site on Google Earth

Figure 1.4: Google Earth Image of Project Site

Figure 1.5: Connectivity map for nearest railway station

1.7 Need for the Project and Its Importance to the Country and or Region

Steel is one such material that has played an important role in the development of mankind in the last century. Today, it is difficult to imagine a world without steel. Steel has become vital to our everyday life, it is at the root of the quality of life that each of us enjoys today, helping to shelter us, to feed us and to facilitate both our working day and leisure activities. We depend on steel for almost everything from our houses and buildings, the cars we drive, roads, bridges, agricultural equipment, machines, the list is endless.

Steel is a versatile, constantly developing material that underpins all manufacturing activity. Even if a product is not made entirely from steel, it will undoubtedly have steel as a component at some point in the manufacturing process. There are currently more than 3,500 different grades of steel with many different properties- physical, chemical, environmental, 75% of which have been developed in the last 20 years. Steel is also an environment friendly material and has the distinction of being the most recycled material in the world today.

Today, consumption of steel is also regarded as an indicator of development of a nation. Per capita steel consumption is now universally accepted as an index of economic development of a nation. Given its role, steel has established itself as the backbone of any economy.

The need for the proposed unit for MS Ingots & M.S. Billets is due to the rising infrastructural demand from the existing unit and to keep its continuous supply, owing to the growth in the region.

The demand for steel in the country is currently growing at the rate of over 8% and it is expected that the demand would grow over by 10% in the next five years. However, the steel intensity in the country remains well below the world levels. Our per capita consumption of steel is around 110 pounds as compared to 330 Pounds for the global average. This indicates that there is a lot of potential for increasing the steel consumption in India. To meet the increasing demand and to stimulate economic growth the proponent has proposed the project.

The National Steel Policy, 2017 has envisaged 300 million tonnes of production capacity by 2030-31. The per capita consumption of steel has increased from 57.6 kgs to 74.1 kgs during the last five years. The government has a fixed objective of increasing rural consumption of steel from the current 19.6 kg/per capita to 38 kg/per capita by 2030-31. As per Indian Steel Association (ISA), steel demand will grow by 7.2% in 2019-20 and 2020-21. Huge scope for growth is offered by India's comparatively low per capita steel consumption and the expected rise in consumption due to increased infrastructure construction and the thriving automobile and railways sectors. India's current steel producing capacity of is ~140 MTPA and the figure is anticipated to rise to 300 MTPA by 2030-31

National

The steel industry in India has always been on the ascent, owing to the abundant availability of raw materials like iron ore, limestone and coal, besides relatively cheap labour, which is a major cost advantage. It is noteworthy to mention that India is the sixth largest producer of iron ore and the tenth largest producer of crude steel in the world. Steel is a core sector industry and the demand for steel affects the economy of the country.

Periodic researches and surveys have produced highly optimistic results. The demand for steel is growing and will continue to grow in leaps and bounds. The cross-cultural influence on India is getting pronounced, as a result of which a more enhanced lifestyle is on the cards. With cities getting wider and mini townships mushrooming all over, the real estate industry will keep booming, and hence the demand for steel will only keep getting higher in the years to come. The consistent need for steel will only keep getting higher in the years to come. The consistent steel will also be form sectors like automobiles, consumer durables and infrastructure.

Regional

The growth of the steel industry significantly contributes to economic growth of the Nation as well as to the region as it generates employment both directly and also due to development of downstream industries. The infrastructural and other social amenities grow in the region leading to overall development of the region. The proposed project will enhance the overall development of the region.

1.8 Scope of the Study

EIA integrates the environmental concerns in the developmental activities so that it can enable the integration of environmental concerns and mitigation measures in project development. The study includes detailed characterization of existing status of environment in an area of 10 km radius around project site. In order to get an idea about the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment are studied /monitored. Environmental baseline monitoring has been carried out during **1st January 2022 to 31st March 2022** and used to identify potential significant impacts. The report is prepared as per the Standard TOR.

The scope of the study broadly includes:

- To describe the project and associated works together with the requirements for carrying out the proposed development
- To establish the baseline environmental and social scenario of the project site and its surroundings
- To identify and describe the elements of the community and environment likely to be affected by the project
- To identify, predict and evaluate environmental and social impacts during the construction and operation phase of the project
- To study the existing traffic load, predict the increment in traffic due the project and to suggest the management plan for the same
- Details about conservation of resources
- To design and specify the monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the mitigation measures adopted
- To access risk during construction and operation phase and formulate the disaster management plan onsite and offsite
- To evaluate proposed pollution control measures and delineate Environmental Management Plan (EMP)
- To delineate post-project environmental quality monitoring program

1.9 Applicable Environmental Regulations

With respect to prevention and control of environmental pollution, the following Acts and Rules of Ministry of Environment and Forest, Government of India govern the proposed project:

- Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988
- Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987
- Environment (Protection) Act, 1986 amended in 1991 and Environment (Protection) rules, 1986 and amendments thereafter
- The Solid Waste Management Rules, 2016

- Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
- E-Waste (Management) Amendment Rules, 2018
- The Noise Pollution (Regulation and Control) Rules, 2000 and as amended
- EIA Notification dated 14.09.2006 as amended

1.10 Structure of EIA Report

EIA report contains baseline data, project description and assessment of impacts and preparation of Environmental Management Plan and Disaster Management Plan. The report is organized in following ten chapters:

Executive Summary

This chapter describes the summary of the environmental impact assessment studies.

Chapter 1: Introduction

This chapter describes objectives and methodology for EIA.

Chapter 2: Project Description

This chapter gives a brief description of the existing facilities and infrastructure required for proposed project. This chapter also gives outline of status of completion of construction activities as this is an augmentation project

Chapter 3: Description of the Environment

This chapter presents details of the baseline environmental status for microclimate, air quality, noise, traffic, water quality, soil quality, flora, fauna and socio-economic status etc.

Chapter 4: Anticipated Environmental Impact and Mitigation Measures

This chapter discusses the possible sources of pollution and environmental impacts due to the project during construction and operation phases and suggests the mitigation measures.

5. Analysis of Alternative Sites and Technology

This chapter describes the analysis of various alternative sites and the technology required for the project.

6. Environmental Monitoring Program

This chapter provides recommendations for Environment Management Plan (EMP) including mitigation measures for minimizing the negative environmental impacts of the project. Environmental monitoring requirements for effective implementation of mitigative measures during construction as well as during operation of the project along with required institutional arrangements for their implementation. Budgetary cost estimates for mitigation measures are also brought out.

Chapter 7: Additional Studies

This chapter covers information about Public Consultation and Risk Assessment Studies for the construction and operation phase, the safety precautions that are taken during construction phase.

Chapter 8: Project Benefits

This chapter presents the benefits from this project.

Chapter 9: Environmental Cost Benefit Analysis

Chapter 10: Environmental Management Plan

This chapter deals with the Environmental Management Plan (EMP) for the proposed augmentation Project and indicates measures proposed to minimize the likely impacts on the environment during construction and operation phases and budgetary allocation for the same.

Chapter 11: Disclosure of Consultants

This chapter deals with the details of consultants engaged and the NABET accreditation details of environmental consultants.

1.11 Compliance to ToR

The compliance to the Terms of Reference (ToR) for EIA and preparation of Environment Management Plan issued by MoEF&CC, GoI, New Delhi is given in **Table 1.3.**

Table 1.3: Compliance to TOR

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
A. Standard Terms of Reference			
1	Executive Summary of the Project		Executive Summary enclosed as separate document.
2	Introduction		
	i.	Details of the EIA Consultant including NABET accreditation	ULTRA-TECH Environmental Consultancy And Laboratory (Gazzeted By MoEF) Unit No. 206, 224, 225 Jai Commercial Complex, Eastern Express Highway, Opp Cadbury Factory, Khopat, Thane (West) – 400 06. Accredited EIA Consultant Organization by NABET, QCI, New Delhi at S. No.146 (MoEF&CC) List of Accredited EIA Consultant Organizations (Rev. 62; February 05, 2018).
	ii.	Information about the project proponent	M/s. Kamaldeep Ispat Private Limited Plot No A20, Panagarh Industrial Park,

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
			District - Paschim Burdwan, West Bengal - 713148.
	iii.	Importance and benefit of the project	Importance and benefits of the project has been given in Chapter -1, Sub-Section – 1.7 and Chapter - 8 of EIA/ EMP Report.
3	Project Description		
	i.	Cost of the project and time of completion	Project Cost: 65.30 Crore Time of Completion: - within 24 months after obtaining all the regulatory clearances.
	ii.	Product with capacities for the proposed projects	

1.	MS Billets	1,32,000TPA	
2.	Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.)	1,05,600TPA	

iii.	If expansion project, details of existing products with capacities and weather adequate land is available for expansion, reference of earlier EC if any	
iv.	List of raw materials required and their source along with the mode of transportation	

S. No.	Raw Material	Quantity Required in TPA Per Annum	Source	Distance from site (Kms)	Mode of Transport
	For Rolling Mill Products				
1	MS Billets/ Ingot	1,32,000	In-house (captive consumption)	--	Truck
	For Billets				
2	Sponge Iron	1,09,560	Durgapur	16 km	Truck
3	MS Scrap	6,468	Open market		

SN	Description	Compliance in the Draft EIA Report

TOR Conditions

			& in -house		
4	Ferro Silico Manganese	1,848	Durgapur		
5	Pig Iron	29,304	Open market		

v.	Other chemicals and materials required with quantities and storage capacities	Not applicable	
vi.	Details of emission, effluents, hazardous waste generation and their management	Emission	The sources of emissions are Induction Furnace. Stack of 30 m height with bag filter will be attached to Chimneys are as per norms of CPCB to allow effective dispersion of pollutants.
		Effluent	Waste water generated from industrial cooling (75 KLD) will be recycled. Domestic waste water (12KLD) will be generated and will be treated in Septic Tank followed by Soak Pit
		Hazardous Waste	Hazardous waste such as used oil, will be handled as per hazardous waste management handling rules 2016

vii	Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular & contract)	**Particulars**	**Demand**	**Source**
		Water	Total: 47 KLD Fresh: 128 KLD	Ground Water
		Power	Existing: 2750 kVA Proposed: 7250 kVA	WBSEDCL
		Man Power	Existing: 135 Proposed: 165	Local
	The project proponent shall furnish the requisite documents from the competent authority in support of drawl of ground water and surface water and	Ground Water permission are given in **Annexure V.**		

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		supply of electricity.	
	ix	Process description along with major equipments and machineries. Process flow sheet (quantitative) from raw material to products to be provided.	The process description for Induction Furnace and Rolling Mill Plant are given in chapter 2 of the EIA/EMP report.
	x.	Hazard identification and details of proposed safety system.	Hazard identification and details of proposed safety systems is given in Chapter -7 of the EIA/EMP report
	xi.	a. Copy <u>all</u> environmental clearance(s) including Amendments thereto obtained for the project from MOEF & CC/SEIAA shall be attached as an annexure. A certified copy of the latest monitoring report of the regional office of the Ministry of Environment and Forests as per circular dated 30th May 2012 on the status of compliance of conditions stipulated in <u>all</u> of the environmental Clearance including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing / existing operation of the project from SPCB shall be attached with the EIA – EMP report	Not Applicable
		b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA notification 1994 and /	

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		or EIA notification 2006 shall be provided. Copies of consent to establish / No objection Certificate and Consent to operate (in case of units Operating prior to EIA notification 2006, CTE and CTO of FY 2005 – 2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.	
4	Site Details		
	i.	Location of the project site covering village, Taluka/ Tehsil, District and state, Justification for selecting the site, wheather other sites are considered.	**Location:** J.L. No.: 83 The proposed project site is located at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan, West Bengal-713148. No other sites were considered as the land required for the proposed project of M/s Kamaldeep Ispat Pvt. Ltd. Details of proposed alternative sites are given in Chapter -5 of the EIA/EMP report
	ii.	A topo sheet of the study area of radius of 10 km and site location on 1:50,000 / 1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)	A Google Earth Image of the study area of radius of 10 Km and site location on 1:50,000 including all eco-sensitive area is given in chapter -1 & 2 of EIA/EMP report.
	iii	Co-ordinates (lat-long) of all four corners of the site	**Point** / **Latitude** / **Longitude** A / 23°28'2.57"N / 87°27'53.18"E B / 23°28'2.55"N / 87°28'1.45"E C / 23°27'56.30"N / 87°27'59.91"E D / 23°27'56.60"N / 87°27'53.14"E
	iv	Google map-Earth downloaded of the project site	Google map- Earth of the project site is given in Figure 1.3 of chapter-1 of

<table>
<tr><th>S N</th><th colspan="2">Description</th><th>Compliance in the Draft EIA Report</th></tr>
<tr><td colspan="4">TOR Conditions</td></tr>
<tr><td></td><td></td><td></td><td>EIA/EMP report.</td></tr>
<tr><td></td><td>v.</td><td>Layout map indicating existing units as well as proposed units indicating storage area, plant area, green belt area, utilities etc. If located within an industrial area/Estate/Complex, Layout of Industrial area indicating location of unit within the industrial area / Estate.</td><td>Layout maps indicating proposed unit indicating storage area, plant area, greenbelt area, utilities etc is given in Figure 2.1 of chapter -2 of EIA /EMP report</td></tr>
<tr><td></td><td>vi.</td><td>Photographs of the proposed and existing (if applicable) plant site. If existing, shows photographs of plantation / greenbelt, in particular.</td><td>Photographs of the proposed plant sites are shown in Plate 2.4 of Chapter - 2 of EIA/EMP report</td></tr>
<tr><td></td><td>vii.</td><td>Land use break up of total land of the project site (identified and acquired), government / private – agricultural, forest, wasteland, water bodies, settlements, etc</td><td></td></tr>
<tr><td></td><td colspan="3">
<table>
<tr><th colspan="2">Installations</th><th>Area in sq.m</th><th>Area in %</th></tr>
<tr><td>1</td><td>Dispatch Office and Weigh Bridge</td><td>120.03 sq.m</td><td>0.30</td></tr>
<tr><td>2</td><td>Security Room</td><td>10.96 sq.m</td><td>0.03</td></tr>
<tr><td>3</td><td>Labour Rest Room Building</td><td>1020 sq.m</td><td>2.52</td></tr>
<tr><td>4</td><td>Administrative Office</td><td>184.97 sq.m</td><td>0.46</td></tr>
<tr><td>5</td><td>Finished Material Shed</td><td>4824.08 sq.m</td><td>11.92</td></tr>
<tr><td>6</td><td>Rooling Mill Shed</td><td>4752.08 sq.m</td><td>11.74</td></tr>
<tr><td>7</td><td>Billet Shed</td><td>3840.05 sq.m</td><td>9.49</td></tr>
<tr><td>8</td><td>SMS Shed</td><td>4392 sq.m</td><td>10.85</td></tr>
<tr><td>9</td><td>Sponge & Scrap Shed</td><td>3660 sq.m</td><td>9.04</td></tr>
<tr><td>10</td><td>Store & Office, Water Complex ECR Room</td><td>879.05 sq.m</td><td>2.17</td></tr>
<tr><td>11</td><td>33 KVA Indoor Sub-Station</td><td>525 sq.m</td><td>1.30</td></tr>
<tr><td>12</td><td>Road & Paved Area</td><td>1396.87 sq.m</td><td>3.45</td></tr>
<tr><td>13</td><td>Green Area</td><td>14864.49 sq.m</td><td>36.73</td></tr>
<tr><td colspan="2">TOTAL LAND AREA</td><td>40469.58 sq.m</td><td>100</td></tr>
</table>
</td></tr>
<tr><td></td><td>viii</td><td>A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details</td><td>
<table>
<tr><th>Name of Industry</th><th>Distance (km)</th><th>Direction</th></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>SN</th><th colspan="2">Description</th><th colspan="4">Compliance in the Draft EIA Report</th></tr>
<tr><td colspan="6">TOR Conditions</td></tr>
<tr><td></td><td></td><td>of the study area.</td><td colspan="3"><table><tr><td>Ashirvad Pipes Pvt. Ltd.</td><td>Adjacent</td><td>N</td></tr><tr><td>Matrix Fertilizers & Chemicals Ltd.</td><td>3.12 km</td><td>SE</td></tr><tr><td>IFB Agro Industry</td><td>4.25 km</td><td>SSE</td></tr><tr><td>Shaw Lightning Industry</td><td>3.19 km,</td><td>S</td></tr></table></td></tr>
<tr><td></td><td>ix.</td><td>Geological features and geo-hydrological status of the study area shall be included</td><td colspan="3">Geological features and Geo-hydrological status of the study area is given in chapter -3 of EIA/EMP report</td></tr>
<tr><td></td><td>x.</td><td>Details of the drainage upto 5 km radius of the study area. If the site is 1 km radius of any major river, peak rainfall data of apst 30 years. Details of flood level of the project site and maximum Flood level of the river shall also be provided. (mega green field project)</td><td colspan="3">Details of Drainage of the project up to 5km radius of study have been given in chapter-3 of EIA/ EMP Report.
Distances of nearest waterbodies are given in Section 1.5 of Chapter 1 of the EIA/EMP Report.</td></tr>
<tr><td></td><td>xi.</td><td>Status of acquisition of the land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land</td><td colspan="3">The proposed expansion project will be done on a land which is already under possession of M/s Purbanchal Concast Pvt. Ltd.
Details of status of land is given in Chapter -2 of the EIA/EMP report</td></tr>
<tr><td></td><td>xii.</td><td>R & R details in respect of land in line with state government policy.</td><td colspan="3">Not Applicable</td></tr>
<tr><td>5</td><td colspan="2">Forest and Wildlife related issues (if applicable):</td><td colspan="3"></td></tr>
<tr><td></td><td>i.</td><td>Permission approval for the use of forest land (forestry clearance), if any, and recommendations of the state Forest Department.(if applicable).</td><td colspan="3">No forest land is involved in the proposed project site; thus no such permission/approval is required.</td></tr>
<tr><td></td><td>ii.</td><td>Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in</td><td colspan="3">No forest land is involved in the proposed project.
Land use map based on High Resolution Satellite Imagery (GPS) of the proposed</td></tr>
</table>

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		case of projects involving forest land more than 40 ha).	project has been given in Figure 3.6 of chapter-3 of EIA/ EMP Report.
	iii.	Status of Application Submitted for obtaining the stage l forestry clearance along with the latest status shall be submitted.	Not applicable
	iv	The projects to be located within 10 km of the National parks , Sanctuaries, Biosphere Reserves , Migratory Corridors of Wild Animals , the project Proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis – a - vis the project location and the recommendations or comments of the chief Wildlife Warden – thereon .	Not applicable
	v.	Wildlife Conservation plan duly authenticated by the chief Wildlife Warden of the State Government for conservation of Schedule l fauna , if any exists in the study area .	Not applicable
	vi.	Copy of application submitted for clearance under the Wildlife (Protection) Act 1972, to the Standing Committee of the National Board for Wildlife.	Not applicable
6	Environmental status		
	i.	Determination of atmospheric inversion level at the project site and site – specific micro – meteorological date using temperature , relative humidity , hourly wind speed and direction and rainfall.	Due to polar tropopause, ground inversion is common in north of 200N after sunset and after sunrise. The lapse rate is least (4^oC km-1) at 850 mb and 700 mb. However, the 24 hrs windrose includes all the stability clauses and depict the possibility of inversion if any. The lapse rate in the entire north western India is governed by Siberian High and influencing factors are upper air quality. Only IMD Pune has the facility to do so. Site - Specific Micro Meteorological data (Temperature, Relative Humidity, Hourly Wind Speed and Direction, Rainfall) were collected during winter season (January 2021

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
			to March 2021) has been given in table 3.5 of section 3.4 of chapter -3
	ii.	AAQ date (except monsoon) at 8 location for PM_{10}, PM_{25}, SO_2, NO_X, CO and other Parameters relevant to the project shall be collected .The monitoring stations shall be based CPCB guidelines and take into account the pre – dominant wind direction , population zone and sensitive receptors including reserved forest .	➢ One – season data (January 2021 to March 2021) has been generated & collected. ➢ AAQ data includes PM_{10}, $PM_{2.5}$, NO_X, SO_2, CO and other parameters relevant to the project were generated. ➢ The monitoring stations were selected taking into account the dominant wind direction, population zone and sensitive receptors etc. The monitoring station selected is as described in Table 3.7 of chapter-3 of EIA/EMP report.
	iii.	Raw date of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with – min., max ., average and 98% values for each of the AAQ parameters from date of all AAQ stations should be provided as an annexure to the EIA Report .	The raw data of all AAQ measurement for 12 weeks of 8 stations as per frequency given in the NAAQM Notification of November 2009 has been given in chapter3, Section –3.5, Table No. – 3.8 of EIA/ EMP report. The same has been enclosed as **Annexure – VII**
	iv	Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MOEF & CC guidelines.	8 surface water samples were collected as grab samples and were analyzed for various parameters as per CPCB/ MoEF&CC guidelines. The monitoring locations has been given in Table 3.11(B) and the analysis has been given in Table 3.13(A) & 3.13(B)of EIA/ EMP report. The same has been enclosed as **Annexure – III**
	v.	Whether the site falls near to polluted stretch of river identified by the CPCB/MOEF&CC.	Not Applicable
	vi.	Ground water monitoring at minimum at 8 locations shall be included.	8 locations of ground water samples have been analysed for various parameters as per CPCB/ MoEF&CC guidelines. The monitoring locations have been given in Table 3.11(A) and the analysis has been given in Chapter-3, Table No. – 3.12 of

SN	Description		Compliance in the Draft EIA Report
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			EIA/ EMP report. The same has been enclosed as **Annexure – III.**
	vii.	Noise levels monitoring at 8 locations within the study area.	Noise level monitoring was carried out at 8 locations within the study area as per CPCB/ MoEF&CC guidelines. The analysis has been given in chapter-3, Section – 3.6, Table No. – 3.9 of EIA/ EMP report. The same has been enclosed as **Annexure – III.**
	viii	Soil Characteristic as per CPCB guidelines.	Soil sampling was carried out for 8 locations within the study area. The analysis has been given in Chapter-3, Table No. – 3.15(A) of EIA/ EMP report. The same has been enclosed as **Annexure – III**
	ix.	Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.	Addressed in Chapter 3 in section 3.11
	x.	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule – I fauna are found within the study area, a Wildlife Conservation plan shall be prepared and furnished.	The study of flora and fauna (terrestrial and aquatic) existing in the study area has been given in Chapter-3, Section -3.9 of EIA/ EMP report.
	xi.	Socio – economic status of the study area.	Socio-Economic status of the study area has been given in Chapter-3, Section – 3.10 of EIA/ EMP report.
7	Impact Assessment and Environment Management plan		
	i.	Assessment of ground level concentration of pollutants from the stack emission based on site – specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using input of the specific terrain characteristics for	The main source of emission will be the proposed stacks attached to the Induction Furnace and existing Reheating Furnace. The stack heights will be given as the CPCB norms. No D.G set has been proposed.

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		determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emission (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modelling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	
	ii.	Water Quality modelling – in case , if the effluent is study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain .	The plant will maintain zero discharge concepts. Thus, no risk is envisaged due to effluent discharge. Industrial effluent generated from cooling will be recycled. Domestic wastewater generated from the plant, will be disposed through septic tank followed by soak pit.
	iii.	Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail – cum road transport or conveyor – cum – rail transport shall be examined.	Impact of transpiration of raw materials and products is addressed in chapter 4 of the EIA/EMP Report.
	iv	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included, Complete scheme of effluent treatment, Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(p)Rules .	Water Consumption for the proposed project will be 97 KLD (fresh water requirement 43 KLD and recycled water 54 KLD) and waste water generation will be 87 KLD (75 KLD industrial and 12 KLD domestic). Industrial waste water generated from cooling purpose will be recycled. Rain water harvesting will be practiced inside the plant. Details of wastewater generation are given in chapter -2 of EIA/ EMP Report.
	v.	Details of stack emission and	The stack emission detail along with action

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		action plan for control of emissions to meet standards.	plan to control the emissions has been given in Table 4.2 of Chapter–4 of EIA/ EMP Report.
	vi.	Measures for fugitive emission control.	Bag filter is proposed as air pollution control measures to proposed chimneys. Also, stacks of adequate height i.e. 30 m are proposed attached to chimneys to disperse flue gases. Water sprinkling shall be carried out to suppress fugitive dust during construction and operation phase
	vii.	Details of hazardous waste generation and their storage, utilization and disposal .Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste – minimization, recycle/ reuse/ recover techniques, Energy conservation, and natural resource conservation.	Hazardous waste will be handled as per hazardous waste management handling rules 2016.
	viii	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009 . A detailed plan of action shall be provided.	Not applicable
	ix.	Action plan for the green belt development plan in 33% area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.	The plant will development a green belt over an area of approximately 33.40% of the total land area. Details of the same have been given in chapter -10 of EIA/EMP report.
	x.	Action plan for rainwater harvesting measures at plan site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use tops and storm water drains to recharge the ground water and also to used for the various	Action plan for rain water harvesting structure has been constructed at plant site has been prepared to harvest rainwater from roof tops and storm water drains to recharge the ground water. Details have been given in Table 4.6, of the Chapter 4 of EIA/EMP Report.

<table>
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<tr><td></td><td></td><td>activities at the project site to conserve fresh water and reduce the water requirement from other sources.</td><td></td></tr>
<tr><td></td><td>xi.</td><td>Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.</td><td></td></tr>
<tr><td></td><td></td><td colspan="2"><table>
<tr><th rowspan="2">No.</th><th rowspan="2">Particulars</th><th colspan="2">Amount in INR, Lakhs</th></tr>
<tr><th>Capital Cost</th><th>Recurring Cost</th></tr>
<tr><td>1</td><td>Air Pollution Control System</td><td>90</td><td>10</td></tr>
<tr><td>2</td><td>Noise Control System</td><td>10</td><td>5</td></tr>
<tr><td>3</td><td>Green Belt Development</td><td>30</td><td>10</td></tr>
<tr><td>4</td><td>Environment Monitoring and Management</td><td>20</td><td>10</td></tr>
<tr><td>5</td><td>Water Pollution Control System</td><td>30</td><td>20</td></tr>
<tr><td>6</td><td>Occupational Health& Safety</td><td>15</td><td>10</td></tr>
<tr><td></td><td>Total</td><td>195</td><td>65</td></tr>
</table></td></tr>
<tr><td></td><td>xii.</td><td>Action plan for post – project environmental monitoring shall be submitted.</td><td>Action Plan for Post –Project Environmental monitoring has been given in Chapter-6 of EIA/ EMP report.</td></tr>
<tr><td></td><td>xiii.</td><td>Onsite and offsite Disaster (natural and Man – made) preparedness and Emergency Management plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management plan .</td><td>Onsite and Offsite Disaster (Natural and Manmade) Preparedness and Emergency Management Plan including Risk Assessment and damage control have been incorporated in Chapter-7 of EIA/ EMP Report.</td></tr>
<tr><td>8</td><td colspan="2">Occupational health</td><td></td></tr>
<tr><td></td><td>i.</td><td>Details of existing Occupational & Safety Hazards . What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL ,what measures the company has adopted to keep them within PEL so that health of the workers can be preserved .</td><td>The occupational health status is very insignificant. No health impact was evident in the primary survey. However, following mitigation measures will be adopted as preventive action:-
All employees will be trained, educated and encouraged to follow best and safe work practices.
Personnel Protective Equipments like face mask, earmuffs, ear plugs, gloves, safety goggles and safety</td></tr>
</table>

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
	ii.	Details of exposure specific health status evaluation of worker , If the workers health is being evaluated by pre – designed format , chest x rays , Audiometry , Spirometry , Vision testing (Far & Near vision , colour vision and any other ocular defect) ECG, during pre- placement and periodical examinations give the details of the same . Details regarding last Month analysed data of abovementioned of the parameters as per age ,sex, duration of exposure and department Wise .	boots are being provided. • Awareness programme regarding the use, maintenance and up-keep of respirators will be conducted on regular basis so that employees are trained to handle the equipment properly.
	iii.	Annual report of health status of workers with special reference to Occupational Health and Safety .	
	iv.	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.	
9	Corporate Environment Policy		
	i.	Does the company have a well laid down Environment policy approved by its Board of Directors? It so, it may be detailed in the EIA report.	
	ii.	Does the Environment policy Prescribe for standard operating process procedures to bring into focus any infringement / deviation /violation of the environmental or forest norms/ conditions? If so , it may be detailed in the EIA .	Addressed in Chapter 10 of the EIA/EMP Report
	iii.	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance	The company has well-defined hierarchical system to deal with the environmental issues and for ensuring compliance. Details of Environment Management Cell is given in Section 10.5 of Chapter 10 of the EIA/EMP Report.

SN	Description		Compliance in the Draft EIA Report
TOR Conditions			
		conditions? Details of this system may be given.	
	iv	Does the company have system of reporting of non – compliance / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.	Management Representative will appraise the highest authority on quarterly basis regarding the performance of the plant on environmental measures. Management Representative will also post the same on firm's website accessible to public domains.
10	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. To be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase .		Addressed in Chapter 10 of the EIA/EMP report.
11	To address the Public Hearing issues, provisions under Ministry's Office Memorandum Vide F. No. 22-65/2017-IA.III dated 30/09/2020 shall be complied.		Public Hearing will be conducted
12	Any litigation pending against the project and / or any direction / order passed by any court of Law against the project , if so , details thereof shall also be included. Has the unit received any notice under the section 5 of Environment (protection) Act. 1986 or relevant sections of Air and Water Acts? If so, details thereof and compliance / ATR to the notice (s) and present status of the case.		No litigation is pending against the project or the project proponent
13	A tabular chart with index for point wise compliance of above TOR		Complied
14	The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (where stipulated).		Agreed. Validity extension has been taken in time.
The following general points shall be noted:			
	i	All documents shall be properly indexed, page numbered.	Complied
	ii	Period / date of data collection shall be clearly indicated.	Complied
	iii	Authenticated English translation	Complied

SN		Description	Compliance in the Draft EIA Report
TOR Conditions			
		of all material in Regional languages shall be provided.	
	iv	The letter / application for environmental clearance shall quote the MoEF file No. and also attach a copy of the letter.	Complied
	v	The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report	Complied
	vi	The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIAEMP Report.	Complied
	vii	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF vide O.M. No. J11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.	Complied
	viii	The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI) / National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIAEMP reports prepared by them and data provided by other organization /Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIAEMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.	Complied
	ix	ToRs' prescribed by the Expert Appraisal Committee (Industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant	Complied

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	information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. Where the documents provided are in a language other than English, an English translation shall be provided. The draft EIAEMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing / Public consultation, district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be included separately in EIA-EMP Report in a separate chapter and summarized in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance	
B. Additional Terms of Reference		
1	Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (Material and energy balance)	Details of Complete process flow diagram along with description of each unit, process, operation is given in Chapter 2 of the EIA/EMP report.
2	Emission from sulphuric acid plant and sulphur muck management.	Not applicable.
3	Details on installation of Continuous Emission Monitoring System with recording with proper calibration system	Will be complied

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TOR Conditions		
4	Details on toxic metals including fluoride emissions	Not applicable.
5	Details on stack height	Details of the same have been given in chapter -4 of EIA/EMP report.
6	Details on ash disposal and management	Around 15 TPM Ash will be generated which is be used for land filling or will be given to the cement manufacturers.
7	Complete process flow diagram process of lead/zinc/copper/aluminium,etc.	Not applicable
8	Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation	Details of the same have been given in chapter -2 of EIA/EMP report.
9	Details on Holding and de-gassing of molten metal from primary and secondary aluminum, materials pre-treatment, and from melting and smelting of secondary aluminum	Not applicable.
10	Details on toxic metal content in the waste material and its composition and end use (particularly of slag)	Details of the same have been given in chapter -4 of EIA/EMP report.
11	Trace metals in waste material especially slag	Metal portion will be extracted from the Slag and reused for land filling / Road construction
12	Plan for trace metal recovery	There will be no trace metals in the Slag. Metal part of slag will be extracted and slag shall be reused as mentioned above.
13	Trace metals in water	There will be no trace metals in industrial water. Surface and Ground water analysis also showed no trace metals.
Specific TOR		
i.	Action plan to limit the dust emission from all the stacks below 30 mg/Nm3 shall be furnished.	Action plan to limit the stack emission is described in Section 4.3 of Chapter 4 of the EIA/EMP Report.
ii.	Action plan for fugitive emission control in the plant premises shall be provided.	Action plan to Control the fugitive emission is described in Section 4.3 of Chapter 4 of the EIA/EMP Report.
iii.	Action plan for green belt development covering 33% of the area shall be submitted.	Greenbelt Development Plan is given in Section 10.3 of Chapter 3 of the EIA/EMP Report.
iv.	Action plan for 100 % solid waste utilization shall be submitted.	Details of Solid waste management is given in Table 10.3 of Chapter 3 of the EIA/EMP Report.
v.	Action plan for rain water harvesting shall be submitted.	Provision for Rainwater harvesting is given in Section 10.3 of Chapter 10 of the EIA/EMP Report.

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vi.	Action plan for the stock piles with impervious floor, provision of garland drains and catch pits to trap run off material shall be submitted.	Not applicable. Materials will be stored on RCC floor and no liquid materials will be stored. Hence, run off of materials is not envisaged.
vii.	Action plan for 90 % Hot Charging shall be practiced. 10 % billets shall be processed through old RHF which shall operate on pulverized coal.	Will be compiled.

CHAPTER 2: PROJECT DISCRIPTION

This chapter highlights the features of the proposed expansion activity with plant layout, process details, various utilities and services, infrastructural facilities and the sources of waste generation with suitable measures for safe disposal of the wastes.

2.1 Type of project

Kamaldeep Ispat Private Limited (KIPL) was established in 16th October, 2007 involved in manufacture and supply of steel bars such as Square steel billets, Carbon steel round bars, Carbon steel flat bars, Mild steel round bars and Mild steel flat bars, Angles channel, Joist etc. Kamaldeep Ispat Private Limited has its registered office at Jalan Complex, NH-6, Jangalpur, Biprannapara, Begri, Dist. – Howrah, West Bengal.

Considering the future growth potential of steel market, M/s KamaldeepIspat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc. at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal.Although the proposal is for hot charging, an additional Reheating furnace of 16TPH capacity is being proposed which will be used in case of breakdown of the Induction Furnace.

The proposed project is coming up within the land area of 10 Acres at Plot No A20 of Panagarh Industrial Park, which has been allotted to KIPL by West Bengal Industrial Development Corporation Ltd. The possession certificate is attached as **Annexure-II**. Total cost of proposed project is Rs.63.50Crores.

As per EIA notification dated 14thSeptember, 2006 and its subsequent amendment, the project is categorized under sector 3 (a) and category "B1".

2.2 Need and Justification of the Project

Steel is one such material that has played an important role in the development of mankind in the last century. Today, it is difficult to imagine a world without steel. Steel has become vital to our everyday life, it is at the root of the quality of life that each of us enjoys today, helping to shelter us, to feed us and to facilitate both our working day and leisure activities. We depend on steel for almost everything from our houses and buildings, the cars we drive, roads, bridges, agricultural equipment, machines, the list is endless.

Steel is a versatile, constantly developing material that underpins all manufacturing activity. Even if a product is not made entirely from steel, it will undoubtedly have steel as a component at some point in the manufacturing process. There are currently more than 3,500 different grades of steel with many different properties- physical, chemical, environmental, 75% of which have been developed in the last 20 years. Steel is also an environment friendly material and has the distinction of being the most recycled material in the world today.

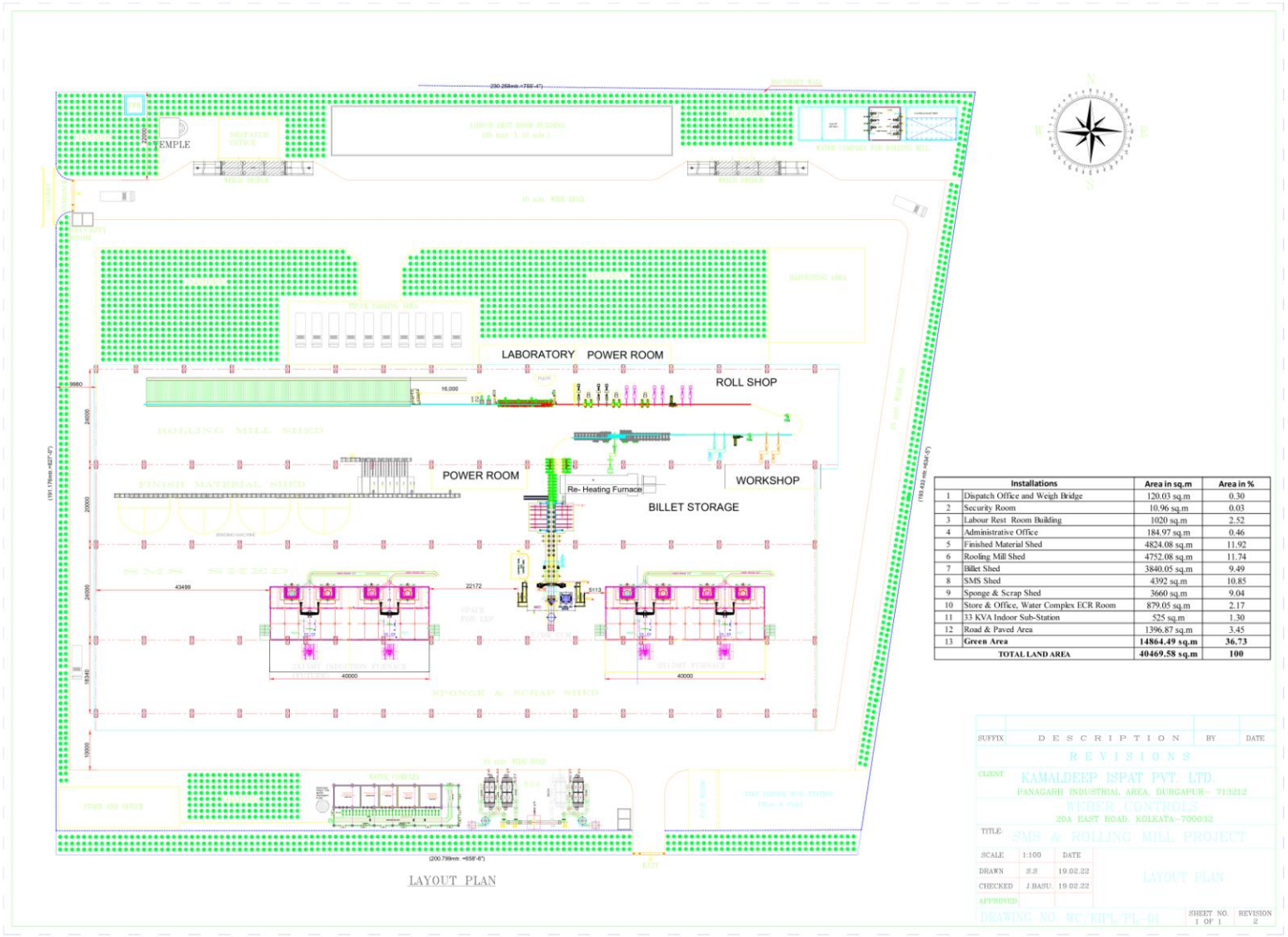
Today, consumption of steel is also regarded as an indicator of development of a nation. Per capita steel consumption is now universally accepted as an index of economic development of a nation. Given its role, steel has established itself as the backbone of any economy.

The need for the proposed unit for MS Ingots & M.S. Billets is due to the rising infrastructural demand from the existing unit and to keep its continuous supply, owing to the growth in the region.

M/s Kamaldeep Ispat Pvt. Ltd has drawn up a growth plan with Considering the future growth potential of steel market, M/s Kamaldeep Ispat Pvt. Ltd. has proposed to set a Steel Plant by installing 4X10T Induction Furnace, CCM & Rolling Mill for production of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill products e.g. TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.) at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal.

2.3 Project Location and Layout

The proposed plant of Kamaldeep Ispat Pvt. Ltd. is located at at Plot No. A20, Panagarh Industrial Park, Dist. - Paschim Barddhaman, West Bengal The proposed expansion will be carried out within the existing plant premises itself in an area of 10.00 Acres. Thus, no additional land will be acquired for the proposed expansion activity. The overall plant layout is shown in **Figure 2.1** and also attached as **Annexure IV**.



	Installations	Area in sq.m	Area in %
1	Dispatch Office and Weigh Bridge	120.03 sq.m	0.30
2	Security Room	10.96 sq.m	0.03
3	Labour Rest Room Building	1020 sq.m	2.52
4	Administrative Office	184.97 sq.m	0.46
5	Finished Material Shed	4824.08 sq.m	11.92
6	Rooling Mill Shed	4752.08 sq.m	11.74
7	Billet Shed	3840.05 sq.m	9.49
8	SMS Shed	4392 sq.m	10.85
9	Sponge & Scrap Shed	3660 sq.m	9.04
10	Store & Office, Water Complex ECR Room	879.05 sq.m	2.17
11	33 KVA Indoor Sub-Station	525 sq.m	1.30
12	Road & Paved Area	1396.87 sq.m	3.45
13	**Green Area**	**14864.49 sq.m**	**36.73**
	TOTAL LAND AREA	**40469.58 sq.m**	**100**

Figure 2.1: Plant Layout Showing Proposed Project

2.4 Size or Magnitude of Operation

The proposal is for installation of 4X10T Induction Furnace for Manufacturing of M.S. Ingot/Billet (1,05,600 TPA) and Rolling Mill (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.) at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan, West Bengal. Although the proposal is for hot charging, an additional Reheating furnace of 16TPH capacity is being proposed which will be used in case of breakdown of the Induction Furnace. Details of product and machineries have been given in Table No. 2.2.

Table 2.1: Product & Installation Details

Production (Proposed)	
MS Billets	1,32,000TPA
Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.	1,05,600TPA
Installation details	
Induction Furnace	4x10 Ton
Continuous Casting Machine	1X2 Strand and 7 m Dia
Rolling Mill	1x16 TPH
Reheating Furnace	1 x 16 TPH

2.4.1 Land Requirement

The total land available under the ownership of M/s. Kamaldeep Ispat Pvt. Ltd. is 10 Acre i.e.40469.58 Sq.m. The proposed activities will be carried out within the allotted land. The details of land-use breakup of the existing plant and after the proposed expansion are given in **Table 2.2**.

Table 2.2: Land Use of Project Site

Installations		**Area in sq.m**	**Area in %**
1	Dispatch Office and Weigh Bridge	120.03 sq.m	0.30
2	Security Room	10.96 sq.m	0.03
3	Labour Rest Room Building	1020 sq.m	2.52
4	Administrative Office	184.97 sq.m	0.46
5	Finished Material Shed	4824.08 sq.m	11.92
6	Rooling Mill Shed	4752.08 sq.m	11.74
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10	Store & Office, Water Complex ECR Room	879.05 sq.m	2.17
11	33 KVA Indoor Sub-Station	525 sq.m	1.30
12	Road & Paved Area	1396.87 sq.m	3.45
13	**Green Area**	**14864.49 sq.m**	**36.73**
TOTAL LAND AREA		**40469.58 sq.m**	**100**

2.4.2 Raw materials

Following raw materials will be required for the manufacturing of MS billets & Rolling mill products.

Table 2.3: Details of Raw Material

S. No.	Raw Material	Quantity Required in TPA Per Annum	Source	Distance from site (Kms)	Mode of Transport
For Rolling Mill Products					
1	MS Billets/ Ingot	1,32,000	In-house (captive consumption)	--	--
For Billets					
2	Sponge Iron	1,09,560	Durgapur	16 - 20 km	Truck
3	MS Scrap	6,468	Open market & in -house		
4	Ferro Silico Manganese	1,848	Durgapur		
5	Pig Iron	29,304	Open market		

2.4.3 Power Requirement:

The total power requirement for the proposed is as given below: -

Table 2.4: Power Demand

Phase	Proposed	Source
Operational	Around 14000 KVA	DVC

Table 2.5: Details of Fuel Requirement

Fuel (Any one)	Machinery	Max Quantity Per day
Furnace Oil	Re-heating Furnace*	14.4KL
Grassfire Coal		44.8T
Pulverized Coal		32.0T
Coal Bed Methane (BCM)		16000 SCM

** The actual proposal is for Hot Charging. Reheating Furnace will be used at the time of Furnace Breakdown.*

2.4.4 Water Requirement

The total water requirement will be around 97 KL per day, out of which 12 KL will be used for domestic purpose from where around 09 KL sewage water will be generated which will be disposed through septic tank followed by soak pit. For industrial cooling purpose, around 75 KLD water will be required from where around 54 KLD water will be recycled. Another 10 KLD water will be required for plantation and sprinkling purpose. For the cooling makeup water and other purpose, total fresh water requirement will be 43 KLD. Water demand will be met from Ground Water at initial stage and later the water will be supplied by PHE.

permission letter and additional ground water application letter is attached as **Annexure V**. The water balance of the project (existing and after expansion) is given in **Figure 2.2**

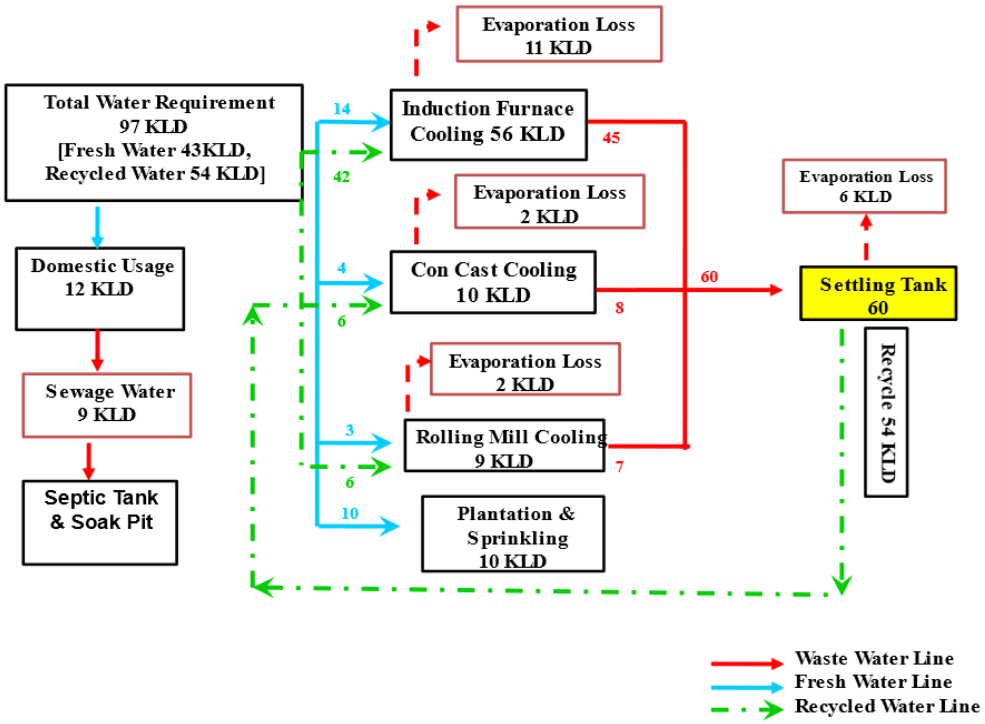


Figure 2.2: Proposed Water Balance Diagram

2.4.5 Manpower Requirement

KIPL will generate direct employment of 271 employees and indirect employment of more than 200 personnel. This will improve employment statistic of the local area, their living standards and livelihood. Details of direct manpower requirement is as under-

Table 2.6: Details of Manpower

Employee Category	Proposed
Administrative Staff	20
Production Staff	168
Other staff	8
Contract Labour	75
Total Employee	271

2.5 Project Schedule for Approval and Implementation

The activities will be completed in a period of one year from the date of receipt of all the approvals from statutory authorities.

2.6 Technology and Process Description

❖ **Process description of MS Billets**

The manufacturing process of MS Ingots &MS Billets involves the following steps in sequence.

MS Billets manufacturing process

(a) The Preparation of Charge

MS Scrap &Sponge Iron form the major raw materials for steel making in the induction furnace. Selected scrap of consistent quality is to be used.

(b) Melting the Charge in Induction furnace

Working of Induction Furnace

After the furnace is switched on; current starts flowing at a high rate and a comparatively low voltage through the induction coil of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. The induced magnetic fluxes thus generate cut through the packed charge in the crucible. As the magnetic fluxes cut through the scraps and complete the circuit, they generate an induced current in the scrap. This induced current, as it flows through the highly resistive path of the scrap mix, generates tremendous amounts of heat and melting of scrap starts. As soon as the charge has melted clearly, any objectionable slag is skimmed off, and the necessary alloying elements are added.

When these additives have melted completely, the power input may be increased to bring the temperature of metal up to the point most desirable for pouring.

The current is then turned off and the furnace is tilted for pouring into a ladle. As soon as pouring has ceased the crucible is cleaned completely from any slag or metal droplets adhering to the wall of the crucible and the furnace is now ready for charging again.

(c) Ingots/Billet manufacturing through Continuous con-cast machine

Liquid Metal from Induction Furnace is carried in a ladle over the Con-cast Machine. The liquid metal flows from the ladle through a slide gate system underneath it into water cooled copper mould tubes which solidifies the liquid metal into a square shaped mould which we call as M.S. Billets.

Continuous Casting Machine:

Liquid Metal from Induction Furnace is carried in a ladle over the Con. casting Machine. The liquid metal flows from the ladle through a slide gate system underneath it into water

cooled copper mould tubes which solidifies the liquid metal into a square shaped mould which we call as M.S. Billets.

Hot Charging Rolling Mill

The hot charging is a best way to reduce the energy cost and improve the product quality at the same time. The process involves converting the shape stock viz. Ingots/billets to desired finished section in hot condition by way of passing the material between a pair of grooved rolls and providing suitable reduction at various stages. Whole operation is conducted at a particular temperature range and within a limited time span. Stages of rolling operation are comprised of heating of feed stock to rollable temperature, rolling the feed stock in different mill stands, cropping the hot bar during process of rolling between stands as applicable and subsequently finishing in the form of hot rolled deformed bar in straight length. The hot bar coming out of last pass is then conveyed through TMT line and collecting in a cooling bed after shearing. The bars at almost ambient temperature are sheared to commercial length stored and kept ready for dispatch. In TMT process hot bars are subjected to quenching by means of an intense cooling installation (cooling installation specially designed water spray system). This step hardens the surface layer to marten site while the core structure remains austenite. When the bar is free of water chamber heat flows from core to surface and surface gets tempered to structure called tempered marten site. In the cooling bed due to atmosphere cooling, the hardened zone is tempered by temperature homogenization in the cross section and the austenite core is transferred to ducktile-ferrite-pearlite core.

Table 2.7: Material Balance for MS Billets

Raw Material	Input Quantity (TPA)	Product(s)	Product Quantity (TPA)
Sponge Iron	1,09,560	M.S Billet	1,32,000
M.S. scrap	6,468	Slag	13,680
Ferro alloy	1,848	Burning Loss	1,500
Pig Iron	29,304		
Total	**1,47,180**	**Total**	**1,47,180**

Table 2.8: Material Balance for Rolling Mill products

Raw Material	Input Quantity (TPA)	Product(s)	Product Quantity (TPA)
M.S. Billets/Ingots	1,32,000	TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.	1,05,600
		Mill Scale ~1.5%	1,980
		Scrap	24,420
Total	**1,32,000**	**Total**	**1,32,000**

Manufacturing Process flow chart is depicted in **Figure 2.3.**

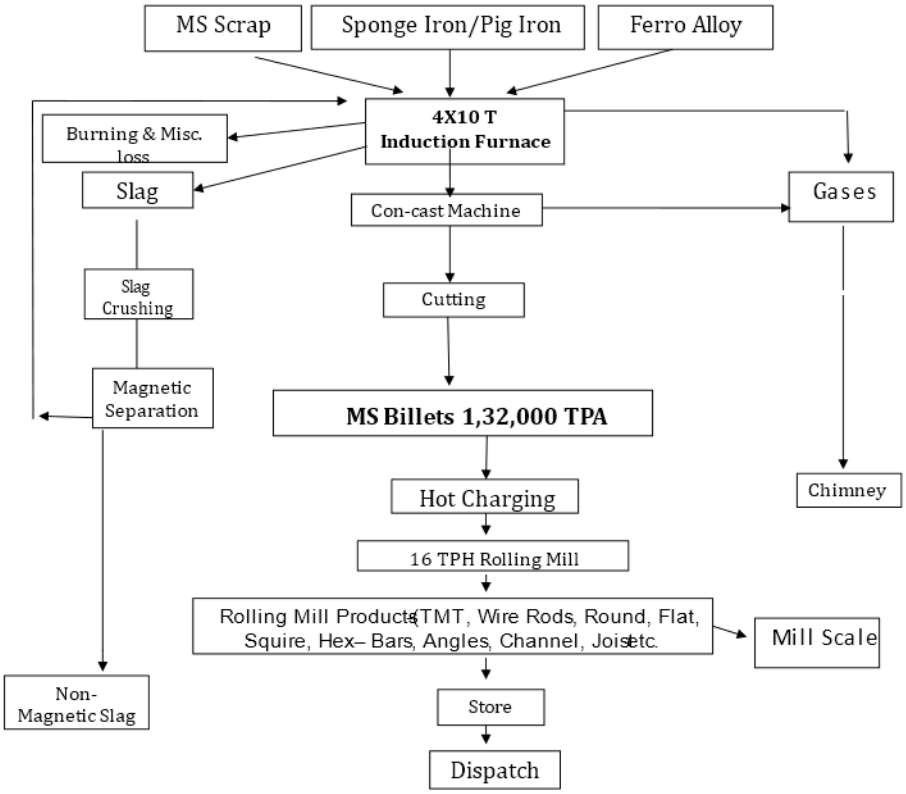


Figure 2.3: Process flow chart

2.7 Fume Extraction System

1. Gas Ingress Arrangement:

Hoods (for Induction Furnace)

A hood at a distance will facilitate the charging of scrap in the crucible by electromagnet. The diameter of the hood will be sufficient to capture the fumes generated in the crucibles. Swivelling/Sliding Arrangement (for Induction Furnace) This will be driven by a motor, gearbox and a gear and pinion arrangement. A variable frequency drive will be provided to the motor to exercise finer control on the motor speed and movement of the hood. There will be two such arrangements one for each crucible. These will facilitate proper positioning of hood during melting cycle and withdrawal of hood during pouring and de-slagging operation.

2. Manual Draught Balancing Dampers: Two manual draught balancing dampers are provided to regulate the gas flow to a common spark arrestor.

3. Spark Arrestor:

Application

The spark arrestor is used generally in the system where sparks are likely to generate and which can pose threat to filter bag media.

Construction

Spark arrestor consists of casing with perforated sheets, hoppers dust discharge value and support structure. Perforated sheets are arranged vertically in the casing. Inlets and Outlets are so arranged that gas take 90 degree turn through perforated sheet.

Working Principle

The spark gets impinged on perforated sheets and losses momentum and heat. They fall by gravity in the hopper and get extinguished. In this case the Spark Arrestor shall be located after the swivelling hood of the induction furnace, to avoid any travel of flame/spark towards the bag filter

4. Dilution Damper: A dilution damper is provided to ensure there is no temperature surge in the gas stream

5. Control Centre:

(a) Swivelling arrangement for hood – 2 Nos
(b) Rotary Airlock value for Spark Arrestor – 1 No
(c) Rotary Airlock value for Bag filter – 4 Nos

6. Compressor:

A two stage compressor to deliver 1.5 m3 /min with drive and motor at 5-7 bars will have to be provided.

7. Various Duct Supports, Platform Railings:

Set of saddles, supporting structures, ladders, stairs and platform for access and maintenance are to be provided for air cooled ducts depending on the SMS shed layout.

8. Technical Specifications for Baghouse:

The Baghouse is an equipment that will ensure filtration of particulates-nuisance dust from the induction furnace and will ensure that the system will give emission levels less than the prescribed limits of pollution control standards.

9. Centrifugal Fan: The fan which is the heart of the system will provide sufficient suction to maintain sufficient negative draught within the system.

The schematic diagram of fume extraction system is shown in **Figure 2.4**.

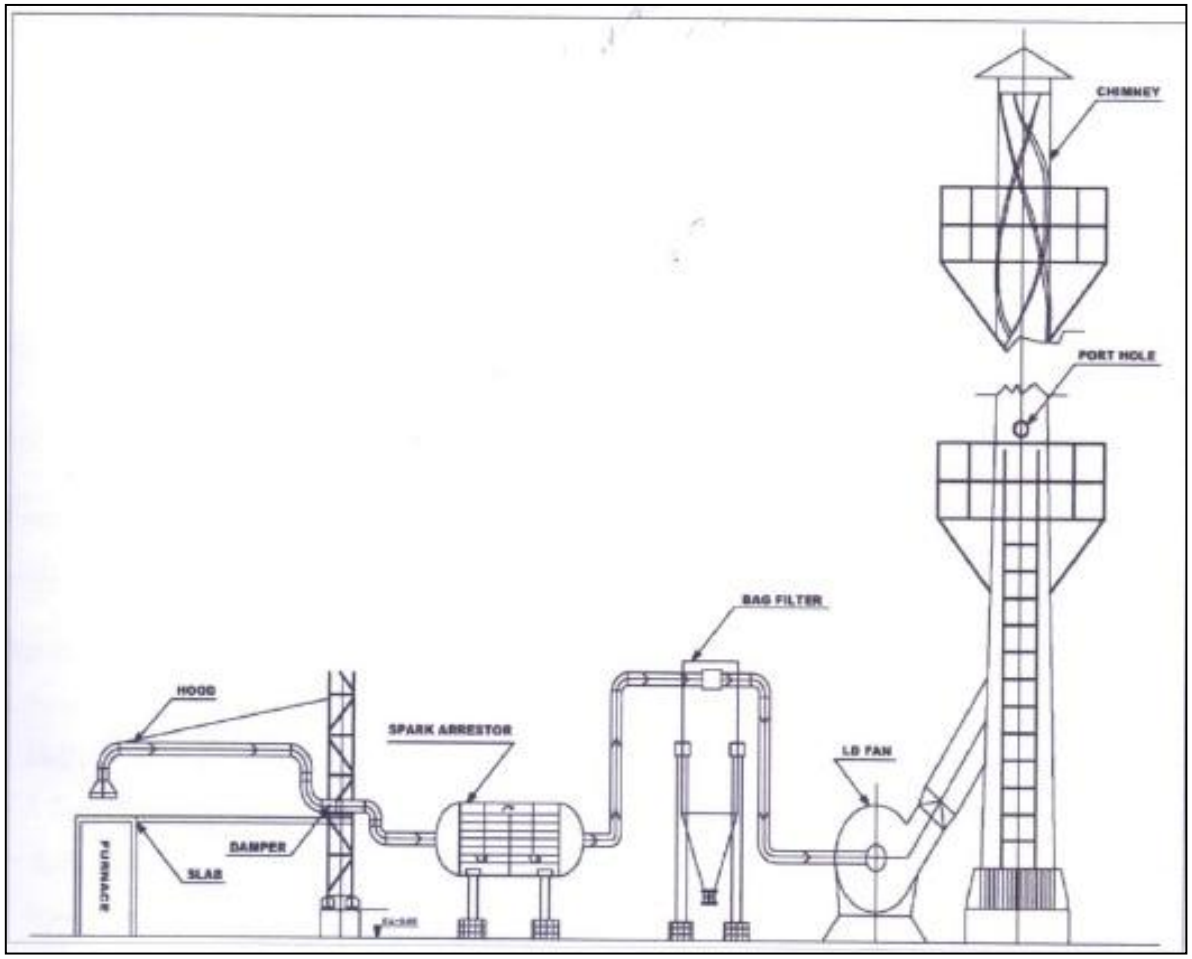


Figure 2.4: Schematic Diagram of Fume Extraction System

10. Bag Filter:

In a Jet Pulse Dust collector the dirty gases enter through inlet manifold to the hoppers where separation of coarse dust particles takes place. The remainder will pass with the gases to the filtering space. Bags are secured in the tube sheet through flange and suspended from top. Wire cages are provided to prevent the bags from collapsing. Filtration takes places from outside to inside of bags. Dust particles are deposited on the outside surfaces of the bags while the clean gases pass through the outlet manifold and finally to the atmosphere through ID fan.

The bags are cleaned intermittently through compressed air pulsed in reverse direction. A Short pulse of compressed air is directed downwards from a header into a row of bags; causing the bags to flex and dislodge the dust cake from outside the bags, the dust falls into the hopper by gravity and hence into the dust handling system. One to few rows of bags are pulsed at time after a predetermined period. The entire cleaning cycle is fully automatic and based on time mode. All timings are adjusted in the field to ensure optimum cleaning efficiency and compressed air consumption. The merits of bag filters are:

It can clean gases up to 3 microns level (up to 99%) We can get maximum efficiency by providing good air to clothe ratio (Min of 110cub.m/hr – sq. m) Dust disposal is easy through

rotary airlock valve Even though 1 or 2 bags are damaged there will be not be much difference in the efficiency.

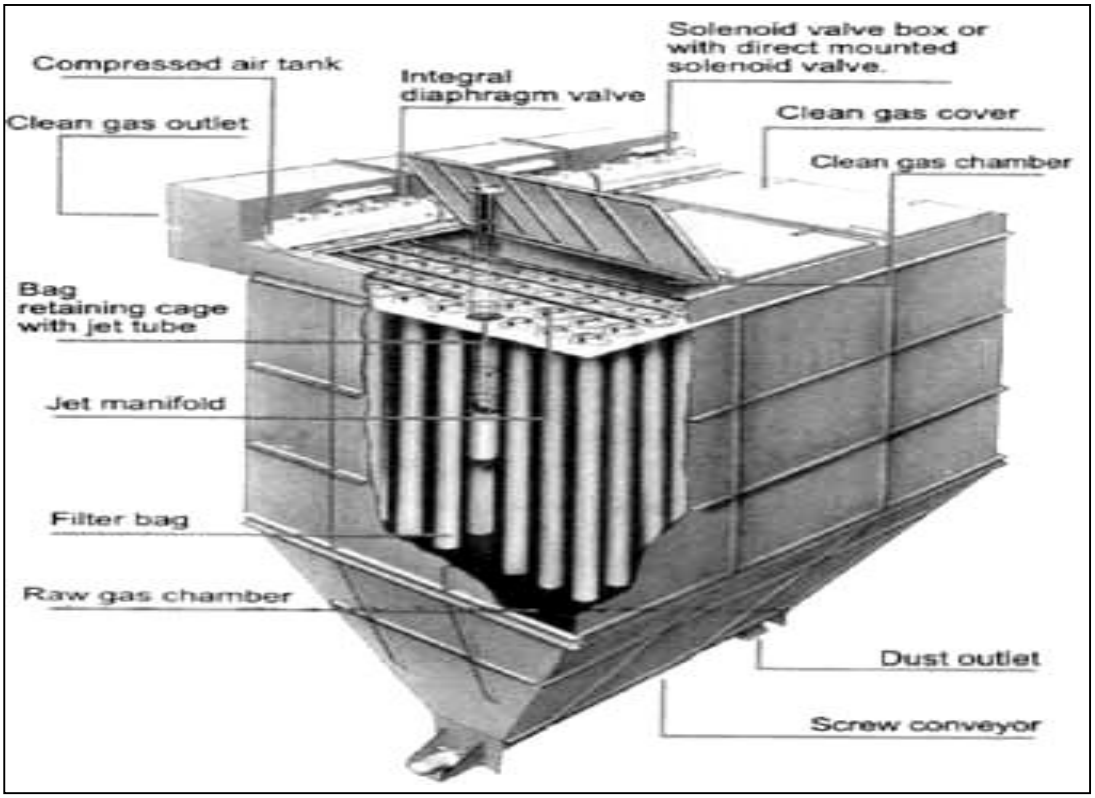


Figure 2.5: Section of Bag Filter

Table 2.9: Specifications of Spark Arrestor & Bag Filter

Spark Arrestor	
Total gas volume	40,000 Nm^3/hr
Temperature	180°C (Inlet)
Pressure drop through Spark Arrestor	50 mmWC
Overall dimension of Spark Arrestor	1m dia x 1.5m long
Inlet velocity	16.7 m/sec
Rotary air lock	400 mm x 400 mm
Geared Motor for rotary air lock valve	0.37 KW, 30 rpm
Bag Filter Unit	
Gas volume	40,000 Nm^3/hr
Air to cloth ratio	1.43 $m^3/min/m^2$
Total filtration area	465.74 m^2
No. of filter bags	270 nos.
No. of Module	1 no.
No. of filter bags in each module	270 nos.
Compressed air quantity	40 m^3/hr at 6-8 kg/cm^2
Pressure drop across bag filter	150mmWC

Temperature	100°C - 130°C
Size and quantity solenoid valves	40NB/18 nos.
Size of rotary air lock	400 x400 mm
Geared motor rating of rotary air lock	0.37 KW 30 rpm
Pulse interval	10-30 sec
Expected outlet particulate matter after APC system	Below 50 mg/m^3

2.8 Sources of Pollution

The various types of pollution from the expansion project are categorized under the following types:

- Air Pollution;
- Water Pollution;
- Pollution emanating due to solid waste; and
- Noise Pollution

2.8.1 Air Pollution Sources and Mitigation Measures

The source of air emission from the proposed project is dust and gaseous emission from the proposed Induction Furnaces in melting unit and reheating furnaces in the rolling mill. The air pollution management is presented in Chapter - 4 of this report. Melting of metals and alloys in the induction furnaces generates dust and metal oxide fumes. These dust and fumes are extracted from the furnace and they are passed through an air pollution control system consisting of spark arrestor, dilution damper followed by bag filter etc. and then it was released into the atmosphere through stacks connection to each IF of height 30.0 m. Fugitive Emissions are generated from vehicular movements for transporting the raw material and end products to and from the plant premise. The emission generated by the diesel generator set is released into the atmosphere through a stack (stack height as per CPCB).

The heating of billets in the reheating furnace using coal and furnace oil generates dust and flue gases. These dust and gases are extracted from the furnace and they are passed through a wet scrubber and then it was released into the atmosphere through a stack of height 30.0 m

2.8.2 Wastewater Generation and its Management

The concept of extensive recycling of water has been adopted in the design of plant water systems.

Water for industrial usage is mainly required for only cooling purpose which is fulfilled by Ground Water Sources.
No pre- treatment of water is required, as the water is directly used. Closed circuit cooling system will be adopted in SMS (Steel Melting Shop). Hence there will not be any waste water generation from process and cooling, only domestic wastewater is generated from

toilets and other service units would be will be Disposed through Septic Tank followed by Soak Pit.

2.8. 3 Solid Waste Generation and Management

Slag will be generated during processing which is stored in an own landfill area and sent to authorized recycler. Dust deposited in the bag filters will be collected and also used for backfilling purpose. The different waste quantity and handling methods are given in Table 2.9.

Table 2.10: Details of Solid Waste Generation & its management

Industrial Waste		
Type of Waste	**Proposed**	**Treatment/Disposal**
Slag	1140 TPM	Slag will be crushed and metal part will be recovered by magnetic separator and rest part will be used for road construction.
Mill Scale	2640 TPA	Sold to contractor for sinter plant
Sludge from Settling tank	1.88 TPA	WBPCB authorized/approved site
Dust from APC System	128TPM	Dust will be packed in HDPE bags and stored in godown and the same is to be used in land filling/sold to authorized vendor for production of fly ash bricks
Municipal Solid Waste (MSW) -Kg/Day		
Type of Waste	**Quantity**	**Treatment/ Disposal**
Wet Garbage	16.26	To be disposed off as per MSW Rules
Dry Garbage	10.84	To be disposed off as per MSW Rules

2.8.4 Noise Pollution

Rotating equipment's like Feed Pumps, Gear Box, ID Fans, and FD Fans are source of noise pollution and vibration. Proper acoustic enclosure and vibration isolators for rotating equipment and providing silencers for vents will help in keeping noise level within CPCB norms and vibration transmission within control.

In areas where bringing down the noise level to within the acceptable limit is not possible, personnel working in these areas will be provided with noise reduction aid such as ear muffs, ear plugs and also the duration of exposure of the personnel will be limited as per the norms stipulated.

CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

3.1 General

This chapter illustrates the description of the existing environmental status of the study area with reference to the prominent environmental attributes. The study area covers the region falling within 10 km radius around the proposed MS Billets & Rolling Mill Products- Rolling Mill Products (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc.The existing environmental setting is considered to adjudge the baseline environmental conditions, which are described with respect to climate, hydro- geological aspects, atmospheric conditions, water quality, soil quality, vegetation pattern, ecology, socio-economic profiles of people, hydro-geological aspects, land use and archaeological importance.

The present report incorporates the data monitored over a period of three months from **1st January 2022 to 31st March 2022** and secondary data collected from various government, semi-government and public sector organizations. The primary baseline monitoring consists of meteorology, ambient air quality, noise levels, water quality, soil quality and ecology (aquatic and terrestrial). The land use, geology, demography, is based on the secondary data collected from various Government, semi-Government and public-sector organizations.

Methodology

Appropriate methodologies have been followed in developing the EIA/EMP report. The methodology adopted for the study is outlined below:

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
1	**Air Environment**						
(i)	Meteorological Wind Speed ,Wind Direction Max. Temperature Min. Temperature Relative Humidity Rain fall Solar radiation Cloud cover	1 location at project site	One hourly continuous for one season	Automatic Weather stations with sensor and microprocessor Max/ Min Thermometer Hygrometer AnemometerRain gauge As per IMD specifications	IS 8829Site specific primary data is essential Secondary data from IMD, Durgapur (WB.)	Site specific primary data	Secondary data IMD Durgapur for data verification and selection of sampling locations
(ii)	**Ambient air quality**						
	$PM_{(10)}$	8 locations, one at project site and 7 in buffer area (in the project impact area/study area)	24 hourly twice a week	As per CPCB Guidelines Gravimetric	IS: 5182 (Part 23): 2006 (As per CPCB guidelines)	• Minimum 2 locations in up wind. • 2 Sites in downwind (based on impact receptor).predominant wind direction • Sensitive receptors. • Transportation route receptors. • Land use pattern	Interpretation based on CPCB NAAQ standards 2009
	$PM_{(2.5)}$		24 hourly twice a week	As per CPCB Guidelines Gravimetric	CARB SOP MLD 055 PM 2.5 gravimetric analysis – revision 9, July 2008 Page 1 of 32 (As per CPCB guidelines)		
	SO_2		8 hourly continuous and averaged for 24 hours twice a week	Improved West & Gaeke	IS: 5182 (Part-2)-2001, RA 2006 (As per CPCB guidelines)		

Sr. No	Attributes	Sampling Network	Measurement Method Frequency	Measurement Method Method	Procedure	Selection Criteria	Remarks
	NO_X		8 hourly continuous and averaged for 24 hours Twice a week	Modified Jacob Hochheiser	IS: 5182 (Part-6)-2006 (As per CPCB guidelines)		
	CO		8 hourly continuos and averaged for 24 hours twice a week	NDIR Method	IS: 5182 (Part 10)-1999 RA-2003 (As per CPCB guidelines)		
2	**Noise**						
	Hourly equivalent noise levels dB(A)	8 locations, one at project site and 7 in buffer area (in the project impact area/study area)	24 hourly Once in season	Noise level meter	IS:9876 2001(As per CPCB)	• Minimum 2 locations in up wind • 2 sites in downwind (based on impact receptor) • sensitive receptors. • Transportation route receptors. • Land use pattern	CPCB /OSHA
	Day Time Noise Levels (Leq_{day}) dB(A)		Once in season		CPCB/ OSHA		
	Night time Noise Levels (Leq_{night}) dB(A)		Once in season		CPCB		
3	**Water Environment**						
(i)	**Parameters for water quality** **<u>Surface water</u>** ▪ pH; ▪ Turbidity; ▪ Total Hardness (as $CaCO_3$); ▪ Total Alkalinity (as $CaCO_3$); ▪ Chlorides (as Cl); ▪ Sulphate (as SO_4);	Set of grab samples during study period at 8 location	Once in season	Samples for water quality has been collected and analyzed as per Standards methods for examination of water and wastewater analysis published by American Public Health	As per the CPCB guidelinesTest method is given in respective component in, Section-3 of EIA report	• Based on water utilization • Upstream and downstream based on outlet (if any)	* subject to availability of surface water sources

Sr. No	Attributes	Sampling Network	Measurement Method Frequency	Measurement Method Method	Procedure	Selection Criteria	Remarks
	Nitrate (as NO_3); ▪ Fluoride (as F); ▪ BOD(3Days at 27ºC;) ▪ COD; ▪ Phenolic Compounds (as C_6H_5OH); ▪ Lead (as Pb); ▪ Iron (as Fe); ▪ Arsenic (as As); ▪ Cadmium (as Cd); Total Chromium (as Cr); ▪ Mercury (as Hg); Copper (as Cu); ▪ Zinc (as Zn); ▪ Selenium (as Se); ▪ Oil & grease; ▪ Colour; ▪ Dissolved solids; Residual free chlorine; ▪ Boron (as B); ▪ Calcium (as Ca); ▪ Magnesium (as Mg); ▪ DO;			association.			
(ii)	**Ground water** ▪ Color; ▪ pH; ▪ Turbidity; ▪ Dissolved solids; ▪ Aluminium as Al; ▪ Ammonia (, as total ammonia-N);	Set of grab samples during study period at the above mentioned 8 locations for ground water.	Once in season	Samples for water quality has been collected and analyzed as per Standards methods for examination of water and wastewater	As per the CPCB guidelines Test method is given in respective component in, Section-3 of EIA report	• Based on water utilization • Ground water flow pattern • Based on impact zone	

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	▪ Anionic Detergents as MBAS; ▪ Barium as Ba; ▪ Boron as B; ▪ Calcium as Ca; ▪ Chloramines as Cl_2 ;Chloride as Cl;Copper as Cu; Fluoride as F; ▪ Free Residual Chlorine; ▪ Iron as Fe; Magnesium as Mg; Manganese as Mn; ▪ Nitrate as NO_3; Phenolic Compounds as C_6H_5OH; ▪ Selenium as Se; ▪ Sulphate as SO_4. ▪ Total Alkalinity as $CaCO_3$. ▪ Total Hardness as $CaCO_3$. ▪ Zinc as Zn, ▪ Cd; Pb; Hg; As;Ni;C			analysis published by American Public Health association.			
4	**Land Environment**						

Sr. No	Attributes	Sampling Network	Measurement Method Frequency	Measurement Method Method	Procedure	Selection Criteria	Remarks
i	**Soil** ▪Particle size distribution; ▪Texture; ▪pH. ▪Electrical conductivity; ▪Bulk density; ▪Organic carbon; ▪Sodium (Na); Potassium (K); ▪Moisture content; ▪Total Nitrogen; Available phosphorous; ▪ organic matter; ▪Total Soluble Chloride; ▪Total Soluble sulphate; ▪Water holding capacity; ▪Porosity;	One location at project site and 7 locations in buffer area	Once in season	Collected and analyzed as per soil analysis reference book, M.I.Jackson and soil analysis reference book by C.A. Black		Based on Utilization pattern Land use pattern Downwind based on impact receptor due to deposition of dust	*Handbook of Agriculture, Indian Council of Agricultural Research*
ii	**Land use/Landcover** ▪Location code ▪Total project area ▪Topography ▪Drainage (natural) ▪Cultivated, ▪forest, ▪plantations, ▪water bodies, ▪roads and settlements	Study area	At least 20 known vectors for geo referencing and verification	Global positioning system Topo sheets Satellite Imageries* (1:50,000) Satellite Imageries*	Digitization of primary data (Toposheet) Superimposing of latest satellite Imageries (cloud free data) Geo referencing Classification using ERDAS /GIS software	-	-
5	**Biological Environment Terrestrial** • Inventarization of floral and faunal species in core and buffer zone	Project area and 7 locations in buffer area	Five-Seven days in a season	▪ Quadrate sampling/ Enumeration/ Survey methods. ▪ Transect method/ Visual Encounter Survey ▪ Point Count/ Opportunistic Survey		• Land use /Landcover classification • Sensitive area in the vicinity • Land utilization	Preliminary assessment point quarter plot less method for

Sr. No	Attributes	Sampling Network	Measurement Method Frequency	Measurement Method Method	Procedure	Selection Criteria	Remarks
	• Density in core zone • Importance value index (IVI) of trees, • Biodiversity index			Tracks and signs, and visual encounter survey		• Downwind based on impact zone	terrestrial vegetation survey
	• Identification of rare threatened and endangered species **Fauna** • Avi fauna • Rare and endangered species • Sanctuaries / National park / Biosphere reserve • Migratory routes						Secondary data to collect from Government offices/forest department, NGOs, published literature
6	**Socio-economic**						
	▪Demographic structure; ▪Infrastructure resource base; ▪Economic resource base; ▪Health status; Morbidity pattern; ▪Working pattern; ▪Cropping pattern	Study area	In two phases of the project	• Primary data collection through questionnaire • proportionate Random sampling method • Transect walk		• Land utilization pattern • Population pattern • Gender pattern • Working pattern	Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies

3.2 Geology and Hydrogeology

3.2.1 Geology

Kanksa C.D. Block (Figure 1) covers an area of approximately 278 km2 (Census, 2001), comprising the Ajay-Damodar Interfluves and the middle section of the Barddhaman District. Kanksa Block is administratively surrounded to the north by Birbhum District, to the south by Bankura District, to the west by Faridpur-Durgapur Block, and to the east by Aushgram II Block, Barddhaman District. The latitude runs from 23°25'N to 23°40'N, while the longitude extends from 87°20'E to 87°35'E. Geologically, the region is located in the transitional zone between the eastern edge of the RaniganjGondwana Basin and the western boundary of the Bengal Basin. A blanket of alluviums and laterite covers the majority of the land. The unconsolidated alluvial layer of Middle Cretaceous to Recent sediments overlies a semi-consolidated basement of the lower and upper Gondwanas. Unconsolidated sediments consist of granular zones of varying thickness composed of sand, extremely coarse to fine, sandy clay, lateritic gravels, and quartz pebbles. Groundwater occurs in these granular zones under unconfined circumstances in shallow aquifers (3 to 11 m bgl) and under semi-confined to confined conditions in deeper aquifers (31 to 118 m bgl), primarily in the eastern half. Almost 70% of the region is covered by the Lalgarh Formation (Middle Pleistocene), 15% by the Sijua Formation (Upper Pleistocene to Lower Holocene), 10% by the Chuchura Formation (Middle to Upper Holocene), and 5% by the Hooghly Formation (Upper Holocene to present day) (Bhattacharya & Dhar, 2005). The Durgapur Bed or Formation was formed during the Tertiary Period, and the clastic ferruginous elements were obtained from the Chotanagpur Formation. Figure 1 shows the geology of the study area.

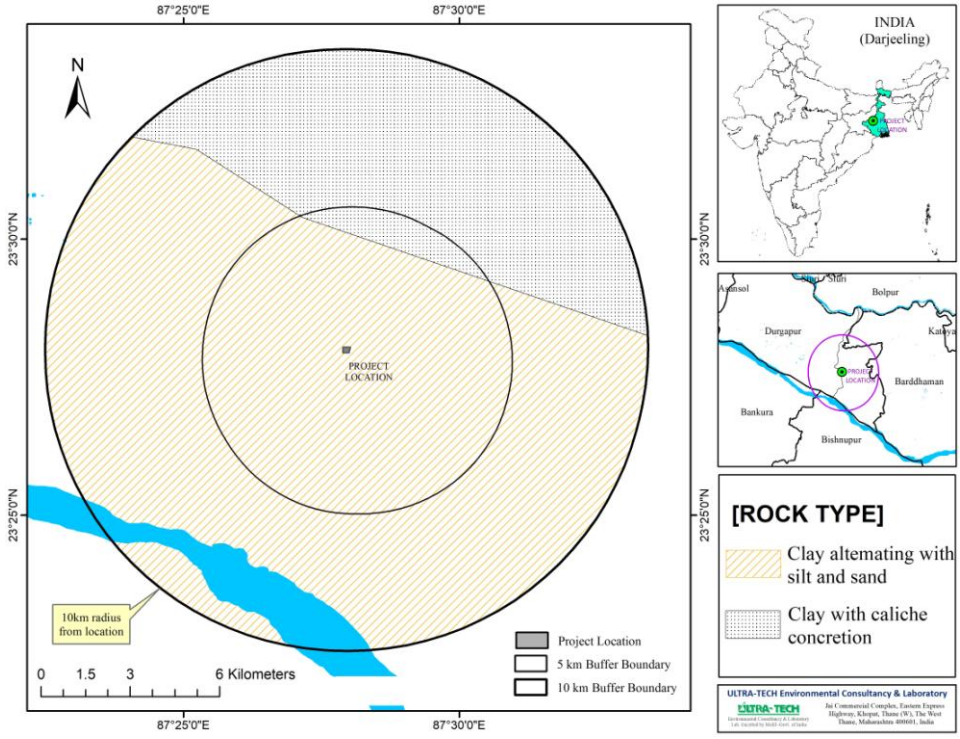


Figure 3.1: Geological map of Project site

3.2.2 Hydrogeology

The Kanksa Ketugram Plain is located alongside the Ajay, which connects to the Bhagirathi. The lateritic high interfluve stretch (mean relief of 50 - 60 metres) of the Ajay (north) and Damodar (south) Rivers exhibits the marks of Late Pleistocene ferruginous formations and tropical deciduous forest. Geologically, the region encompasses a portion of the western rim of the Bengal Basin (Figure 2). The Surface water sources include ponds, tanks, and perennial rivers such as the Damodar, Ajay, and Kunur. At the same time, groundwater is used in the same location, although its relevance is relatively minor (Fig. 2). Groundwater occurs in an unconfined and confined region inside a thick saturated granular zone. Clayey silt, sandy silt, and laterite comprise the near surface aquifer from which unconfined groundwater is accessible. It is found beneath the groundwater table and is accessed through dug wells.

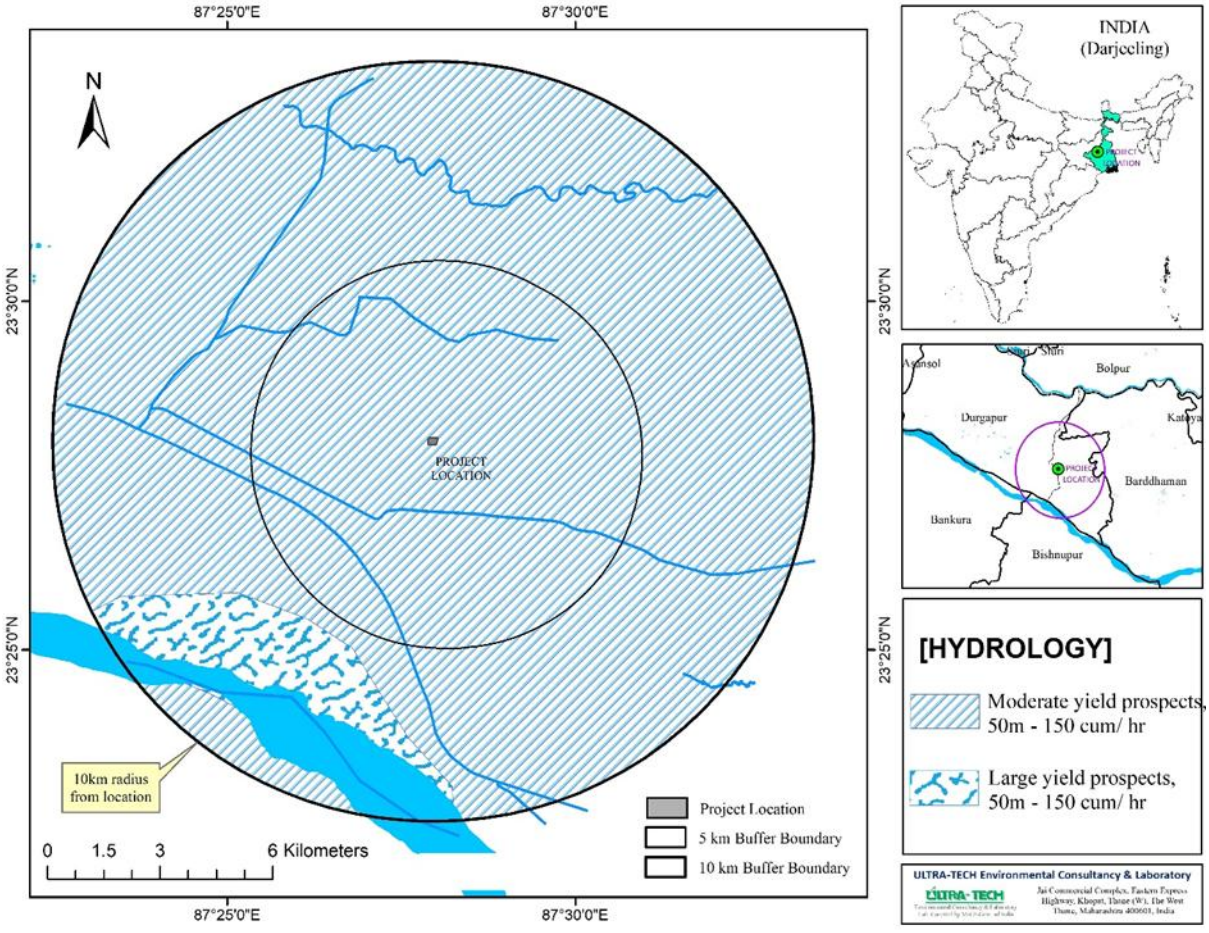


Figure 3.2: Hydrological map of Project site

Ground Water

Ground water systems are a result of the complex combination of different lithological and structural types within an area that together constitutes an aquifer within which ground water accumulates and moves. Rather than describing individual lithological and their tendencies to

form aquifers or otherwise, it is useful to describe the ground water as one continuous across various lithological types (Kulkarni and Deolankar, 1995).

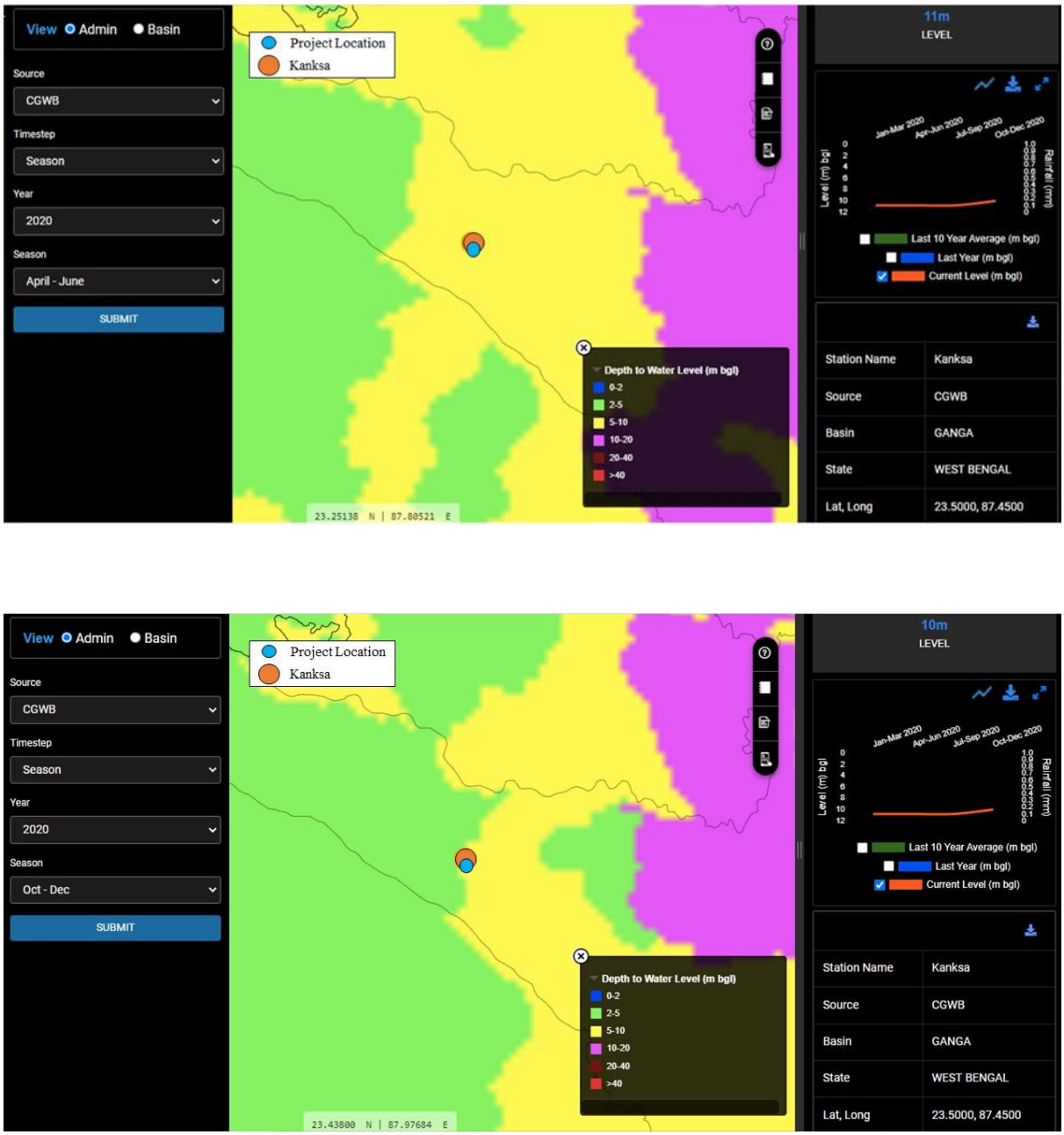


Figure 3.3: Groundwater depth

Ground water level in pre-monsoon season and post monsoon season are 11km and 10 km .

3.2.3 Topography

Topographically, the project area comprises of gently flat land. The highest elevation of the project area is 71 MSL.

Topography: Bardhaman district with its varied tectonic elements and riverine features, is a transitional zone between the Jharkhand plateau which constitutes a portion of peninsular

shield in the west and Ganga-Brahamaputra alluvial plain in the north and east. In general the Jharkhand plateau consists of the metasedimentary rocks of precambrian age, Gondwana sedimentary rocks, Rajmahal basalts and upper tertiary sediments. Laterite has developed on these older rocks as well as on early Quaternary sediments. Towards south, the alluvial plain merges with Damodar-kasain-Subarnarekha deltaic plains.

The western half of the district resembles a promontory jutting out from the hill ranges of Chotonagpur plateau and consists of barren, rocky and rolling country with a laterite soil rising into rocky hillocks, the highest being 227 m. These diversify the otherwise monotonous landscape and lend a special charm to the skyline around Asansol subdivision.

Ajoy-barakar divide is a convex plateau, the average altitude being 150 m. The gradient is westerly to the west and to the east it is northerly towards Ajay and southerly towards Damodar below the latitude. The Ajoy- Damodar inter-stream tract is made up of several stows consisting of vales and low convex spurs which run in almost all directions except north-east and thus lends a very complicated character to local relief.

River System: The river system in Bardhaman includes the Bhagirathi-Hooghly in the east, the Ajoy and its tributaries in the north and the Dwarakeswar, the Damodar and its branches in the south-west. Besides, there are innumerable Khals and old river beds all over the area.

The notable rivers and khals are Damodar, Bhagirathi, Barakar, Ajay, Dwarakeswar, Nonia, Singaram, Tamla, Kukua, Kunur, Tumuni, Khari, Banka, Chanda-kanki nala, Behula, Gangur, Brahmani, Khandesvari, Karulia nala, Dwaraka or Babla, Koiya nala, Kandarkahal, Kanadamodar, Kananadi, Ghea, Kakinadi etc.

Minerals: Bardhaman is one of the premier districts in India in terms of value of mineral. The Raniganj coalfield was the birth place of the Indian coal industry. Besidescoal,important minerals found in the district are iron ores, calcium carbonate, abrasives, silica bricks and moulding sands, glass sands, building materials, Manganese, Bauxite, laterite etc.

3.2.4 Seismicity

According to IS: 1893-1984, the study area falls under Zone-III. It means that the area is covered under “High hazard zone”.

Seismic map of the West Bengal including indication of the Project Site presented in Figure 3.4:

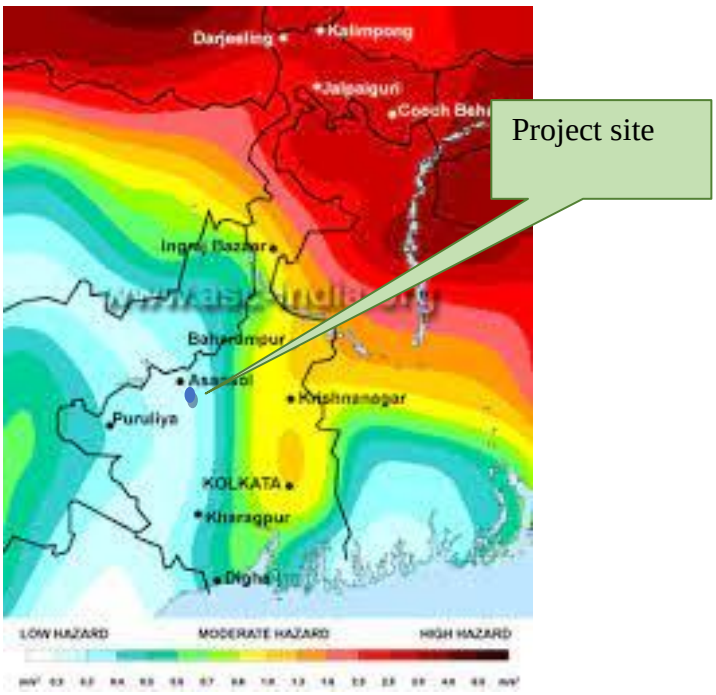


Figure 3.4. Seismic Map of West Bengal

3.3 Land Use/Land Cover of the Study Area

1.1. Introduction

Remote sensing data is a general source of information on natural resources in a region or territory that tracks the state of those resources over time due to its continuous scope. Remote sensing is a powerful and rigorous data collection process. Satellite imaging surveys provide a great way to measure both the quantitative scale of natural vegetation and the changes in conditions brought on by climate change. Understanding the complexities of the earth's surface properties, as well as phenomena such as complex environments, is also fascinating.

1.2. Methodology

Land use area and land use classification analysis as follows:

1. Development of an input database.

2. Data processing and analysis.

3. End planning of development.

2. Data input

2.1. Toposheet: Figure 1 is showing the project location and its surrounding area on the toposheet of series 73M/10, 73M/11, 73M/6, and 73M/7, of Survey of India (SOI)

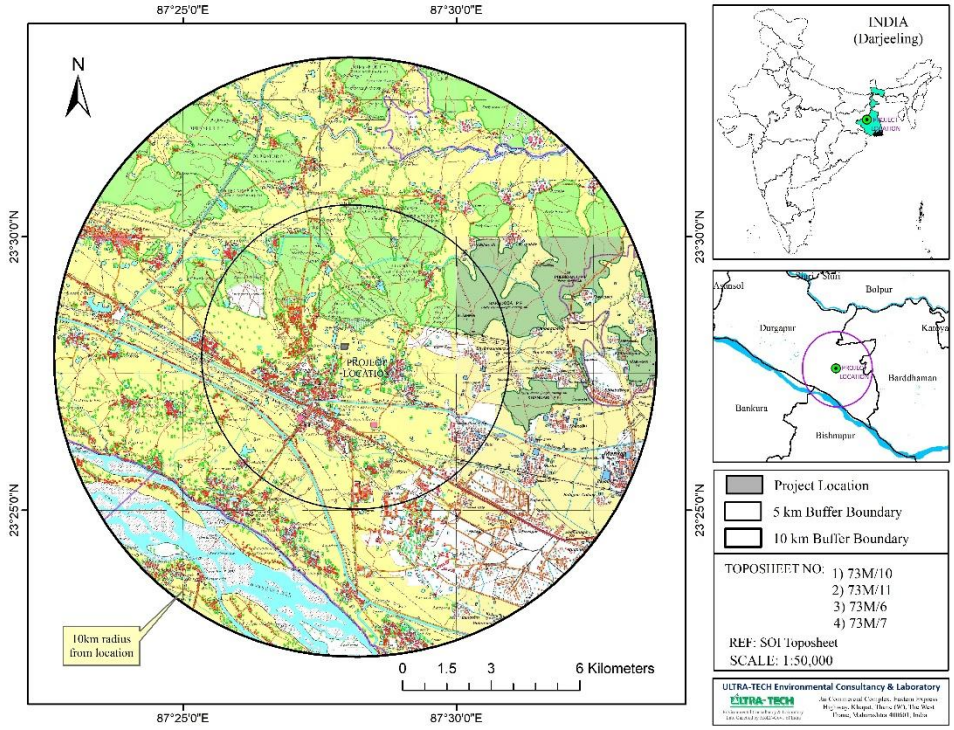


Figure 3.4: Topographical sheet covering the project location and its surroundings

2.2. **Google Earth image:** Google Earth images have been analyzed for spatial characteristics, soil sensors, latitude, longitude, and geo-recording of satellite images.

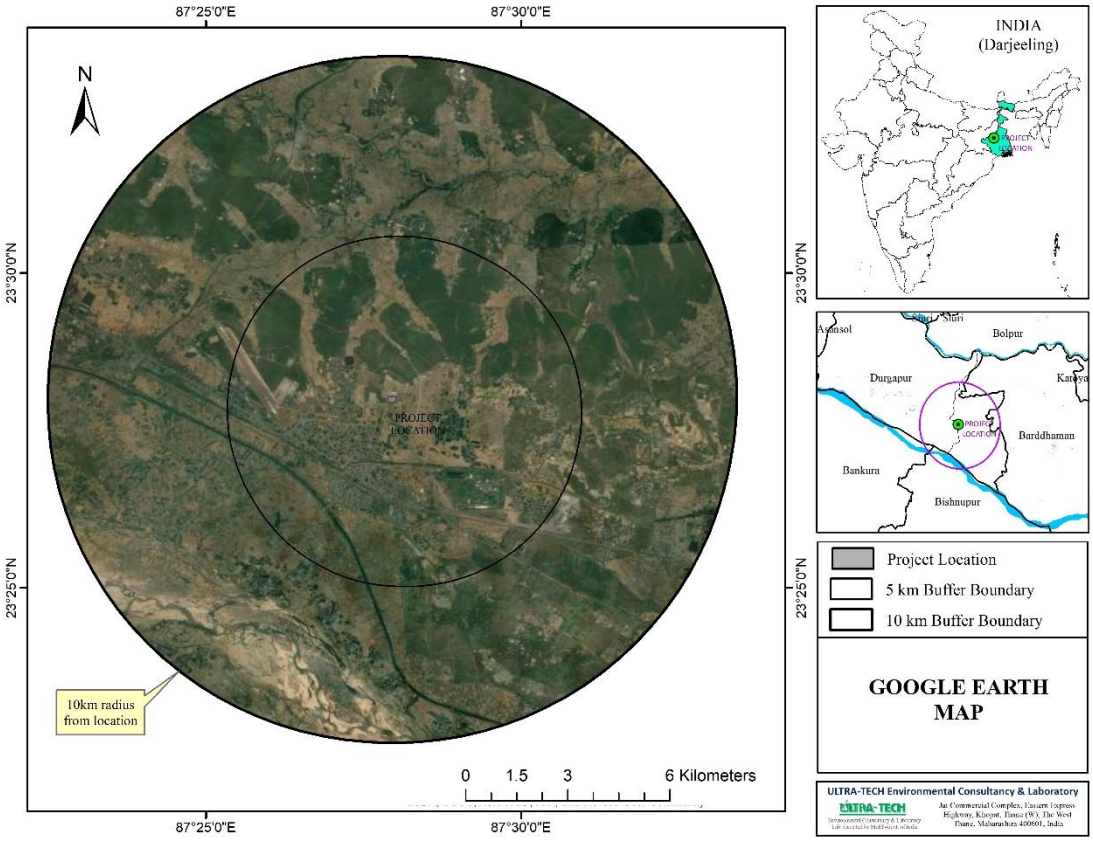


Figure 3.5(a). Project site on Google Earth Image

2.3. **Satellite Imageries:** Satellite data or satellite image has been downloaded to the framework and a land-use map has been created from the website of the European Space Agency https://scihub.copernicus.eu, information provided in Table 1. The first move was the establishment of the FCC standard (using Sentinel 2 bands B2, B3, B4, and B8) and the implementation of the LULC Classification Map of the test site around the site for the project (Figure 3). Sentinel-2 data from the above source have been downloaded to cover the whole area. Sentinel-2 has a total of 13 bands in it. Both bands vary in their spatial resolution. Radiometric and atmospheric corrections have been used to generate the reflectance file. For Sentinel-2, bands 2, 3, 4, and 8 were selected to prepare the RGB to achieve improved classification accuracy. The RGB of the sample region is prepared using the boundary form file to clip the data. Area of significance to all the adjacent scenes. Mosaicking was carried out to minimize the disparity between the various sensing dates and the impact of color issues.

The following are the specifics of the satellite image used in this study:

Entity ID	L1C_T43PFT_A029231_20211126T052106
Acquisition date	26/11/2021
Tile Number	T43PFT
Agency	ESA
Platform	SENTINEL-2A
Orbit Number	62

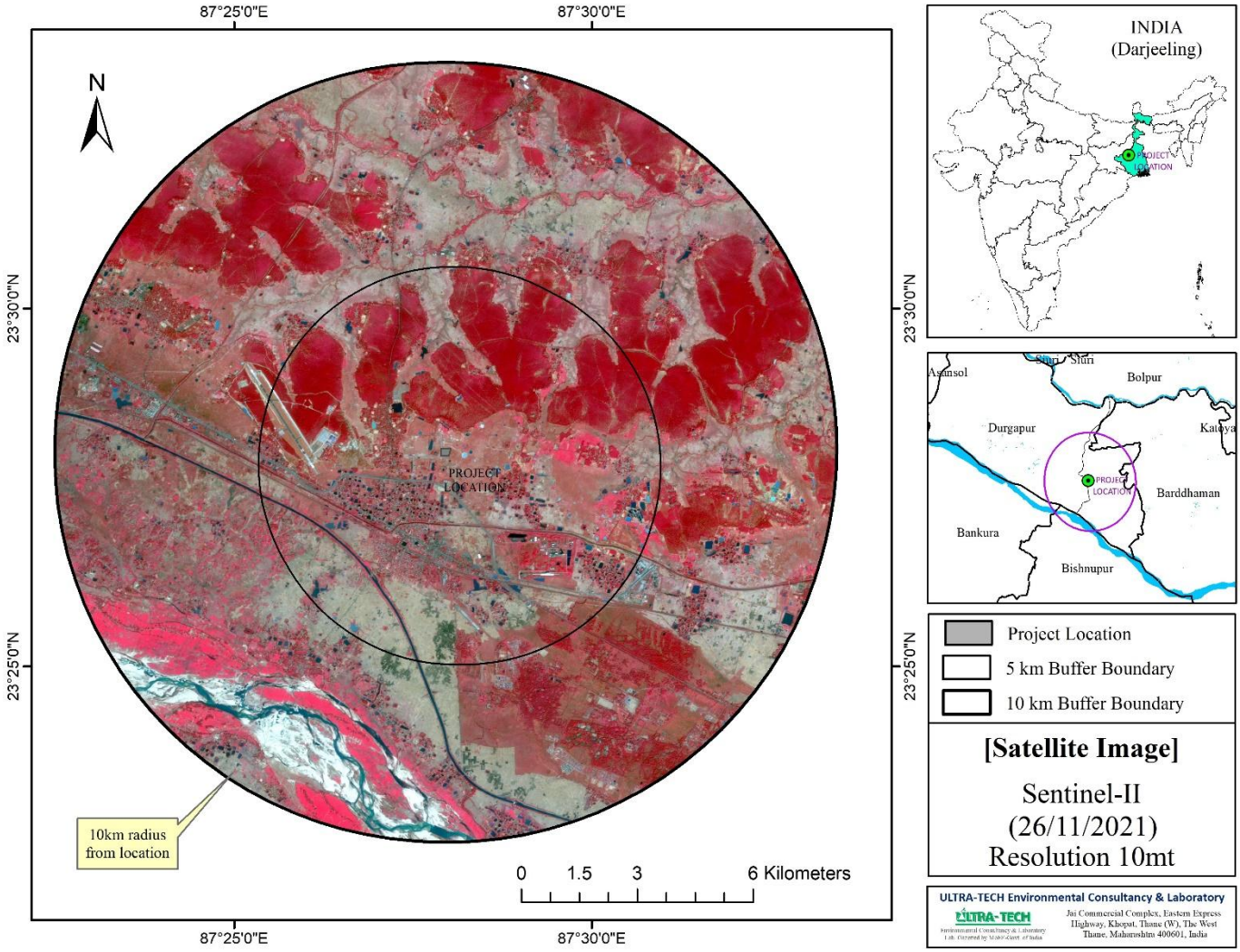
Orbit Direction	Descending Orbit

Figure 3.5(b): Satellite Image Map covering the project location and its surroundings.

3. Processing/Analysis of data

3.1. Restoration of image Data

Data errors, noise, and geometric distortions are added during scanning, transmitting, and recording operations and restoration processes are designed to detect and compensate for them. The aim is to make the image resemble the original scenario as closely as possible. Since each band's pixels are stored independently, image restoration is relatively simple. Picture restoration attempts to restore image data that has been blurred or corrupted in order to provide a more precise depiction of the original scene. This usually includes the initial analysis of raw image images to correct geometric distortions and calibrate the data radiometrically. Image correction and restoration procedures are often referred to since retrieval operations since they normally precede the editing and review of image data in order to extract relevant data and information.



3.2. Radiometric corrections

To calibrate pixel values or fix value errors, radiometric correction is used. The method improves the readability and precision of remote sensing data. When comparing various data sets over time, radiometric calibration and correction are especially important. The difference between the energy emitted or reflected from the surface to the earth as measured by aircraft or satellite instruments and the true energy emitted or reflected from the surface to the earth. This is due to the sun's azimuth, as well as elevation and ambient conditions, which can modify the sensor's capacity. In order to obtain actual or true ground radiance or reflectance values, radiometric errors must also be taken into account.

3.3. Geometric Correction

Geometric correction is an integral step in the pre-processing of the image since the orientation of the images is calculated. However, the geometric adjustment also requires pixel values in their original location in order to change the original values. Raw digital images usually contain such extreme geometric inconsistencies that they cannot be used as diagrams. The cause of these distortions varies between altitude variance and the velocity of the sensor platform, including panoramic distortion, Earth curve and atmosphere.

3.4. Ground Truthing:

A study of identification was carried out in order to gain a broad understanding of the field of analysis. In order to assess the accessibility of the region as well as the pattern and distribution of vegetation and its composition, it was necessary to have knowledge of current field conditions. Land validation means the formation of a connection between objects and objects observed, labeled, marked, and satellite imagery. In satellite imaging for identification, the appearance of a few species of plants on the field was associated with its tonality.

4. Final Outputs

4.1. Classifications of land use:

The land use classification of Hybrid Level-2 was carried out using the Supervised Classification System. Bands 2, 3, 4, 8 are the most appropriate ones. At the end of the study, 8 classes were derived and the picture was ranked. The pattern for graded land use is seen in Table 1 and seen in Figure 4. The False Color Composite for the area as seen in Figure 3.

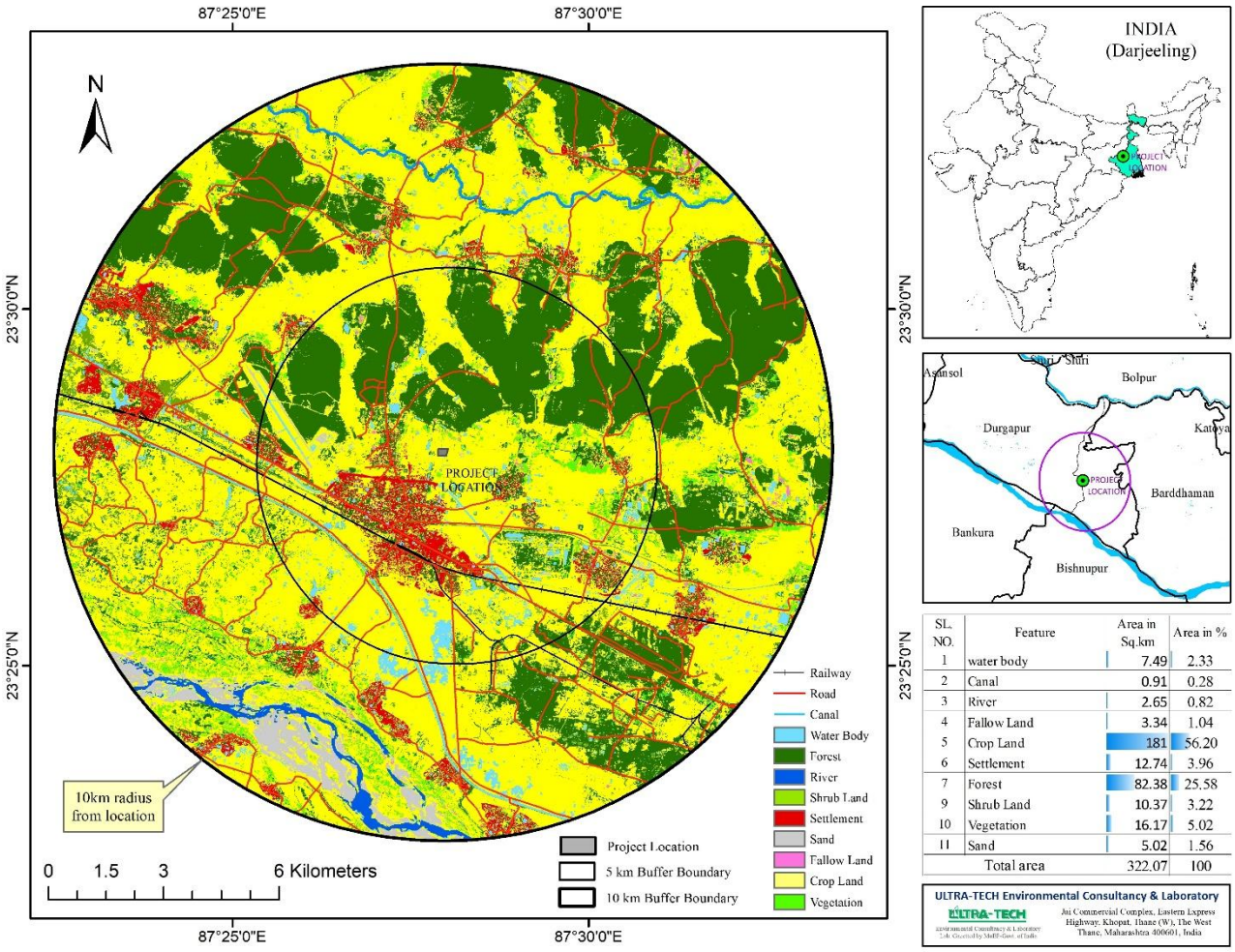


Figure 3.6: Map of LULC Classification (10 Km. Radius)

Table 3.1: Land-use Classification – Area (10 Km. Radius)

SL. NO.	Feature	Area in Sq.km	Area in %
1	water body	7.49	2.33
2	Canal	0.91	0.28
3	River	2.65	0.82
4	Fallow Land	3.34	1.04
5	Crop Land	181	56.20
6	Settlement	12.74	3.96
7	Forest	82.38	25.58
9	Shrub Land	10.37	3.22
10	Vegetation	16.17	5.02
11	Sand	5.02	1.56
Total area		322.07	100

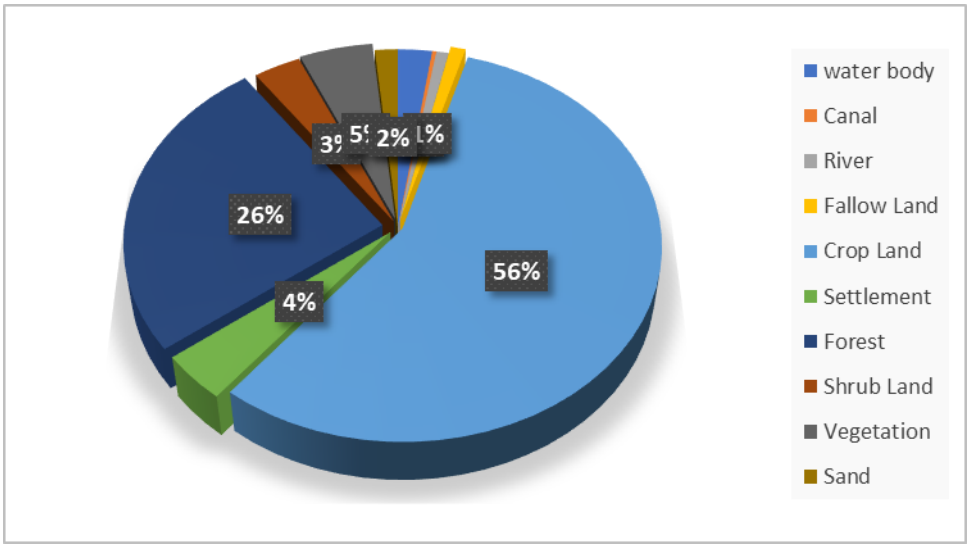


Figure 3.7: LULC Classification (10 Km. Radius)

5. Interpretation of the classes of land use

The project location is located nearby Kanksa, which is a census town and a gram panchayat in the Kanksa CD block in the Durgapur subdivision of the Paschim Bardhaman district in the Indian state of West Bengal. The Headquarters of Kanksa CD block is at Kanksa. ccording to the 2011 Census of India, Kanksa had a total population of 23,789 of which 12,406 (52%) were males and 11,383 (48%) were females. Population in the age range of 0–6 years was 2,577. The total number of literate persons in Kanksa was 17,992 (84.82% of the population over 6 years. Because the Kanksa C.D. block t is familiar with agriculture and forest-based low-level subsistence economies, land use parameters such as net sown area, forest, culturable waste, and its associates such as irrigation facility, etc. are likely to be controlling factors in this land use system.

Crop Land:

Cropland includes areas used for the production of adapted crops for harvest. Two subcategories of cropland are recognized: cultivated and non-cultivated. Cultivated cropland comprises land in row crops or close-grown crops and also other cultivated cropland, for example, hay land or pastureland that is in a rotation with a row or close-grown crops. Non-cultivated cropland includes permanent hay land and horticultural cropland. In 2003-04, the net cultivated area in Kanksa CD Block was 11,613 hectares, with 5,268 hectares planted to multiple crops. Kanksa CD Block produced 30,815 tonnes of Aman paddy from 10,211 hectares in 2013-14, 862 tonnes of Boro paddy (spring crop) from 237 hectares, 380 tonnes of wheat from 120 hectares, 10,825 tonnes of potatoes from 413 hectares, and 120 tonnes of sugarcane from 2 hectares. It also produced pulses and oilseeds. In 2013-14, the total area irrigated in Kanksa CD Block was 1,473.03 hectares, with canal water accounting for 1,007.58 hectares, river lift irrigation accounting for 438.17 hectares, and deep tube wells accounting for 27.28 hectares. As per table 1 and figure 5, the project area, the croplands accounted for 181 sq.km (56.20%) of the project area.

Fallow Land

Another important indicator of backwardness is cultivable wasteland, which comprises both useable and fallow land. According to table 2 and figure 5, fallow land occupied the smallest share of the project area. According to table 1 and figure 5, croplands accounted for 3.34 square kilometres (1.04%) of the project area.

Rivers and Canals

Rivers, streams, and canals serve a wide range of important agricultural, commercial, transport, ecological and household uses. They also have major aesthetic, recreational and socio-cultural benefits. Kanksa CD Block is part of the Kanksa Ketugram plain, which lies along the Ajay. The river forms a boundary with Birbhum district on the north for a long stretch and then flows through district. Then across the southern stretch Damodar river flows in south westerly direction. According to table 1 and figure 5, the project area, Rivers, and canal accounted for 3.56 sq.km (1.11 %) of the total project area.

Water Bodies:

This category covers surface water areas, either in the form of lakes, rivers, etc. They are visible on the satellite image in blue to dark blue or cyan, depending on the temperature of the ocean. These areas have been classified and mapped as water bodies; this unit is distributed over a region of 7.49 sq. km, which is 2.33 % of the overall project area.

Vegetation:

The vegetation class is chosen based on the fertility of the soil and the pattern of land usage over time. The vegetation of Chhattisgarh includes the adjacent portion along the vast stretch of forests. About 44% of the total area of Chhattisgarh is covered by forest. Large swathes of land in Kanksa and Aushgram Blocks (administrative units) are still covered in Sal trees (Shorea robusta). This land use/land cover class accounting for 16.17 sq.km (5.02 %) of the total research area.

Forest

The forest land cover class is found just on the lateritic Lalgarh terrain. The forest land is administered by the Durgapur P.F. It is mostly characterized by moderate to fairly dense mixed jungle dominated by sal trees. Eucalyptus planting is also made locally. This land use/land cover class covered 82.38 square kilometres of the project area. 25.58 percent of the entire research area**.**

Shrub land:

Shrub land, scrubland, scrub, brush, or bush is a kind of plant community characterized by shrub-dominated vegetation, which may also include grasses, herbs, and geophytes. Shrub land can emerge naturally or as a consequence of the human intervention. This land use/land cover class encompassed 10.37 square kilometers of shrub lands in the project area, accounting for 3.22 % of the total area around the project location.

Settlement:

Built-up Land is defined as a human ecosystem formed as a result of the non-agricultural activity. The built-up territory within 10 kilometers of the project site, comprising cities, income communities, including buildings and industry, factories, roads, communications, water, and vegetation amenities. According to the 2011 Census of India, Kanksa CD Block has a total population of 178,125, with 103,594 rural residents and 74,531 urban residents. There were 91,350 men (51 percent) and 86,775 girls (49 percent). There were 20,210 people under the age of six. There were 62,239 Scheduled Castes (34.99 percent) and 18,239 Scheduled Tribes (10.24 %). Figure 5 shows that the project location is adjacent to a linear kind of attributes (roads, canal. River), and because the settlement is linear, it is easy to conclude that the project location is close to a well-connected road network, making the region more suitable for the project setup. In the project area, this land use/land cover class covered 12.74 square kilometers of settlement area, accounting for 3.96 % of the total area around the project location.

Sand:

The Kanksa area, where the project is located, is rich in minor minerals, with sand being one of the most important building materials. It is vital for the state's infrastructure development to ensure their long-term availability. These minerals are available from a number of sources. This region's rivers are the most important. The extraction of such minor minerals from riverbeds must be managed and carried out with the requisite environmental safeguards in place. Sand accounts for 5.02 square kilometres (1.56 %) of the area surrounding the project site, according to table 1 and figure 5.

3.4 Meteorological Data

The meteorological parameters play a vital role in transport and dispersion of pollutants in the atmosphere. The collection and analysis of meteorological data, therefore, is an essential component of environmental impact assessment studies. The long term and short-term impact assessment could be made through utilization and interpretation of meteorological data collected over long and short periods.

Since, the meteorological parameters exhibit significant variation in time and space, meaningful interpretation can only be done through a careful analysis of reliable data collected very close to the site.

Table 3.2: Meteorological Monitoring at site

S.N.	Parameter	Instrument	Frequency
1	Wind Speed	Automatic Weather station (Envirotech WM 251)	Continuous Automatic 1 hourly Average
2	Wind Direction		
3	Ambient Temperature		
4	Max. & Min Temperature	Wet & Dry Bulb Thermometer	Daily at 08:30 and 17:30 IST
5	Relative Humidity	Hygrometer	Daily at 08:30 and 17:30

S.N.	Parameter	Instrument	Frequency
			IST
6	Rainfall	Rain Gauge	Daily

The aforesaid meteorological parameters were being observed in the field during monitoring period. The analysis of the field observations is given in **Table 3.5**. The wind rose during the study period is presented in **Figure 3.8(A), 3.8(B), 3.8(C) & 3.8(D).**

Table 3.3: Meteorological Data Recorded at study area

Period	Wind Speed (m/s)		Temp (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Max	Min	
January 2022	4.27	0.08	25.64	7.07	99.88	49.62	0
February 2022	6.13	0.06	28.88	8.23	99.88	36.06	0
March 2022	3.63	0.21	35.72	14.38	99.75	23.25	0

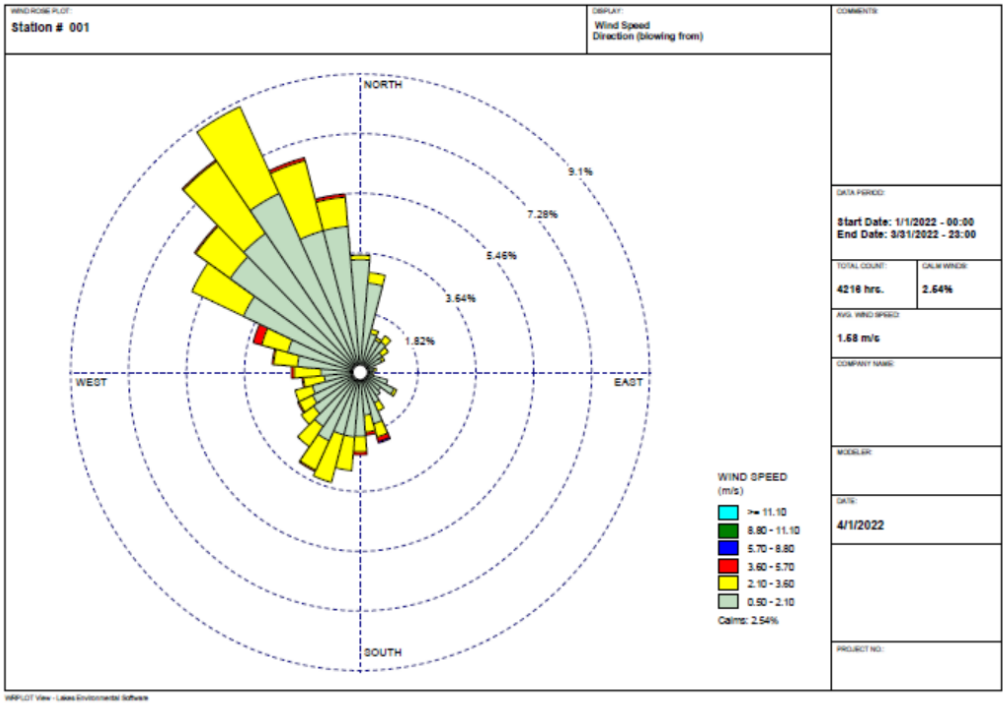


Figure 3.8(A): Wind rose for period of 1st January 2022 to 31st March 2022

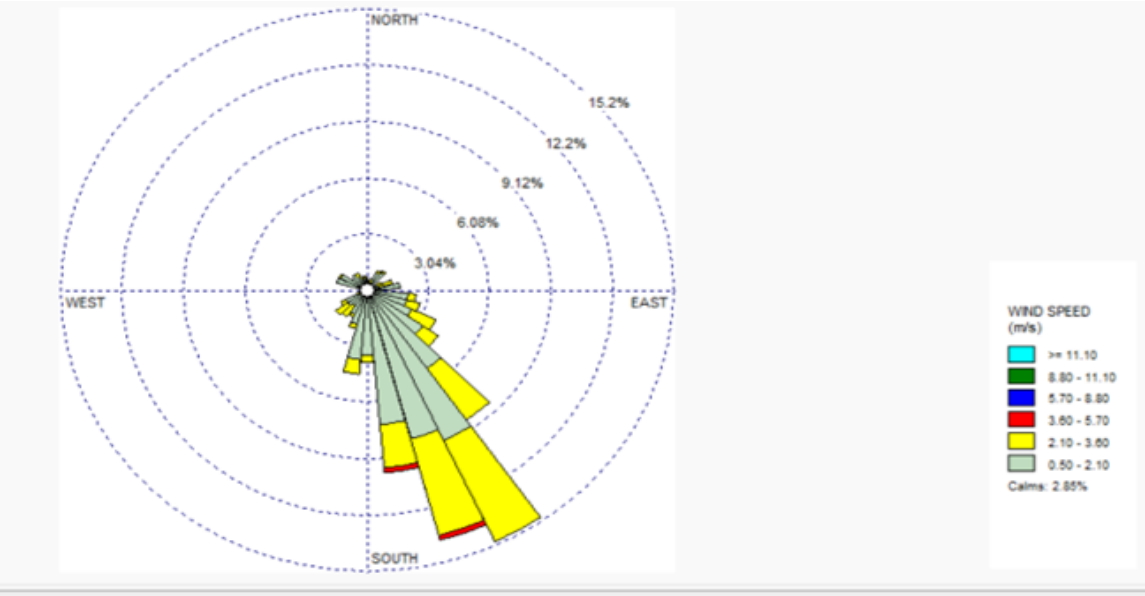


Figure 3.8(B): Wind rose for period of January 2022

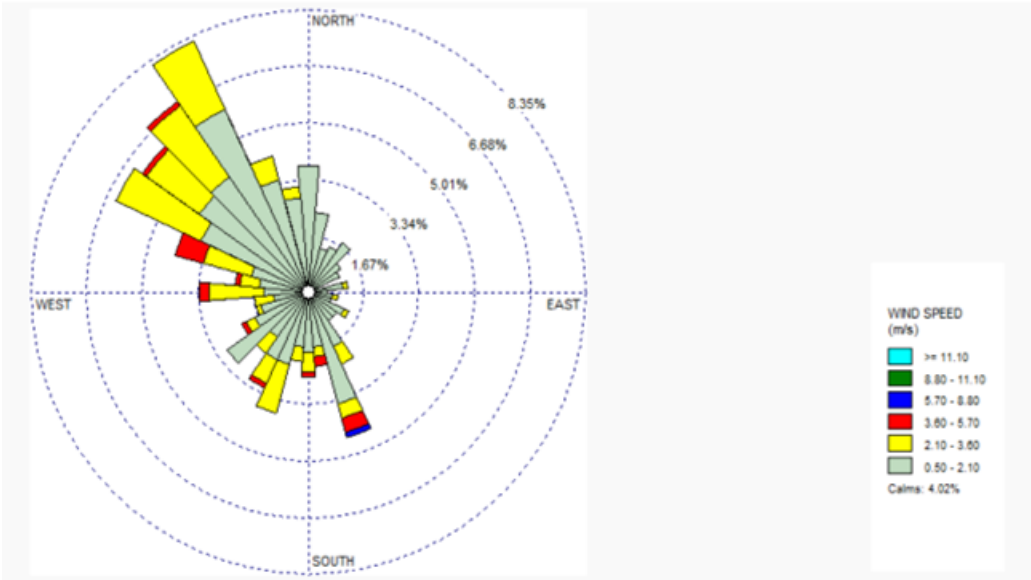


Figure 3.8(C): Wind rose for the month of February 2022

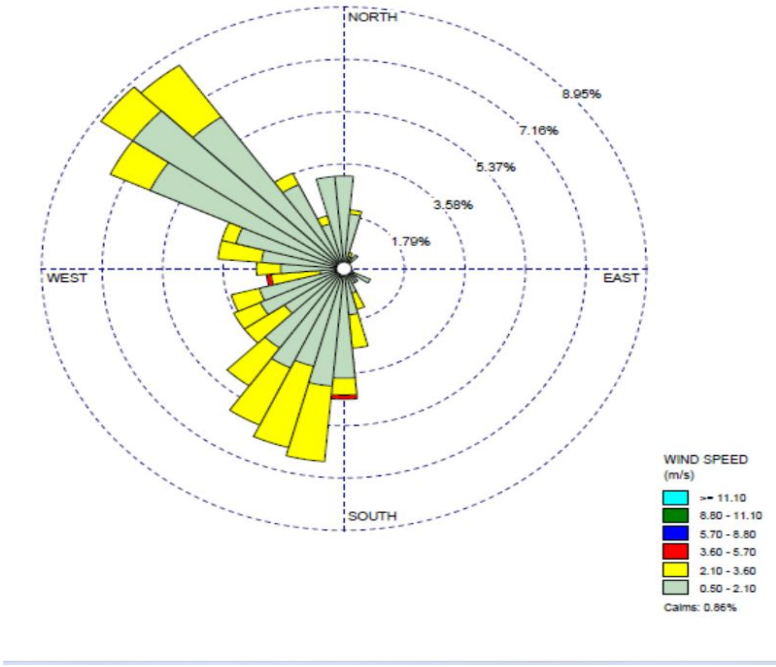


Figure 3.8(D): Wind rose for the month of March 2022

3.5 Ambient Air Quality

The ambient air quality monitoring was carried out at 8 locations within the 10 km radius around the site of project to know the existing background ambient air quality. The purpose of the estimation of background pollutant concentration was to assess the impact of the project on the ambient air quality within the region based on the activities of the project. The parameters chosen for assessment of air quality were PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Carbon Monoxide (CO).Their quality monitoring was conducted as per revised NAAQ standards 2009.

3.5.1 Methodology Adopted for the Study

$PM_{10,}$ $PM_{2.5,}$ Sulphur dioxide (SO_2), Nitrogen Dioxide (NO_2) andCarbon Monoxide (CO) were the major pollutants associated with project. The baseline status of the ambient air quality has been established through field monitoring data on PM_{10}, $PM_{2.5,}$ Sulphur dioxide (SO_2), Nitrogen Dioxide (NO_2) andCarbon Monoxide (CO) at 8 locations within the study area. The locations for air quality monitoring were scientifically selected based on the following considerations using climatologically data.

- Meteorological conditions on synoptic scale;
- The methodology for conducting the baseline environmental survey and selection of sampling locations considered the guidelines given in the EIA manual of the MoEF;
- Topography of the study area;
- Representative of the regional background air quality for obtaining baseline status;

- Representative of likely impact areas.

Ambient air quality monitoring was carried out on 24-hour basis with a frequency of twice a week at a station during the study period for 8 locations.

3.5.2 Sampling and Analytical Techniques

Respirable Dust Samplers PEM-RDS of Poltech instruments were used for monitoring Respirable fraction (<10 microns) and gaseous pollutants like SO_2, NO_2, CO. Fine Particulate Air sampler PEM-ADS 2.5/10 of Poltech instruments were used for monitoring fine particles i.e PM2.5 in the ambient air. **Table 3.6** shows the techniques for sampling and analysis for these parameters.

Table 3.4: Techniques Used for Ambient Air Quality Monitoring

Parameters	Technique	Technical Protocol	Détectable Limit, (µg/m^3)
PM_{10}	Respirable Dust Sampler (Gravimetric method)	Gravimetric	10.0
$PM_{2.5}$	FRM method/ Low volume sampling (Gravimetric)	Gravimetric	5.0
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	5.0
Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	5.0
Carbone Monoxide	Non- Dispersive Infrared Absorbtion Method	IS-5182 (Part 10)	1.14 mg/m^3

Ambient air at the monitoring location is sucked through a cyclone. Coarse and non-respirable dust is separated from the air stream by centrifugal forces acting on the solid particles and these particles fall through the cyclone's conical hopper and get collected in the sampling cap placed at the bottom. The fine dust (<10 microns) forming the PM_{10} passes the cyclone and is retained on the filter paper. A tapping is provided on the suction side of the blower to provide suction for sampling air through a set of impingers for containing absorbing solutions for SO_2 and NO_2. Samples of gases are drawn at a flow rate of 0.2 liters per minute.

PM_{10} has been estimated by gravimetric method. Modified West and Gaeke method (IS-5182 part-II, 1969) has been adopted for estimation of SO_2 and Jacobs-Hochheiser method (IS-5182 part-VI, 1975) has been adopted for the estimation of NO_2. Calibration charts have been prepared for all gaseous pollutants.

Duration of Sampling

The duration of sampling of PM_{10}, $PM_{2.5}$, SO_2, and NOx was each twenty-four hourly continuous sampling per day and CO was sampled for 8 hours continuous thrice in 24-hour duration monitoring. The monitoring was conducted for two days in a week for three months.

This is to allow a comparison with the present revised standards mentioned in the latest Gazette Notification of the Central Pollution Control Board (CPCB) (16th November 2009).

The location of the monitoring stations with reference to the project site is given in **Table 3.7** & **Figure 3.9 (A).**

Table 3.5: Details of Ambient Air Quality Monitoring Locations

Station Code	Location	Coordinates	Distance from Project Site	Direction
AAQ-1	Project Site	23°27'55.35"N, 87°27'59.08"E	--	--
AAQ-2	Sonai	23°27'42.60"N, 87°29'0.78"E	1.78	ESE
AAQ-3	Shyamsundar	23°27'48.48"N, 87°30'26.52"E	4.15	E
AAQ-4	Bilaspur	23°29'18.46"N, 87°29'30.55"E	3.45	NE
AAQ-5	Paschim Kanksa	23°25'47.50"N, 87°28'42.83"E	1.97	SSW
AAQ-6	Kota	23°26'28.99"N, 87°30'0.88"E	4.36	SE
AAQ-7	Kanksa	23°29'38.92"N, 87°25'52.99"E	1.10	WNW
AAQ-8	Anuragpur	23°26'2.37"N, 87°28'3.35"E	3.51	S

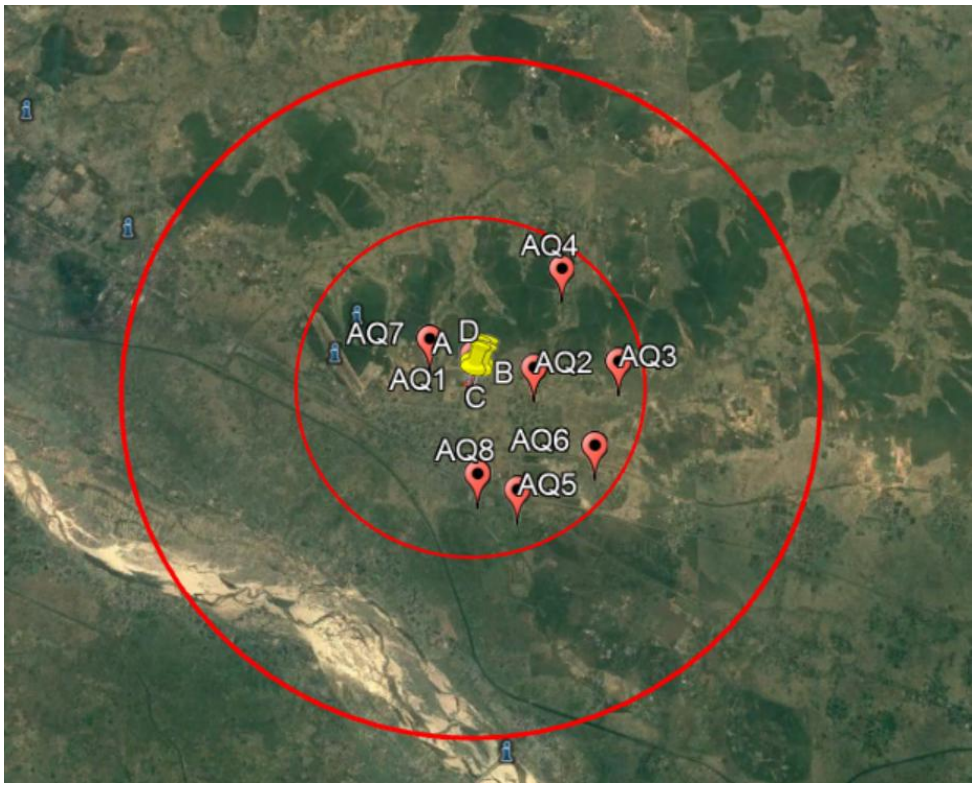


Figure 3.9(A): Map Showing Ambient Air Quality Monitoring Locations

The ambient air quality results are as summarized in **Table 3.8.**

Table 3.6: Summary of Ambient Air Quality Monitoring Results

Location Code	Name of the Location	Range	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
			$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3
AAQ1	Project Site	Average	80	50	13	22	1.4
		Minimum	75	46	10	20	1.2
		Maximum	91	54	15	25	1.6
		98 Percentile	88	54	15	25	1.6
AAQ2	Sonai	Average	67	38	7	15	0.7
		Minimum	60	30	5	10	0.5
		Maximum	75	45	9	20	0.9
		98 Percentile	75	45	9	20	0.9
AAQ3	Shyamsundar	Average	67	38	7	16	0.7
		Minimum	60	32	5	10	0.5
		Maximum	75	45	9	20	0.8
		98 Percentile	75	45	9	20	0.8
AAQ4	Pondali	Average	71	38	7	15	0.7
		Minimum	61	32	5	10	0.6
		Maximum	80	45	9	20	0.9
		98 Percentile	80	45	9	20	0.9
AAQ5	Paschim Kanksa	Average	67	38	7	16	0.7
		Minimum	61	30	5	10	0.5
		Maximum	75	45	9	20	0.9
		98 Percentile	75	45	9	20	0.9
AAQ6	Kota	Average	67	38	7	12	0.7
		Minimum	61	32	5	10	0.5
		Maximum	75	45	9	20	0.9
		98 Percentile	74	45	9	18	0.9
AAQ7	Kanksa	Average	68	39	7	12	0.7
		Minimum	60	30	5	10	0.5
		Maximum	75	46	9	20	0.9
		98 Percentile	75	46	9	20	0.9
AAQ8	Anuragpur	Average	70	26	8	16	1.2
		Minimum	66	24	6	14	1.0
		Maximum	74	30	10	18	1.3
		98 Percentile	74	30	10	18	1.3
NAAQ Standards			**100**	**60**	**80**	**80**	**2**

Observations of Primary Data

The results of the monitored data indicate that the ambient air quality of the region in general is in conformity with respect to rural/residential norms of the National Ambient Air Quality Standards of CPCB, with present level of activities.

PM_{10}: The maximum value for PM_{10} is observed at AAQ1, as 91 **µg/m^3**, while the minimum value observed at AAQ2,AAQ3, AAQ7 as **60 µg/m^3** during the study period.

$PM_{2.5}$: The maximum value for $PM_{2.5}$ is observed at AAQ1, as 54 **µg/m^3** with the minimum value observed at AAQ8, as **24 µg/m^3** during the study period.

SO_2: The maximum value for SO_2 is observed at AAQ1, as **15 µg/m^3** with the minimum value observed at AAQ2, AAQ3, AAQ4, AAQ5, AAQ6, AAQ7 as **5 µg/m^3** during the study period.

NO_2: The maximum value for NO_2 is observed at AAQ1, as **25 µg/m^3** with the minimum value observed at AAQ2,AAQ3,AAQ4,AAQ5,AAQ6,AAQ7 as **10µg/m^3** during the study period.

3.6 Noise

Noise in general is sound, which is composed of many frequency components of various loudness distributed over the audible frequency range. The most common and universally accepted scale is the A weighted scale which is measured as dB (A). This is more suitable for audible range of 20 to 20,000 Hz and has been designed to weigh various components of noise according to the response of a human ear. The environmental assessment of noise from the industrial activity, construction activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses, and annoyance and general community responses.

3.6.1 Objective

The main objective of monitoring of ambient noise levels was to establish the baseline noise levels in different zones. i. e. Residential, Industrial, Commercial and Silence zones, in the surrounding areas and to assess the total noise level in the environment of the study area.

3.6.2 Methodology

- **Identification of Sampling Locations**

A preliminary reconnaissance survey was undertaken to identify the major noise sources in the area. The sampling location in the area was identified considering location of industry, commercial shopping complex activities, residential areas with various traffic activity and sensitive areas like hospital, court, temple and schools also near the railway track for railway noise.

The noise monitoring was conducted at 8 locations in the study area during monitoring period.

- ***Equivalent sound pressure level (Leq)***

The sound from noise source often fluctuates widely during a given period of time. Leq is the equivalent continuous sound level, which is equivalent to the same sound energy as the actual fluctuating sound measured in the same time period.

- **Instrument used for Monitoring**

Noise levels were measured using an Integrating sound level meter manufactured by Cygnet (Model No. 2031). It had an indicating mode of Lp and Leq. Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in "A" weighing set the sound level meter was run for one hour time and Leq was measured at all locations.

There are different types of fields for measuring the ambient noise level, e categorized as free field, near field and far field.

- **Free Field**

The free field is defined as a region where sound wave propagates without obstruction from source to the receiver. In such case, the inverse square law can be applied so that the sound pressure level decreases by 6 dB(A) as the distance is doubled.

- **Near Field**

The near field is defined as that region close to the source where the inverse square law does not apply. Usually this region is located within a few wavelengths from the source.

- **Far Field**

The far field is defined as that region which is at a distance of more than 1-meter from the source.

The location of the monitoring stations with reference to the project site is given in **Figure 3.10(A).**

3.6.3 Method of Monitoring and Parameters Measured

Noise monitoring was carried out continuously for 24-hours with one-hour interval. During each hour parameters like L_{10}, L_{50}, L_{90} and Leq were directly computed by the instrument based on the sound pressure levels. Monitoring was carried out at 'A' weighting and in fast response mode.

The important parameters to be measured are L_{eq}, L_{day}, and $L_{night.}$

L_{eq}: Latest noise monitoring equipments have the facility for measurement of L_{eq} directly. However, L_{eq}can also be calculated using the following equation:

$$L_{eq\ (hrly)} = L_{50} + (L_{10} - L_{90})^2 / 60$$

Where,

L_{10} (Ten Percentile Exceeding Level) is the level of sound exceeding 10% of the total time of measurement.

L_{50} (Fifty Percentile Exceeding Level) is the level of sound exceeding 50% of the total time of measurement.

L_{90} (Ninety Percentile Exceeding Level) is the level of sound exceeding 90% of the total time of measurement.

L_{day}: This represents L_{eq} of daytime. L_{day} is calculated as Logarithmic average using the hourly L_{eq}'s for day time hours from 6.00a.m to 10.00p.m

L_{night}: This represents $L_{eq}$of night time. L_{night} is calculated as Logarithmic average using the hourly L_{eq}'s for night-time hours from 10.00p.m to 6.00a.m.

3.6.4 Noise Results

The values of noise level parameters like Leq (day), and Leq (night), were monitored during study period and are presented in **Table 3.9.**

Table 3.7: Ambient Noise Monitoring Results

Location Code	Name of the Location	Limits in dB(A)		Noise level result in dB(A)	
		Day Leq	Night Leq	Day Leq	Night Leq
ANQ1	Project site	75	70	50.6	42.0
ANQ 2	Sonai	65	55	50.3	42.2
ANQ 3	Shyamsundar	65	55	50.8	42.8
ANQ 4	Bilaspur	65	55	52.9	42.3
ANQ 5	Dharala	65	55	50.4	41.9
ANQ 6	Kota	65	55	48.9	39.3
ANQ 7	Rajkusum	65	55	51.5	42.7
ANQ 8	Anuragpur	65	55	51.9	41.5

- **Noise Standards**

Ambient air quality standard in respect of noise have been stipulated by Govt. of India vide Gazette notification dated. 14.2.2000. **Table 3.8** describes ambient noise standards.

In Respect of Noise*

Table 3.8: Ambient Noise Standards

Area Code	Category of Area	Limits in dB(A), L_{eq}	
		** Day time	#Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone @	50	40

* As per Environment protection act.
** Day Time: 6.00a.m to 10.00p.m.
# Night Time: 10.00p.m to 6.00a.m.
@ Silence zone is defined as an area up to 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority; Use of horns, loudspeakers and bursting of crackers shall be banned in these zones.

The noise data compiled on noise levels is given in **Table 3.7.** Noise level of the study area varied from 50.6 to 52.9 dB (A) in day time and from 39.3 to 42.8 dB (A) in the night time.

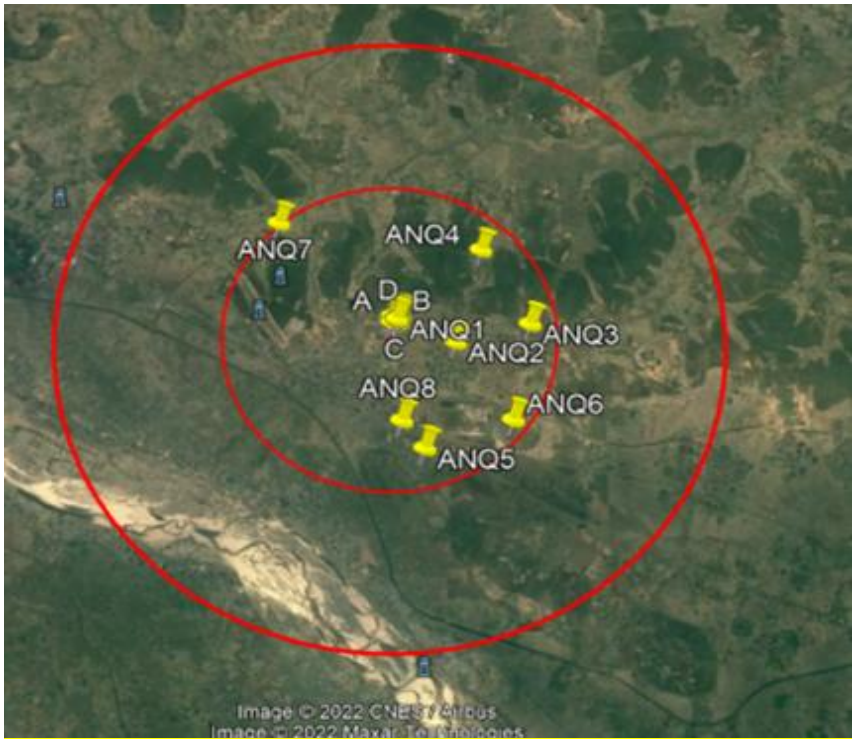


Figure 3.9(B): Map Showing Ambient Noise Monitoring Locations

3.7 Water Environment

Selected water quality parameters of ground water and surface water resources within the study area have been studied for assessing the hydrological environment to evaluate anticipated impact of the proposed project. Understanding the water quality is essential in the

preparation of Environmental Impact Assessment. It also assists to identify critical issues in a view to suggest appropriate mitigation measures for implementation to curb the deterioration of various hydrological sources in the vicinity of the project.

The purpose of this study is to:

- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity; and
- Predict the likely impacts on water quality due to the project and related activities.

3.7.1 Methodology

8 surface water and 8 ground water samples were examined for physico-chemical, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on surface and ground water. The samples were analyzed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO_3. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physic-chemical and bacteriological parameters have been analyzed for projecting the existing water quality status in the study area. Parameters like Dissolved Oxygen (DO) and pH were analyzed.

3.7.2 Water Sampling Locations

Eight (8) ground water samples and Eight (8) surface water samples were collected. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards for drinking water as per IS: 10500:2012. The Ground & Surface water sampling locations are listed below in **Table 3.9(A) & 3.9(B)** and **Figure 3.9(C) & 3.9(D).**

Table 3.9(A): Ground Water Sampling Locations

Code	Location	Coordinates
GW-1	Project Site	23°27'55.97"N,87°27'6.05"E
GW-2	Kanksa	23°27'15.07"N, 87°26'48.32"E
GW-3	Trilokechandrapur	23°30'48.04"N, 87°26'55.00"E
GW-4	Gopal Math	23°27'55.26"N, 87°31'53.57"E
GW-5	Maro	23°25'55.38"N, 87°31'31.64"E
GW-6	Kota	23°26'28.66"N, 87°30'0.97"E
GW-7	Naskarbandh	23°25'16.25"N, 87°26'23.91"E
GW-8	Nakarkhana	23°25'48.37"N, 87°28'41.45"E

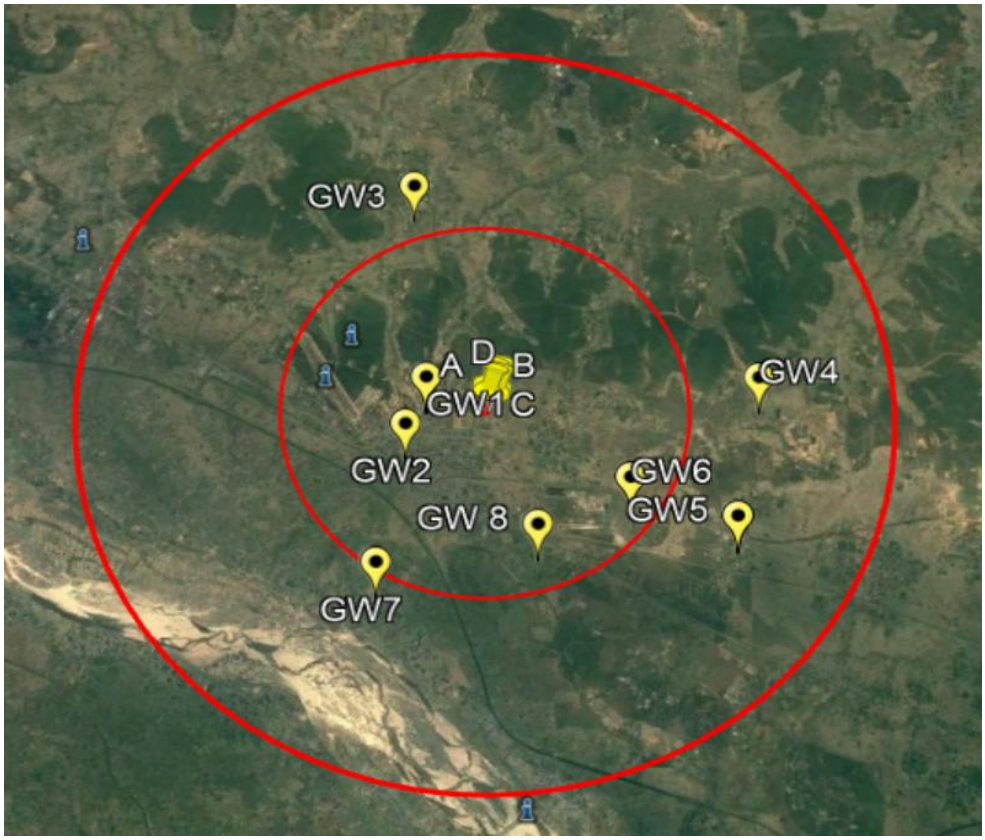


Figure 3.9(C): Map Showing Ground Water Sampling Locations

Table 3.9(B): Surface Water Sampling Locations

Code	Location	Coordinates
SW-1	Kankhar Khad	23°28'38.51"N, 87°27'16.49"E
SW-2	Murshid Pond	23°27'20.18"N, 87°27'9.61"E
SW-3	Pondali	23°26'49.85"N, 87°28'54.88"E
SW-4	Khandari	23°26'38.16"N, 87°32'9.52"E
SW-5	Shokna	23°26'54.17"N, 87°24'50.51"E
SW-6	Trilokchandrapur	23°30'40.21"N, 87°26'53.80"E
SW-7	Baradoba	23°30'8.78"N, 87°31'0.27"E
SW-8	Damodor river	23°24'24.85"N, 87°26'35.92"E

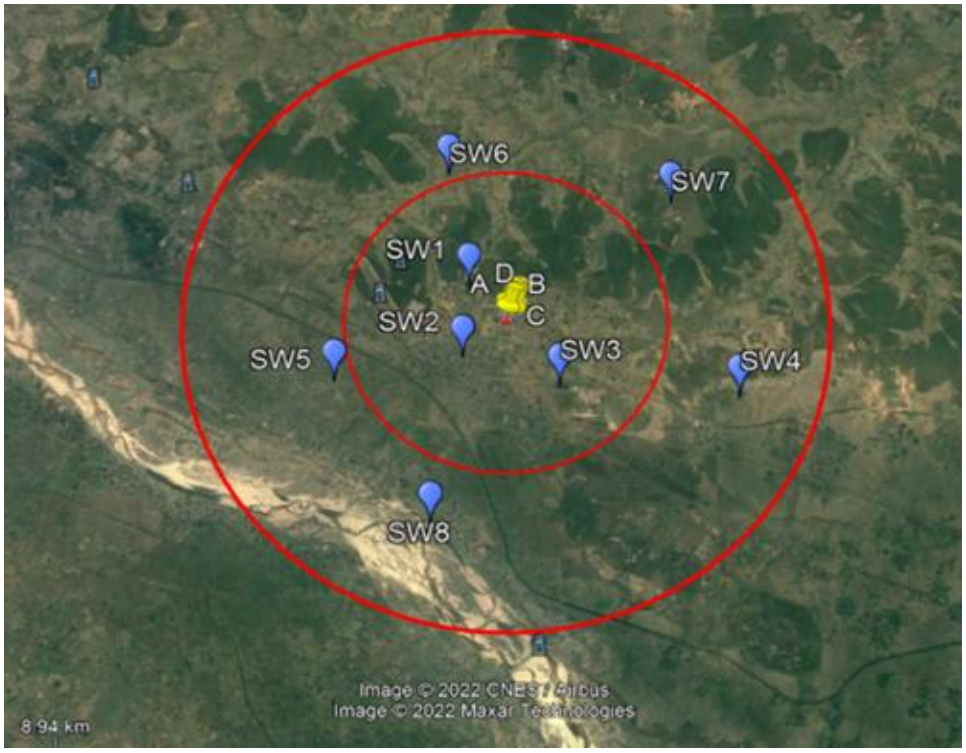


Figure 3.9(D): Map Showing Surface Water Sampling Locations

3.7.3 Ground and Surface Water Quality Results

8 ground water and 8 surface water samples representing water environment have been considered around the existing plant within the periphery of 10 km taking in to account the various uses. The results of ground water and surface water quality are presented in Table fauna

2 and Table 3.13(A). The physico-chemical characteristics of Ground water are confirming to permissible limits of drinking water standards, prescribed in IS: 10500 (Test Characteristics for Drinking Water) and suitable for consumption.

Table 3.10: Ground Water Characteristics

Sr. No.	Test Parameter	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
1.	Colour	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]
2.	Odor*	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Temperature	26.7	26.9	27.1	26.8	27.1	26.8	27.1	27.5
4.	Turbidity	0.3	0.4	0.2	0.5	0.4	0.5	0.6	0.9
5.	pH	7.5	7.7	7.5	7.7	7.5	7.6	7.2	7.2
6.	Electrical Conductivity	812	862	757	931	874	924	925	950
7.	Total Dissolved Solids	528	544	492	578	558	568	560	578
8.	Total suspended solids	2.0	1.0	1.0	2.0	1.0	1	2	3
9.	Total Hardness as $CaCO_3$	360	372	344	384	368	372	376	386
10.	Ammonical Nitrogen as NH_3-N	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]
11.	Nitrates as NO_3^--N	1.1	1.2	1.3	1.4	1.3	1.0	1.2	1.3
12.	Nitrite as	0.014	0.008	0.014	0.016	0.01	0.016	0.006	0.008

	NO_2^--N								
13.	Phosphates as PO_4^{3-}	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]
14.	Potassium as K	2.5	2.2	1.8	2.2	2.5	2.7	2.8	2.9
15.	Sodium as Na	45	42	43	50	51	52	50	53
16.	Calcium as Ca	75	77	72	80	75	79	77	85
17.	Magnesium as Mg	42	44	40	45	44	42	45	42
18.	Carbonates (CO_3^{-2}) as $CaCO_3$*	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]
19.	Bicarbonates as (HCO_3^-) as $CaCO_3$*	352	360	328	372	352	364	356	362
20.	Chlorides as Cl^-	75	77	70	84	83	86	84	88
21.	Sulphates as SO_4^{2-}	62	68	62	76	64	67	69	70
22.	Fluoride as F^-	0.5	0.5	0.4	0.7	0.5	0.6	0.7	0.6
23.	Boron as B	0.4	0.2	0.2	0.4	0.3	0.3	0.3	0.4
24.	Iron as Fe	0.2	0.1	0.3	0.1	0.2	0.2	0.3	0.2
25.	Arsenic as As	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]	BDL[DL=0.01]
26.	Mercury as Hg	BDL[DL=0.006]	BDL[DL=0.006]	BDL[DL=0.006]	BDL[DL=0.006]	BDL[DL=0.006]	BDL[DL=0.006]	BDL[DL=0.006]	BDL[DL=0.006]
27.	Total Coliform Bacteria*	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]
28.	Fecal coliform*	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]	BDL[DL=2]

29.	E. Coli*	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Table 3.11: Surface Water Characteristics

Sr. No.	Test Parameter	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
1.	Colour	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]
2.	Odor*	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Temperature	27.8	27.6	27.4	27.6	27.9	27.5	27.9	27.5
4.	Turbidity	3.8	3.9	2.8	2.6	2.4	2.8	2.4	2.7
5.	pH	7.4	7.3	7.2	7.4	7.6	7.4	7.6	7.5
6.	Electrical Conductivity	498	477	390	412	378	362	392	380
7.	Total Dissolved Solids	312	310	258	278	234	222	248	242
8.	Total suspended solids	48	50	41	38	36	41	34	40
9.	Total Hardness as $CaCO_3$	218	210	172	180	162	156	170	160
10.	Ammonical Nitrogen as NH_3-N	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]	BDL[DL=0.1]
11.	Nitrates as NO_3^--N	0.7	0.8	0.6	0.5	0.4	0.3	0.6	0.7
12.	Nitrite as NO_2^--N	0.015	0.01	0.006	0.008	0.006	0.004	0.007	0.008
13.	Phosphates as PO_4^{3-}	0.18	0.16	0.08	0.07	0.04	0.05	0.04	0.08
14.	Biochemical Oxygen	3.1	2.8	2.1	2.0	BDL[DL=2]	2.2	BDL[DL=2]	2.7

	Demand (27^0C, 3Days)								
15.	Chemical Oxygen Demand	28	24	16	12	8	12	8	12
16.	Dissolved Oxygen	5.0	5.3	5.5	5.7	5.9	5.6	5.9	5.5
17.	Potassium as K	1.8	1.6	1.6	1.8	1.5	1.6	1.7	1.8
18.	Sodium as Na	24	25	19	20	16	16	17	18
19.	Calcium as Ca	45	46	36	38	33	31	37	35
20.	Magnesium as Mg	26	23	20	21	19	19	19	18
21.	Carbonates (CO_3^{-2}) as $CaCO_3$*	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]	BDL[DL=1]
22.	Bicarbonates as (HCO_3^-) as $CaCO_3$*	202	200	166	174	154	150	158	156
23.	Chlorides as Cl^-	40	41	31	34	26	27	29	30
24.	Sulphates as SO_4^{2-}	46	48	32	34	31	33	36	32
25.	Fluoride as F^-	0.7	0.5SW2	S2W0.5	0.6	0.4	0.5	0.6	0.7
26.	Boron as B	0.4	0.2	0.3	0.4	0.2	0.3	0.2	0.5
27.	Iron as Fe	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]
28.	Zinc as Zn	BDL[DL=0.02]	BDL[DL=0.02]	BDL[DL=0.02]	BDL[DL=0.02]	BDL[DL=0.02]	BDL[DL=0.02]	BDL[DL=0.02]	BDL[DL=0.02]
29.	Total Coliform Bacteria*	70	90	90	80	65	75	90	90

30.	*Fecal coliform**	16	14	18	17	13	14	16	13
31.	*E. Coli**	Present	Present	Present	Present	Present	Present	Present	Present

Table 3.12: Surface Water Quality Standards

Class of water	Criteria
A	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 6mg/l or more • Biochemical Oxygen Demand 5 days 20^{o}C 2mg/l or less
B	• Total Coliforms Organism MPN/100ml shall be 500 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 5mg/l or more • Biochemical Oxygen Demand 5 days 20C 3mg/l or less
C	• Total Coliforms Organism MPN/100ml shall be 5000 or less • pH between 6 to 9 • Dissolved Oxygen 4mg/l or more • Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
D	• pH between 6.5 to 8.5 • Dissolved Oxygen 4mg/l or more • Free Ammonia (as N) 1.2 mg/l or less
E	• pH between 6.0 to 8.5 • Electrical Conductivity at 25C micro mhos/cm Max.2250 • Sodium absorption Ratio Max. 26 • Boron Max. 2mg/l

3.7.4 Observations

Ground Water Quality

- The analysis results indicate that the pH ranges in between 7.2 to 7.7, which is well within the specified standard of 6.5 to 8.5. The minimum pH of 7.2 was observed at GW7& GW8; the maximum pH of 7.7 was observed at GW2 & GW4.
- Total hardness was observed to be ranging from 344 to 386 mg/l. The minimum hardness (344 mg/l) was recorded at GW3 and the maximum (386mg/l) was recorded at GW8.
- Chlorides were found to be in the range of 70 to 88 mg/l, the minimum concentration of chlorides (70 mg/l) was observed at GW3, whereas the maximum value of 88 mg/l was observed at GW8.
- Sulphates were found to be less than 62.0 mg/l in all the locations.
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 492 to 578 mg/l, the minimum TDS observed at GW4 (492mg/l) and maximum concentration of TDS observed at GW1 (578 mg/l).

Surface Water Quality

- The analysis results indicate that the pH values in the range of 7.2 to 7.6, the minimum value was observed at SW3 and maximum value was observed at SW5 & SW7.
- DO was observed to be in the range of 5.0 to 5.5 mg/l. The minimum DO value was observed at SW1 and maximum DO was observed at SW5.
- The TDS was observed in the range of 222 to 312 mg/l, the minimum TDS value was observed at SW6, and where as maximum value was observed at SW1.
- The chlorides and Sulphates were found to be in the range of 26 to 40 mg/l and 32 to 46 mg/l, respectively.
- Total hardness expressed as $CaCO_3$ ranges between 160 to 218 mg/l.
- The calcium & magnesium were found to be in the range of mg/l and 18 to 45 mg/l, respectively.
- As per CPCB Classification Surface Water quality of SW1 falls in Class C and in all the other locations surface water quality is falling in Class B.

3.8 Soil

Soil is generally differentiated into two horizons of minerals and organic constituents of variable depth, which differ from the parent material below in morphology, physical properties, constituents, chemical properties, and composition and biological characteristics. The physico- chemical characteristics of soil have been determined at 8 locations during the monitoring period with respect to colour, texture, cation exchange capacity, pH, N, P, and K etc. The sampling locations have been selected to represent the study area.

3.8.1 Selection of sampling Locations

The sampling locations have been identified with the following objectives:

- To determine the baseline soil characteristics of the study area;
- To determine the impact of existing plant on soil characteristics; and
- To determine the impact on soils more importantly from agricultural productivity point of view.

Seven locations within 10 km radius around the project site were selected for soil sampling. The details of the sampling locations are given in **Table 3.13** and **Figure 3.9(E)**. The soil samples have been analyzed for physico-chemical parameters and heavy metals in accordance with the USEPA and Soil Science Society of America (SSSA) standard test methods. The analysis results of all the locations are presented in **Table 3.15(A).** The results are compared with standard classification given in **Table 3.13**

Table 3.13: Soil Sampling Stations in the Study Area

Code	Location	Coordinates
S-1	Kanksa	23°28'18.20"N, 87°26'56.84"E
S-2	Garadaha	23°29'38.69"N, 87°26'45.37"E
S-3	Sonai	23°27'14.49"N, 87°28'14.76"E
S-4	Near to project site	23°28'15.81"N, 87°28'9.35"E
S-5	Sonaima	23°28'9.11"N, 87°28'57.32"E
S-6	Kota	23°26'44.12"N, 87°30'12.55"E
S-7	Patihar	23°24'22.97"N, 23°24'22.97"N
S-8	Shokna	23°26'38.48"N, 87°25'41.67"E

Figure 3.9(E): Map showing Soil Sampling Locations

3.8.2 Methodology

The soil samples were collected during monitoring period. The samples collected from the all locations are homogeneous representative of each location. At random 4 sub locations were

identified at each location and soil was dug from 30 cm below the surface. It was uniformly mixed before homogenizing the soil samples. The samples were filled in polythene bags, labeled in the field with number and site name and sent to laboratory for analysis.

3.8.3 Soil Results

The detailed soil results of all the monitoring locations are as shown in **Table 3.14**

Table 3.14: Soil Quality Monitoring Results

Sr. No.	Test Parameter	S1	S2	S3	S4	S5	S6	S7	S8
1.	Color*	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
2.	pH(1:2.5 Soil: Water)	7.5	7.6	7.5	7.8	7.3	7.5	7.3	7.7
3.	Electrical Conductivity (1:2 Soil: Water Extract)	0.352	0.254	0.311	0.255	0.352	0.308	0.295	0.362
4.	Bulk Density	1129	1149	1103	1154	1087	1059	1066	1103
5.	Organic Matter	0.6	0.7	1.2	0.9	0.8	0.9	1.0	0.6
6.	Total Organic Carbon	0.3	0.4	0.7	0.5	0.5	0.5	0.6	0.3
7.	Moisture Content	6.3	7.1	5.7	7.1	4.3	4.7	6.3	4.9
8.	Water Holding Capacity	56.0	57.0	57.1	58.1	53.3	55.0	54.9	55.9
9.	Cation Exchange Capacity	29.8	27.5	28.0	27.6	27.0	28.9	28.3	29.7
10.	Sodium as Na (Exchangeable)	1.1	1.2	1.2	1.3	1.4	1.4	1.2	1.2
11.	Potassium as K (Exchangeable)	0.4	0.4	0.3	0.4	0.5	0.5	0.5	0.4
12.	Calcium as Ca	12.5	12.5	11.4	13.5	16.6	13.5	12.5	13.5

Sr. No.	Test Parameter	S1	S2	S3	S4	S5	S6	S7	S8
	(Exchangeable)								
13.	Magnesium as Mg (Exchangeable)	14.7	13.7	14.7	13.7	12.6	12.6	12.6	13.7
14.	Sodium as Na (water Extractable)	53	61	56	52	57	62	50	56
15.	Potassium as K (water Extractable)	17	23	27	13	22	125	22	19
16.	Calcium as Ca (water Extractable)	108	108	83	125	100	116	108	92
17.	Magnesium as Mg (water Extractable)	61	66	96	61	71	66	66	71
18.	Chloride as Cl^- (water Extractable)	78	68	87	58	97	68	87	78
19.	Sulfate as SO_4^{--} (water Extractable)	102	122	107	99	101	97	111	124
20.	Available Phosphorus as P_2O_5	54	70	61	77	68	65	66	64
21.	Available Potassium as	284	297	285	285	282	456	281	298

Sr. No.	Test Parameter	S1	S2	S3	S4	S5	S6	S7	S8
	K_2O								
22.	Available Nitrogen as N	131	135	137	151	135	212	139	137
TCLP Metals									
1.	Cadmium as Cd	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]
2.	Total Chromium as Cr	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]
3.	Cobalt as Co	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]
4.	Copper as Cu	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]
5.	Iron as Fe	BDL[DL=0.09]	BDL[DL=0.09]	BDL[DL=0.09]	BDL[DL=0.09]	BDL[DL=0.09]	BDL[DL=0.09]	BDL[DL=0.09]	BDL[DL=0.09]
6.	Lead as Pb	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]	BDL[DL=0.06]
7.	Manganese as Mn	BDL[DL=0.12]	BDL[DL=0.12]	BDL[DL=0.12]	BDL[DL=0.12]	BDL[DL=0.12]	BDL[DL=0.12]	BDL[DL=0.12]	BDL[DL=0.12]
8.	Nickel as Ni	BDL[DL=0.0	BDL[DL=0.0	BDL[DL=0.0	BDL[DL=	BDL[DL=0	BDL[DL=0	BDL[DL=0	BDL[DL=0.

Sr. No.	Test Parameter	S1	S2	S3	S4	S5	S6	S7	S8
		6]	6]	6]	0.06]	.06]	.06]	.06]	06]
9.	Zinc as Zn	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]	BDL[DL=0.018]

Table 3.15: Standard Classification of Soil

S. No.	Soil Test	Classification
1.	pH	<4.5 Extremely acidic 4.51- 5.50 Very strongly acidic 5.51-6.0 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 Neutral 7.31-7.80 slightly alkaline 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline 9.01 very strongly alkaline
2	Salinity Electrical Conductivity (mmhos/cm) (1 ppm = 640 mmho/cm)	Upto 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)
3	Organic Carbon	Upto 0.2: very less 0.21-0.4: less 0.41-0.5 medium, 0.51-0.8: on an average sufficient 0.81-1.00: sufficient >1.0 more than sufficient
4	Nitrogen (Kg/ha)	Upto 50 very less 51-100 less 101-150 good 151-300 Better >300 sufficient

Source: Handbook of Agriculture, Indian Council of Agriculture Research, New Delhi

Baseline Soil Status

- It has been observed that the pH of the soil in the study area varied from 7.3 to 7.8. The minimum pH value of 7.3 was observed at S5 where as the maximum value of 7.8 was observed at S4.
- The electrical conductivity was observed to range from 0.254 to 0.362 mS/cm, with the maximum observed at S8 with the minimum observed in S2.
- The nitrogen value found between the range of 131 to 212 mg/kg and Total Organic Carbon found between 0.3 % to 0.7%.

3.9 Biological Environment

3.9.1 Introduction

Study of biological environment is one of the most important aspects for Environmental Impact Assessment. In view of the need for conservation of environmental quality and biodiversity study, biological environment is one of the most important aspects for Environmental Impact Assessment. Ecological systems shows complex inter-relationships between biotic and abiotic components including dependence, competition and mutualism.

Biotic components comprise of both plant and animal communities, which interact not only within and between them but also with the abiotic components viz. physical and chemical components of the environment. Generally, biological communities are the indicators of climatic and edaphic factors. The biological environment includes mainly terrestrial ecosystem and aquatic ecosystem.

3.9.2 Objectives of Ecological studies:

The present study was undertaken with the following objectives:

- To assess the nature and distribution of vegetation in and around the project site
- To evaluate the distribution of animal life spectra, including avifauna and butterflies, available in this area.
- To ascertain whether the proposed project will have any adverse impact on the ecology in and around project areas, and suggest mitigation measures, if needed.

3.9.3 Study Area

Project site is located at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan,West Bengal-713148.As per guidelines of MoEF for Environmental Impact Assessment, the study area was restricted up to 10 km periphery of the project site. All observations were undertaken in March 2021 in the study area **(Fig 3.10).**

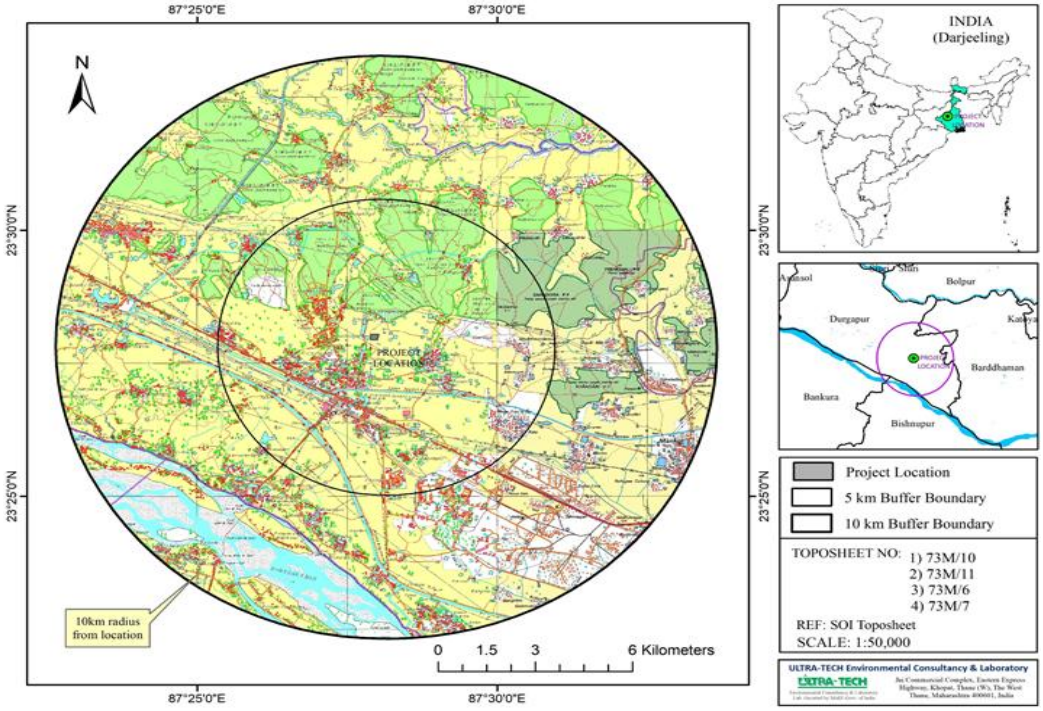


Figure 3.10: Study Area for Biological Environment

3.9.4 Survey Methodology

Sampling locations were identified for study on biological environment based on topography, vegetation structure, pattern and distribution. The observations were taken from different

villages along agricultural field, marshy land, waste land, river side vegetation and built up area Accordingly the objectives were delineated for environmental impact assessment studies.

- Primary data have been collected within project site as well as up to 10 Km from project site
- Identified vegetation patterns at different locations through GIS map and physically surveyed representative sites.
- Checklist of trees, shrubs, herbs, Palms & grasses from the study area was prepared.
- Different types of animals, including avifauna, available in this area, have been recorded
- To spot the fauna in the study area and also to identify the fauna by secondary indicators such as pugmarks, scats, fecal pellets, calls and other signs;
- For ecological information, the secondary sources such as local officials & villagers were interviewed
- Secondary data, up to 10 Km boundary from the project site have been collected from literature, forest department, and discussions with local people & NGO

3.9.5 Observation

3.9.5.1 Project Site

Figure 3.11: View of the Project Site

Terrestrial Ecology:

A. Terrestrial Ecology:

a) Flora:

The floristic survey reveals that the project site **(Plate 3.16)** possesses tree species such as:

Trees: *Acacia auriculiformis, Casuarina equisetifolia,, Mangifera indica , Psidium guajava* etc.

Shrubs: *Ixora coccinia* & *Calotropis gigantea*

Herbs: *Achyranthes aspera, Parthenium hysterophorus* & *Hibiscus rosa-sinensis* etc. **(Table 3.16).**

Palm *: Cocos nucifera*

b) Fauna:

The fauna **(Table 3.17)** observed in project site are as follows;

The project site is rich in avifauna commonly observed birds are the Crow, Drongo, Bulbul, Common myna etc. The reptiles are represented by garden lizard. In butterflies Plain tiger &common Indian crow are very common in project site.

B. Aquatic Ecology

No water body was observed within the project site.

II Area between Project site & 10 km of the project site

3.1.5 a) Flora

Dominant tree species in the study area are *Acacia auriculiformis(*Akashmoni), *Acacia Nilotica (*Babool), Eucalyptus (*Eucalyptus globules*), Date palm/Khejur *(Phoenix sylvestris)* Sal *(Shorea robusta),* Radhachura *(Peltophorum pterocarpum),* Mahua *(Madhuca indica),* Devdaru *(Polyalthia longifolia),* Segun *(Tectona grandis),* Arjun *(Terminalia arjuna),* Guava *(Psidium guajava), Shorea robusta(sal),* Palm Tree/Taal *(Borassus flabellifer)* etc. **(Table 3.16).** There is a scattered vegetation primarily dominated by *Acacia* sp. in a study area. in view of this IVI was not studied

Table 3.16: Presence of vegetation up to10 km surroundings of the project site

SN	Scientific Name	Common Name	Family
Trees			
1	Acacia auriculiformis	Akashmoni	Mimosaceae
2	Acacia nilotica	Babool	Mimosaceae
3	Aegle marmelos	Bel	Rutaceae
4	Albizia lebbeck	Siris	Mimosaceae
5	Alstonia scholaris	Chhatim	Apocynaceae
6	Anthocephalus cadamba	Kadam	Rubiaceae
7	Artocarpus heterophyllus	Kathal	Moraceae
8	Azadirachta indica	Neem	Meliaceae
9	Bomax ceiba	Simul	Bombacaceae
10	Butea monosperma	Palash	Fabaceae
11	Carica papaya	Pepe	Caricaceae
12	Cassia fistula	Amaltas	Caesalpiniaceae
13	Citrus grandis	Lebu	Rutaceae
14	*Casuarina equisetifolia	Whistling Pine.	Casuarinaceae
15	Dalbergia sissoo	Sissu	Fabaceae
16	Delonix regia	Gulmohar	Fabaceae
17	Dillenia indica	Chalta	Dilleniaceae
18	Eucalyptus globulus	Eucalyptus	Myrtaceae
19	Eugenia jambolana	Kalajam	Myrtaceae
20	Feronia elephantum	Kathbel	Rutaceae
21	Ficus benghalensis	Banyan	Moraceae
22	Ficus hispida	Fig	Moraceae
23	Ficus religiosa	Aswatha	Moraceae

SN	Scientific Name	Common Name	Family
24	Lagerstroemia parviflora	Jarul	Lythraceae
25	Lannea coromandelica	Jiol	Anacardiaceae
26	Madhuca indica	Mahua	Sapotaceae
27	*Mangifera indica	Mango/Aam	Anacardiaceae
28	Mimusops elengi	Bakul	Sapotaceae
29	Moringa pterygosperma	Sajina	Moringaceae
30	Peltophorum pterocarpum	Radhachura	Fabaceae
31	Phoenix sylvestris	Date Palm	Arecaceae
32	Polyalthia longifolia	Devdaru	Annonaceae
33	Psidium guajava	Guava	Myrtaceae
34	Shorea robusta	Sal	Dipterocarpaceae
35	Spondias pinnata	Amra	Anacardiaceae
36	Swietenia mahagoni	Mahogany	Meliaceae
37	Streblus asper	Sheora	Moraceae
38	Tamarindus indica	Tamarind	Fabaceae
39	Tectona grandis	Segun	Verbenaceae
40	Terminalia arjuna	Arjun	Combretaceae
41	Terminalia bellirica	Baheda	Combretaceae
42	Ziziphus mauritiana	Jujube	Rhamnaceae
Shrubs			
1	Annona squamosa	Sarifa	Annonaceae
2	Cassia tora	Panar	Fabaceae
3	Calotropis gigantea	Bhatkaya	Apocynaceae
4	Ixora coccinea	Ramgan	Rubiaceae
5	Nerium odorum	Kaner	Apocynaceae
6	Solanum nigrum	Regani	Solanaceae
7	Jatropha curcas	Kananeranda	Euphorbiaceae
Herbs			
1	*Achyranthes aspera	-	Amaranthaceae
2	Ocimum Sanctum	Tulsi	Lamiaceae
3	*Hibiscus rosa-sinensis	Jaba	Malvaceae
4	*Parthenium hysterophorus	Congress grass	Asteraceae
5	Ocimum sanctum	Tulsi	Lamiaceae
6	Primula officinalis	Primrose	Primulaceae
Palms			
1	Cocos nucifera	Coconut	Arecaceae
2	Borassus flabellifer	Palm Tree	Arecaceae
Grassess			
1	Dendrocalamus strictus	Bass	Poaceae
2	Dendrocalamus gigenteus	Bamboo	Poaceae
3	Saccharum spontaneum	Kans	Poaceae
4	Cynodon dactylon	Dube	Poaceae

Source: Primary data generation by Ultratech team

b) Fauna

(1) Vertebrates

Mammals

The domestic animals in the study area mostly comprise of Cat and Cow the survey revealed that 9 species of mammals were recorded in and around the study area while no wild mammal was observed in this area during site visit.

Reptiles & Amphibians

Four species of reptiles & two species of amphibians were recorded. Availability of fauna in the vicinity of the sites is presented in Table 3.2 none of these animals are endangered (Schedule I) as per Wildlife (Protection) Act 1972.

Avifauna

Birds were studied by direct observation with the help of ‘‘Olympus 10 x 50 DPS I’’ binocular and were identified by adopting available literature (Grimmett et al. 1998). During the survey, 9 species of birds were noticed. The dominant birds were Red vented Bulbul, Indian Black Drongo (Plate 3.1). Small blue Kingfisher Spotted owl etc. It has been observed that the majority of birds were insectivorous in habit preferring insects, worms and arachnids. None of these birds are endangered (Schedule I) as per Wildlife (Protection) Act 1972 (Table3.3).

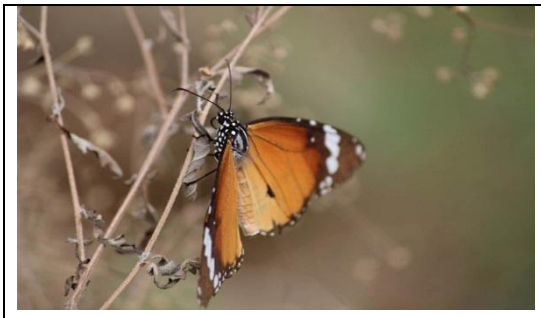
	
Red vented Bulbul***(Pycnonotus cafer)***	Indian Black Drongo(***Dicrirus macrocercus)***

Plate 3.12: Avifauna Observed in the Study Area

2) Invertebrates

Butterflies

Study area comprises of 8 species of butterflies, dominated by *Euploea core*, *Danaus chrysippus* **(Plate3.2***)* and *Phalanta phalantha.* Butterfly diversity and community composition are dependent on plants, as their caterpillars are highly specific to host plants on which they feed and metamorphose into the adults. Fairly good butterfly diversity in this area is conspicuous due to presence of wide varieties of flowering plants. Therefore, richness of host plant diversity contributes to butterfly diversity. None of these is endangered (Schedule I) as per Wildlife (Protection) Act 1972.



Plain tiger (*Danaus chrysippus*)

Common Indian Crow (*Euploea core*)

Plate 3.13 Butterflies in the Study Area

Table 3.17: Fauna recorded in the study area up to 10 km periphery

SN	Scientific Name	Common Name	Status according to IWPA 1972
Mammals			
1	*Bos taurus*	Cow	Not enlisted
2	*Canis aureus*	Fox	II
3	*Felis domesticus*	Cat	Not enlisted
4	*Presbytis entellus*	Common Langur	II
5	*Canis aureus*	Jackal	Sch. II
6	*Herpestes edwardsii*	Common Mongoose	Sch. II
7	*Trachypithecus geei*	Golden Langur	Sch. II
8	*Mus musculus*	House mouse	Sch IV
9	*Funambulus palmarum*	Squirrel	Sch. IV
Reptiles			
1	**Calotes versicolor*	Common Garden lizard	Not enlisted
2	*Mabuya carinata*	Brahminy Skink/ Bahmani	-

SN	Scientific Name	Common Name	Status according to IWPA 1972
3	*Ptyas mucosa*	Dhaman/Ret Snake	Sch. II
4	*Bungarus caeruleus*	Common Indian Krait	Sch. IV
Amphibians			
1	*Bufo stomaticus*	Indian Marbled Toad	-
2	*Rana tigerinus*	Indian Bull Frog	Sch. IV
Butterflies			
1	*Papilio polytes*	Common Mormon	Not enlisted
2	*Papilio polymnestor*	Blue Mormon	Not enlisted
3	**Euploea core*	Common Indian Crow	Sch. IV
4	**Danaus chrysippus*	Plain Tiger	Not enlisted
5	*Phalanta phalantha*	Common leopard	Not enlisted
6	*Papilio polytes*	Common mormon	Not enlisted
7	*Junonia atlites*	Gray pansy	Not enlisted
8	*Papilio demoleus*	Lime butterfly	Not enlisted

Table 3.18: Avifauna recorded in the study area up to 10 km periphery

S.N	Scientific Name	Common Name	Status according to IWPA-1972
1.	*Streptopelia chinensis*	Spotted dove	Sch. IV
2.	*Columba livia*	Rock pigeon	Sch – IV
3.	*Psittacula krameri*	Rose-ringed parakeet	Sch. IV
4.	**Corvus splendens*	House crow	Sch. V
5.	**Acridotheres tristis*	Common myna	Sch. IV
6.	*Passer domesticus*	House sparrow	Sch. IV
7.	**Dicrirus macrocercus*	Black Drongo	Sch. IV
8.	**Pycnonotus cafer*	Red vented Bulbul	Sch. IV
9.	*Athene brama*	Spotted owl	Sch. IV
10.	*Alcedo atthis*	Small blue Kingfisher	Sch – IV
11.	*Ardeola grayii*	Pond Heron	--

Source: Primary data generation by Ultratech team

** Also observed on site Project site*

3.9.6 Agriculture & Horticulture crops observed in the study area

The common crops in the study area are Oryza sativa, Zea mays which are mainly dependent on rainwater, while tube well & bore well in non- monsoon seasons. Apart from these, commercial crops like Potato, Onion and several vegetables like chillies, brinjal, leafy vegetable, besides various fruits like mango, Banana ,papaya etc. are also grown.

Table 3.19: Agricultural & Horticulture crops found in the study area

SN	Common Name	Scientific Name
CEREALS		
1	Rice	*Oryza sativa*
2	Wheat	*Triticum* aestivum
3	Maize	*Zea mays*
PULSES		
1	Pea	*Pisum sativum*
2	Mung bean	*Vigna radiata*
3	Groundnut	*Arachis hypogaea*
4	Cowpea/ Badbati	*Vigna unguiculata*
5	Pigeon pea	*Cajanus cajan*
OILSEEDS		
1	Mustard Seed	*Brassica nigra*
2	Sesame/ Til	*Sesamum indicum*
VEGETABLES		
1	Potato	*Solanum tuberosum*
2	Brinjal	*Solanum melongena*
3	Cucurbita	*Cucurbita maxima*
4	Cucumber	*Cucumis melo*
5	Ladies finger	*Abelmoschus esculentus*
7	Cabbage	*Brassica oleracea var. capitata*
8	Cauliflower	*Brassica oleracea var. botrytis*
9	Tomato	*Solanum lycopersicum*
10	Radish	*Raphanus sativus*
11	Carrot	*Daucus carota sativus*
12	Chilli	*Capsicum frutescens*
13	Beans	*Phaseolus vulgaris*
14	Onion	*Allium cepa*
15	Spinach	*Spinacia oleracea*
16	Bitter Gourd	*Momordica charantia*
FRUITS		
1	Mango	*Mangifera indica*
4	Banana	*Musa sapientum*
5	Papaya	*Carica papaya*
6	Guava	*Psidium guajava*
8	Jack fruit	*Artocarpus heterophyllus*
OTHER CROPS		
1	Jute	*Corchorus capsularis*

Source: https://agricoop.nic.in/sites/default/files/WestBengal%206-Darjeeling-31.12.2011_0.pdf
http://www.visvabharati.ac.in/file/Final-Report-181.pdf

3.9.7 National Park & Wildlife Sanctuary and Reserve Forest

No National Park, Sanctuary and Reserve Forest are present within 10 km from the Project site.

3.9.8 Aquatic Ecology

Sampling

Water sample within 10km periphery of project site were collected from Mahananda River. Samples from these water bodies were collected during March 2021 for Phytoplankton and zooplankton analyses.

To enumerate phytoplankton, unfiltered surface waters were collected from the water bodies. Phytoplankton samples were immediately fixed in 2% Lugol's iodine solution so as to prevent adverse effects of light and temperature which might cause rapid decay of organisms (APHA 2005). Phytoplankton was identified up to genera level using standard taxonomic keys. For zooplankton, about 40 liter water was filtered through plankton net having mesh size of 75µ to represent all the available groups. The samples were fixed immediately with 5% buffered formalin and subsequently analysed under microscope in the laboratory with the help of Sedgwick rafter cell.

Observations

a. Phytoplankton

Phytoplankton are the primary producers of an ecosystem and thus helps maintain DO of a water body. Any reduction in number of phytoplankton would ultimately affect the whole ecosystem.

Phytoplankton counts, recorded in Damodar River Altogether 12 genera were recorded (Table 3.20). Amongst 4 groups Cynophyaceae were dominant followed by Chlorophyceae, Bacillariophyceae and Euglenophyceae.

Table 3.20: Table of phytoplanktons

SN	Genera
A	**Bacillariophyceae**
1	*Cytotella* sp.
2	*Navicula* sp.
3	*Nitzschia* sp.
4	*Synedra* sp.
B	**Chlorophyceae**
1	*Spirogyra sp.*
2	*Oedogonium sp.*
3	*Zygnema*
C	**Cyanophyceae**
1	*Anabena sp.*
2	*Microcystis* sp.
3	*Oscillatoria* sp
4	*Lyngbya*
E	**Euglenophyceae**
1	*Euglena* sp.

3.8: Detail of Fishes

Fish are at the tertiary level of the food chain of aquatic ecology. As the study area having many inland water bodies like several ponds, jheels, beels, ditches and the important river Damodar, so the biodiversity of fish is high. Types of freshwater fish of both confined and unconfined (flowing) surface water bodies in the study area were known by talking to local fishermen,local people & from research-paper have been summarized in **Table-3.21**

Table 3.21: Checklist of Fish Species

SN	Scientific Name	Common Name
1	*Salmostoma sardinella*	Chela
2	*Osteobrama cotio cotio*	Chanda
3	*Catla catla*	Katla
4	*Cyprinus carpio*	Common Carp
5	*Hypophthalmichthys molitrix*	Silver carp
6	*Cirrhinus mrigala*	Mrigal
7	*Cyprinus carpio*	American rui
8	*Labeo rohita*	Rohu
9	*Labeo bata*	Bata
10	*Puntius sticto*	Punthi
11	*Clarias batrachus*	Magur
12	*Heteropneustes fossilis*	Singi
13	*Channa striatus*	Shol
14	*Channa punctatus*	Lata
15	*Oreochromis mossambica*	Tilapia
16	*Anabas testudineus*	Koi
17	*Mystus seenghala*	Tangra
18	*Lates calcarifer*	Bhetki
19	*Mastacembelus armatus*	Pakal
20	*Mastacembelus pancalus*	Pakal
21	*Labeo calbasu*	Kurchi
22	*Wallago attu*	Boal

***Source**: Fishes in the Mahananda River: seasonal variation and community structure J Fish 4(1): 325-334, Apr 2016*

3.10 Socio-Economic Environment

Introduction

An environmental factor is a socioeconomic concern. The emphasis is mostly on the social and economic consequences of the proposed development's construction and operation. It covers characteristics such as demographic composition, access to basic utilities such as housing, education, health and health services, occupation, water supply, sanitation, connectivity, and power, prevalent local diseases, and characteristics such as tourist sites and ancient monuments. The examination of these criteria aids in defining and assessing the potential implications of project activity on the surrounding area. Every development effort

has an immediate and indirect, positive and negative impact. Every development activity has an immediate and indirect, good and bad impact on the region's socioeconomic environment.

Objectives

The following are the socioeconomic study priorities:

- To investigate the demographic and facility structure available in the field of study.
- Identification and evaluation of the effects on the socioeconomic status of the study area.
- Consider any potential negative and positive social consequences of the initiative.
- We are recommending action to minimize the adverse effects of the project.
- To check that environmental and industrial standards have been complied with.
- To advise the adoption of cost-effective steps to mitigate the expected consequences.

The field of socioeconomic evaluation study was formed within a 10-kilometer radius. The Ministry of Environment and Forestry has designated a main radius of 10 km from the project data site radius. The radius of the project location. The EIA Guiding Handbook is used to classify the effect zone. For socioeconomic study, both primary and secondary data are used.

Data Collection

The word "data collection" refers to a method of processing and obtaining data. Systematic data compilation from various sources for a particular project, which has been frequently monitored, documented, and coordinated. Data are critical inputs to every phase of the project's decision-making process.

Primary Data Collection

The term "primary data" refers to data that was collected specifically for this reason. Data collected in the field with the investigator's assistance and supervision. This type of Information is often new and collected for the first time. It is beneficial for both present and future research. The following strategies are used to collect primary data in the research sector.

1. Form of observation

2. Focus group discussion (FGD)

3. Questionnaires and Surveys

Secondary Data Collection

Secondary data is acquired and registered by someone else before and with a reason other than the present one. Secondary Information is collected from a variety of other offices such as: Census offices (2011 Indian Census), Statistical, Health Offices, Department of Land and Revenue, Zilla Parishad and Non-Governmental Organizations.

Concepts and Definition

- **Study area:** The study area, also known as the impact area, has been established as the whole core region plus a buffer region 10 kilometres from the core perimeter. The study area includes both natural and man-made features.
- **Quality of Life (QoL):** Quality of Life refers to how much a person may appreciate his or her life's favourable resources. The 'possibilities' that each individual has in his or her life, which represent the combination of personal and environmental variables, are derived from opportunities and limits. Leisure consists of two parts: the sensation of pleasure and the possession or attainment of such attributes.
- **Household:** A household is a group of people who usually live together and dine in shared kitchens. People in the household might be related, unconnected, or a combination of the two. However, if a group of similar or unrelated persons reside in the same house but do not share a kitchen, they do not belong to a shared home. Each individual is regarded as if they were a member of a distinct family. Households might include one man, two, or more people.
- **Sex ratio**: The percentage of women and males in a particular population is referred to as the sex ratio. It is stated the term "number of women per 1000 males."
- **Literate:** Anyone above the age of seven who can read and write in any language is called literate. There is no formal schooling or minimum educational credentials required for an individual to be considered literate. Blind persons who can read Braille are now considered academics.
- **Literacy rate:** The literacy rate is defined as the percentage of the Population aged 7 and older who are literate.
- **Labor force:** the number of employees in a geographical unit is equal to the number of jobs and unemployed persons. The workforce is defined as the number of persons who work and those who are jobless. An individual who is not an employee must be characterized as being actively engaged in work. Those between the ages of 14 and 16 make up the majority of the country's labour force, as do those beyond the retirement age (about 65) who are either employers or job searchers. Students, seniors, home visitors, inmates, persons with permanent impairments, and incentives are not counted as part of the labour force.
- **Work:** Work is defined as participation in any economically advantageous action, with or without compensation, wages, or revenue. Such involvement might be emotional or physical in character. Jobs need not only actual work, but also close supervision and instruction. Jobs on a farm, in a family business, or in another type of business might be part-time or full-time.
- **Worker:** All personnel are classed as workers. People who produce or prepare milk are typically regarded as employees, even if only for personal consumption.
- **Main workers:** Individuals who worked the majority of the time (6 months or more for a year of the comparative period) are referred to as Main Workers.

- **Marginalized workers:** These are people who have not served for the majority of their time (i.e., for less than 6 months).
- **The rate of participation in work**: the rate of participation is the ratio of workers to the total size of the cohort (national population of the same age range). The labour participation rate is defined in this study as the total (main and marginal) share of the work force.

Project Location

The project site is close to Kanksa, which is a census town and gramme panchayat in the Kanksa CD block of the Paschim Bardhaman district in the Indian state of West Bengal. Kanksa is the headquarters of the Kanksa CD block. Kanksa had a total population of 23,789 according to the 2011 Census of India, with 12,406 (52%) men and 11,383 (48%) females. There were 2,577 people between the ages of 0 and 6. Kanksa has 17,992 literate residents (84.82 percent of the population over the age of six). Because the Kanksa C.D. block t is familiar with agricultural and forest-based low-level subsistence economies, land use characteristics such as net sown area, forest, culturable waste, and cultivated waste have been used. Because the Kanksa C.D. block t is familiar with agricultural and forest-based low-level subsistence economies, land use characteristics such as net sown area, forest, culturable waste, and its associates such as irrigation facility, etc. are expected to be governing elements in this land use system.

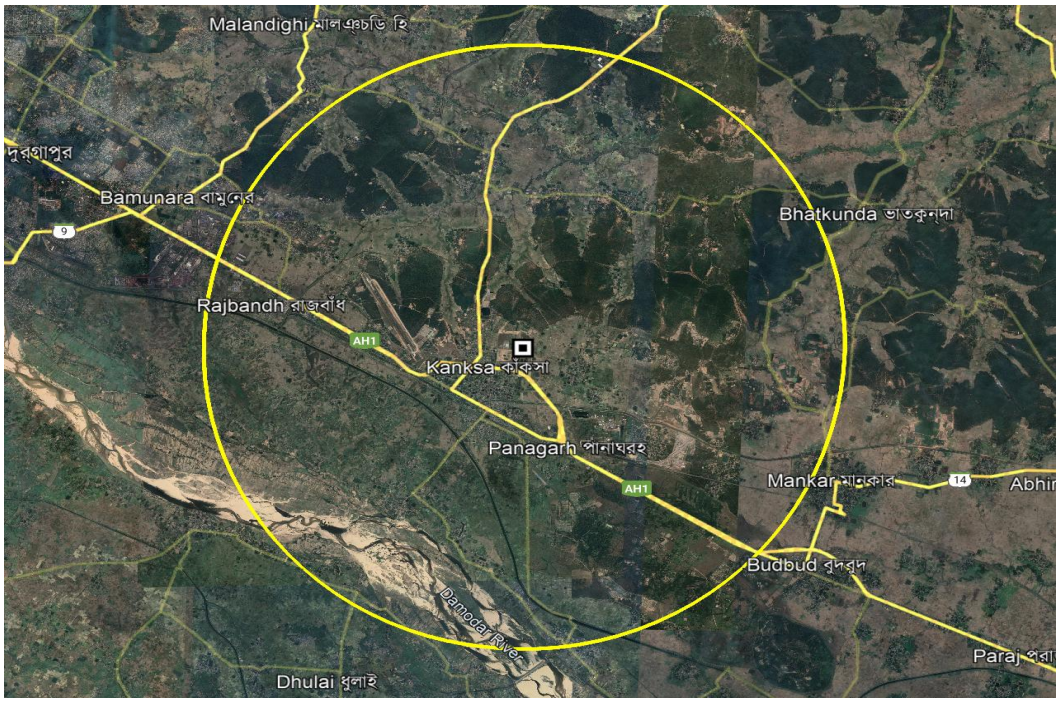


Figure 3.14: Project site and Study area

In the 10 km radius area, settlements are under study during the discussion of the basic socioeconomic environment scenario. Various tables and graphs give detailed descriptions of these settlements**.**

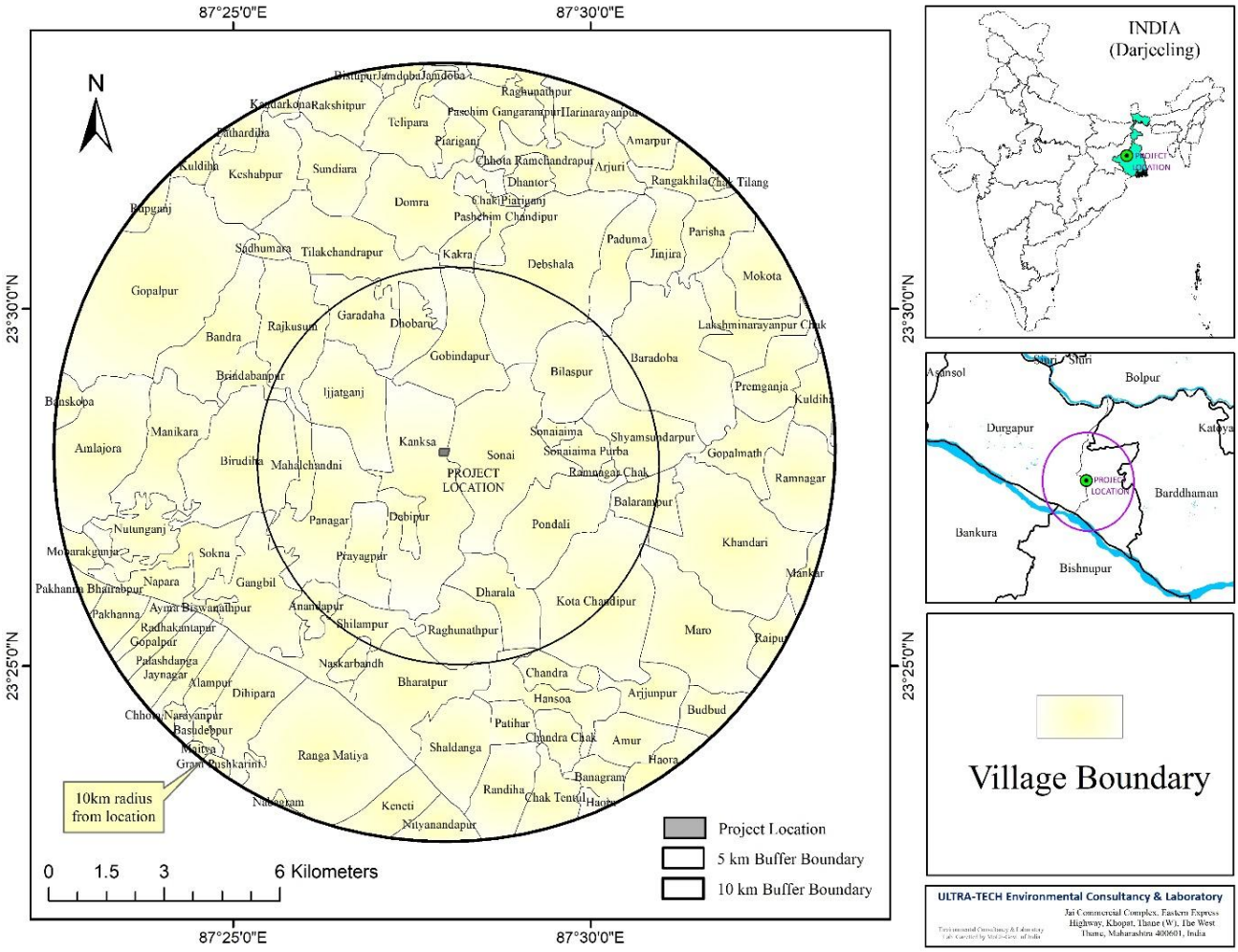


Figure 3.15 : Village boundary map of the study area.

❖ Demography

Kanksa is a West Bengal state block with a population of 228,000 in 2022. According to the 2011 Indian census, this Block has a total Kanksa population of 178,125 people, with 91,350 men and 86,775 women. Kanksa's population in 2021 is 220,875 people. Literate persons number 120,545 out of 67,797 males and 52,748 females. There are 75,480 employees who rely on many talents, including 53,636 males and 21,844 women. A total of 5,394 cultivators rely on agriculture cultivation, with 5,032 being males and 362 being women. Kanksa has 10,338 individuals working in agricultural land as labourers, including 7,054 males and 3,284 women.

Table 3.22: Census data of the area around project location

Name	No of Households	Total Population		Population in the age group 0-6 Person	Scheduled Castes population		Scheduled Tribes population		Literates Population		Illiterate Population		Working Population		Non Working Population	
		Male	Female		Male	Female	Male	Female	Male	Female	Male	Female	Main Worker	Marginal Worker	Male	Female
Bistupur	455	1160	1129	306	269	289	456	434	627	372	533	757	851	125	503	810
Jamdoba	85	233	196	66	55	42	167	146	132	63	101	133	244	0	102	83
Rakshitpur	308	728	746	192	383	433	20	0	482	267	246	479	195	438	323	518
Raghunathpur	190	442	436	130	301	285	90	80	229	124	213	312	144	239	191	304
Amarpur	364	821	817	257	373	365	125	120	477	305	344	512	452	291	360	535
Kandarkona	210	528	527	194	309	313	76	93	324	178	204	349	198	357	208	292
Telipara	295	722	668	225	278	279	285	251	376	223	346	445	539	111	328	412
Harinarayanpur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paschim Gangarampur	132	332	321	93	90	95	162	149	196	103	136	218	201	152	141	159
Kuldiha	517	1285	1270	416	384	396	368	349	795	494	490	776	590	531	580	854
Pathardiha	43	99	84	20	0	0	23	19	68	46	31	38	22	25	60	76
Piariganj	203	530	497	116	164	146	148	144	312	184	218	313	283	93	254	397
Keshabpur	146	363	356	106	144	148	84	84	226	128	137	228	182	64	174	299
Sundiara	226	571	566	185	179	178	273	261	296	174	275	392	295	288	249	305
Chhota Ramchandrapur	162	397	354	121	245	237	0	0	223	122	174	232	111	213	166	261
Arjuri	70	150	166	59	105	106	0	0	78	56	72	110	70	69	57	120
Rupganj	206	579	554	138	133	141	57	52	416	264	163	290	355	78	259	441
Rangakhila	295	721	681	228	219	222	204	187	434	260	287	421	214	511	294	383
Domra	397	984	856	292	358	331	284	255	553	292	431	564	393	403	419	625
Dhantor	110	261	244	79	40	43	9	4	193	135	68	109	165	34	105	201

Chak Tilang	36	112	82	20	65	46	0	0	66	32	46	50	25	93	38	38
Pashchim Chandipur	129	352	303	124	51	37	70	58	227	111	125	192	72	205	162	216
Gopalpur	2592	6587	6225	1511	3389	3276	181	171	4967	3705	1620	2520	3009	1358	3254	5191
Mokota	178	420	393	131	158	144	114	113	241	151	179	242	333	111	172	197
Jinjira	139	341	326	95	158	145	53	54	250	166	91	160	167	180	126	194
Tilakchandrapur	385	899	871	257	470	445	71	72	503	346	396	525	399	449	359	563
Debshala	806	1971	1822	541	669	643	130	127	1417	1077	554	745	963	740	799	1291
Parisha	140	315	263	69	248	191	0	0	224	123	91	140	313	92	86	87
Chak Piariganj	12	40	29	9	0	0	40	29	22	3	18	26	16	25	17	11
Paduma	109	306	277	68	124	108	111	112	211	134	95	143	262	9	156	156
Kakra	122	306	321	112	16	20	30	32	195	167	111	154	155	154	105	213
Sadhumara	22	55	48	22	0	0	53	46	12	0	43	48	22	34	26	21
Bandra	401	1042	1007	275	452	466	0	0	687	431	355	576	363	509	457	720
Rajkusum	311	778	731	193	342	324	97	98	485	317	293	414	469	213	346	481
Lakshminarayanpur Chak	10	25	27	12	0	0	25	27	8	1	17	26	13	12	10	17
Gobindapur	108	249	262	58	134	140	105	114	183	130	66	132	131	118	84	178
Baradoba	224	581	557	166	122	112	187	202	393	264	188	293	314	273	205	346
Garadaha	132	317	325	102	85	85	99	99	238	161	79	164	137	133	145	227
Dhobaru	152	327	359	121	145	171	139	145	163	82	164	277	52	217	143	274
Bilaspur	86	244	238	62	161	141	0	0	177	122	67	116	114	116	94	158
Premganja	146	353	335	96	213	195	53	51	172	97	181	238	157	204	147	180
Ijjatganj	721	1714	1609	385	828	760	226	228	1297	975	417	634	787	625	823	1088
Brindabanpur	91	223	219	67	0	0	219	217	119	64	104	155	78	117	115	132
Kuldiha	122	310	290	104	49	37	190	191	159	78	151	212	194	160	124	122
Banskopa	432	1180	1024	297	367	350	7	10	785	437	395	587	401	423	526	854
Sonai	636	1557	1462	391	780	754	56	53	1000	583	557	879	598	757	637	1027

Manikara	181	542	494	82	298	261	45	51	334	210	208	284	219	149	244	424
Amlajora	976	2512	2268	619	862	858	115	91	1873	1270	639	998	1109	453	1244	1974
Kanksa	3263	8616	7916	2038	1891	1780	456	439	6493	4738	2123	3178	3977	1117	4317	7121
Birudiha	640	1684	1470	346	661	579	33	33	1132	756	552	714	443	757	799	1155
Mahalchandni	42	120	88	36	2	1	0	0	80	52	40	36	52	5	69	82
Shyamsundarpur	299	726	673	193	43	42	0	0	554	437	172	236	303	408	256	432
Gopalmath	162	422	393	128	175	174	99	93	265	177	157	216	197	319	152	147
Sonaiaima Purba	80	181	188	69	0	0	0	0	96	85	85	103	93	132	61	83
Sonaiaima	2	10	2	0	1	0	2	2	10	1	0	1	9	1	1	1
Ramnagar	231	569	592	217	0	0	565	591	221	153	348	439	248	433	231	249
Panagar	1055	2650	2397	640	773	690	149	163	1985	1386	665	1011	1286	605	1179	1977
Khandari	422	1065	1028	329	566	509	320	345	594	331	471	697	587	509	406	591
Ramnagar Chak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Balarampur	161	408	385	153	0	0	215	201	212	126	196	259	306	162	148	177
Pondali	214	514	520	127	334	350	0	0	319	170	195	350	241	354	167	272
Debipur	1745	4771	4344	1155	848	765	6	12	3540	2563	1231	1781	2559	293	2257	4006
Nutunganj	241	679	618	185	182	177	0	0	451	299	228	319	421	9	349	518
Prayagpur	990	2680	2469	662	598	598	44	51	1985	1368	695	1101	1461	122	1311	2255
Mankar	1832	4481	4232	1011	1773	1690	153	184	2934	2238	1547	1994	2316	858	2079	3460
Kota Chandipur	862	2306	2148	575	1043	973	5	3	1590	1080	716	1068	1110	763	955	1626
Gangbil	284	1025	916	332	60	60	19	12	594	294	431	622	517	244	477	703
Sokna	225	620	556	197	431	392	0	0	391	208	229	348	175	376	292	333
Mobarakganja	302	854	749	213	292	272	35	28	543	317	311	432	436	241	367	559

Maro	632	1623	1545	462	1017	988	0	0	985	596	638	949	679	720	680	1089
Pakhanna Bhairabpur	220	623	587	190	375	355	0	0	437	294	186	293	215	450	263	282
Napara	416	1234	1109	348	609	565	15	16	774	469	460	640	272	716	553	802
Dharala	251	631	581	134	276	241	7	6	431	320	200	261	313	170	283	446
Anandapur	253	747	665	189	243	226	7	22	459	303	288	362	180	362	322	548
Raghunathpur	215	561	515	117	187	189	10	7	377	256	184	259	303	136	247	390
Pakhanna	659	1682	1683	465	560	585	0	0	1217	927	465	756	797	397	791	1380
Raipur	1092	2622	2484	538	1214	1167	13	8	2062	1559	560	925	1226	463	1276	2141
Shilampur	703	1798	1683	429	618	573	28	21	1202	848	596	835	803	471	826	1381
Ayma Biswanathpur	364	1065	983	262	484	442	26	27	633	411	432	572	410	480	431	727
Radhakantapur	304	848	771	227	660	595	0	0	509	217	339	554	415	406	361	437
Gopalpur	161	424	408	102	205	195	0	0	321	217	103	191	268	54	209	301
Palashdanga	428	1171	1128	322	725	680	0	0	606	371	565	757	859	173	521	746
Jaynagar	78	258	225	83	161	137	0	0	170	106	88	119	206	0	105	172
Bharatpur	759	2019	1875	439	811	738	2	2	1384	805	635	1070	781	721	921	1471
Alampur	216	561	520	131	202	186	0	0	364	223	197	297	360	98	237	386
Naskarbandh	286	777	740	195	524	498	0	0	473	324	304	416	489	145	331	552
Dihipara	255	740	688	203	357	341	0	0	389	248	351	440	545	110	328	445
Hansoa	317	754	643	168	94	85	29	21	614	365	140	278	270	76	433	618
Chandra	288	1036	341	93	55	7	21	19	956	215	80	126	861	29	186	301
Arjjunpur	265	570	496	205	26	25	7	6	429	340	141	156	261	1	312	492
Ranga Matiya	495	1360	1267	343	429	405	2	3	915	667	445	600	938	277	573	839

Budbud	807	2077	1952	524	679	659	38	31	1515	1076	562	876	1198	129	1058	1644
Shaldanga	596	1692	1472	352	1193	1011	0	0	990	584	702	888	574	780	760	1050
Patihar	226	678	404	80	62	49	8	6	627	327	51	77	426	7	264	385
Chhota Narayanpur	19	45	49	11	30	32	0	0	28	23	17	26	40	0	21	33
Basudebpur	96	237	244	78	148	158	0	0	130	87	107	157	145	132	84	120
Chandra Chak	497	1265	888	326	10	11	5	6	952	536	313	352	698	17	577	861
Amur	254	814	529	200	188	184	4	4	585	227	229	302	453	168	281	441
Haora	170	508	463	149	188	189	0	0	363	217	145	246	172	205	225	369
Maitya	69	151	150	50	79	84	0	0	94	53	57	97	73	52	76	100
Randiha	353	907	800	209	518	473	13	19	587	393	320	407	244	399	421	643
Chak Tentul	845	2284	2129	620	1055	986	35	36	1436	896	848	1233	1169	643	983	1618
Gram Pushkarini	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banagram	144	395	365	83	155	141	0	0	308	228	87	137	92	125	204	339
Keneti	187	501	456	121	348	333	1	0	376	221	125	235	372	106	240	239
Nabagram	84	269	212	62	111	75	0	0	184	101	85	111	119	176	113	73
Nityanandapur	414	1070	1016	333	810	769	0	0	689	502	381	514	583	470	427	606

Data Source: http://censusindia.gov.in/pca/SearchDetails.aspx?Id=345721 , http://censusindia.gov.in/pca/SearchDetails.aspx?Id=346603

1.1 Population

Although the study area (10 km radius from the project location) is divided based on secondary data (Population Census 2011), the total population of the study area is 201327, as shown in Table 1.1. There are 40283 households on a surface area of 683 square kilometres.

Table 3.23: Population Statistics of the study area

Population density	683/sq.km
Total Population	201327
No of Households	40283
Total area	294.9 sq.km
0-6 age group Population	26661
SC/ ST Population	91536
General Population	109791

Data Source: http://censusindia.gov.in/pca/SearchDetails.aspx?Id=345721, http://censusindia.gov.in/pca/SearchDetails.aspx?Id=346603

As far as the population share of male and female is concerned, the male and female population share in the study area has disparity. The total female population in the study area is 96385, which is significantly lower than the male population of 104942. Figure 1.1 shows the village-wise population concentration in the study area selected from the project location of project location by a radius of 10 km. Based on the concentration of population within the 10 km radius of the study area, a map of the study area has been prepared—the largest number of inhabitants in the village of Savner in the southwestern regions. Then in the village of Kanksa, where the project location is situated there the population is 16532, which is high, but as per figure 1.1, Figure 1 comprises the five classes of the population, which shows there is a high population in the villages of Gopalpur, Debipur (western fringe), and Mankar,(eastern fringe). The moderate population is concentrated in Sonai, Debshala, Lijatganj, Silampur, these all are located in the central portion of the study area. The lower population is concentrated in the northern and northwestern sections of the study area.

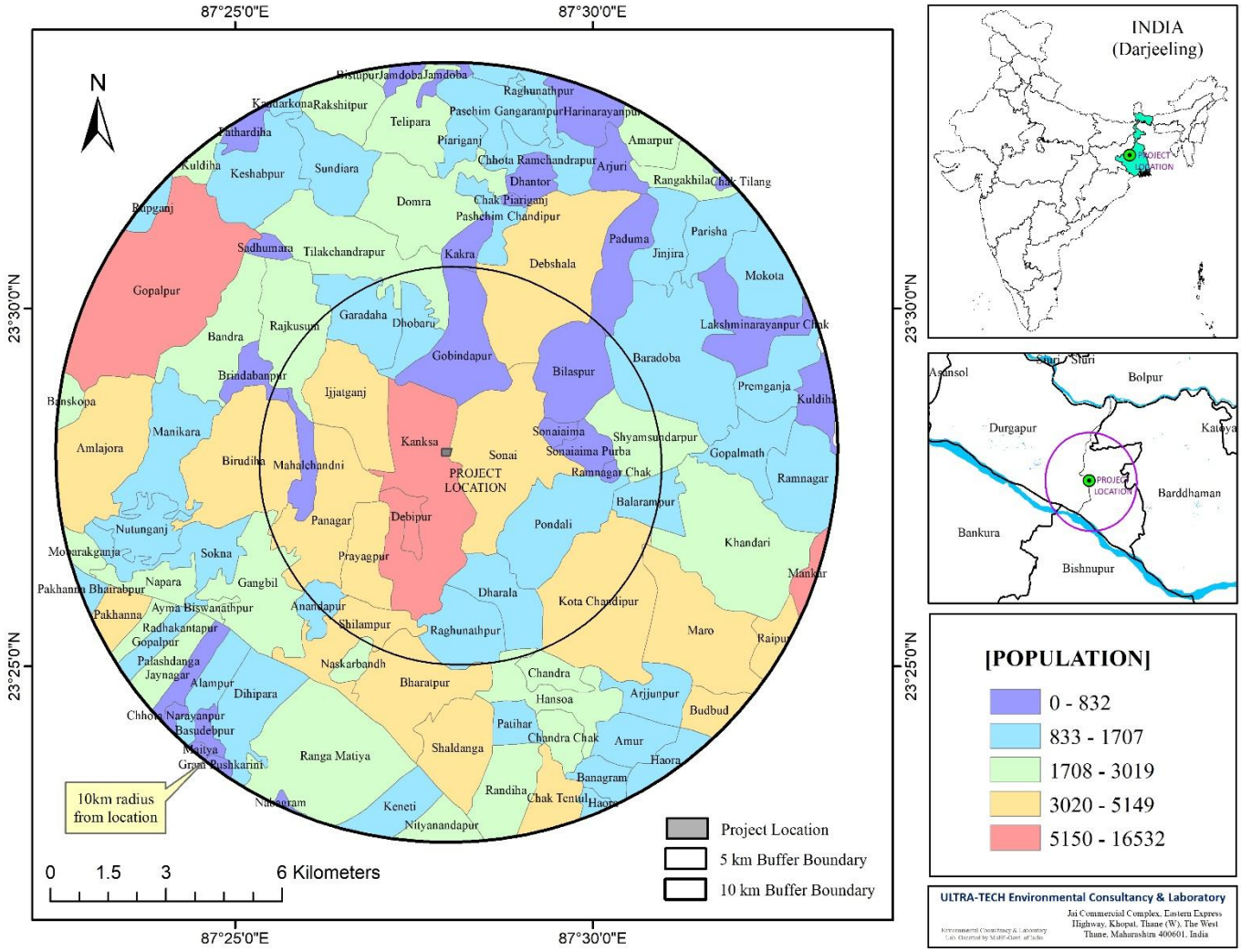


Figure 3.16: Population Concentration Map of the study area

2.1 Religion

Hinduism is majority religion in the study area with 83.42 % followers. Islam is second most popular religion in study area with approximately 14.88 % following it. In the study area, Christinity is followed by 0.19%, Jainism by 0.04%, Sikhism by 0.22% and Buddhism by 0.02%. Around 0.03 % stated 'Other Religion', approximately 1.19 % stated 'No Particular Religion'.

Table 3.24: Religion Statistics of Howrah.

Religion	Percentage
Hindu	83.42
Muslims	14.88
Christian	0.19
Sikh	0.22
Buddhist	0.02
Jain	0.04
Others	0.03
Not Stated	1.19

3.1 Sex Ratio

The sex ratio is the ratio of males to females in the population. The human sex ratio in anthropology and demography is the ratio of males to females in the population. More figures are available for humans than for any other animal, and the human sex ratio is more researched than for any other species, but it can be difficult to analyze these figures. In most sexually reproduced animals, the ratio tends to be 3:1. This propensity is explained by the theory of Fisher. However, many animals deviate from the same sex ratio for different reasons, either regularly or indefinitely. As the pie figure in figure 3.1 is showing the population share between males and females is 54% and 46%. Thus it can be inferred from this diagram in figure 3.1. that the sex ratio in the study area is not low; rather it is balanced and positive. This pattern of a balanced sex ratio is highlighted in figure 2.1.

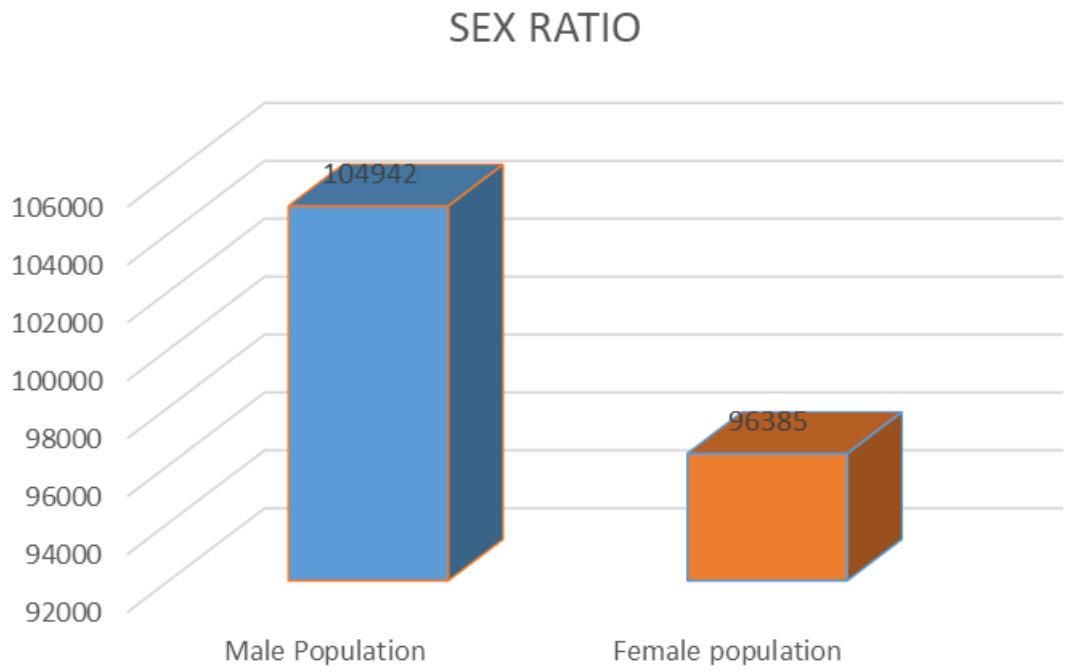


Figure 3.17: Pie-Diagram showing sex ratio of the study are

Figure 3.2 shows the graphical distribution of the male and female population, which is depicted in the form of comparative bar diagrams on the map of villages of the study area, representing the male and female population share. Other than this, Figure 3.2 shows the village-wise concentration and distribution of population and the population share of males and females in the form of separate comparative bar diagrams for a different village situated in the study area, selected from the project location by a radius of 10 km. The village of Kanksa, situated in the Southern portion of the map, has the highest population share comprising the male-female population share of 8616 and 7917. Figure 3.2 shows that, while there is an unequal spread of population from one village to another, the unique proportion of males and females is the same or nearly the same, demonstrating a positive and equal sex ratio in the research region covering the project site.

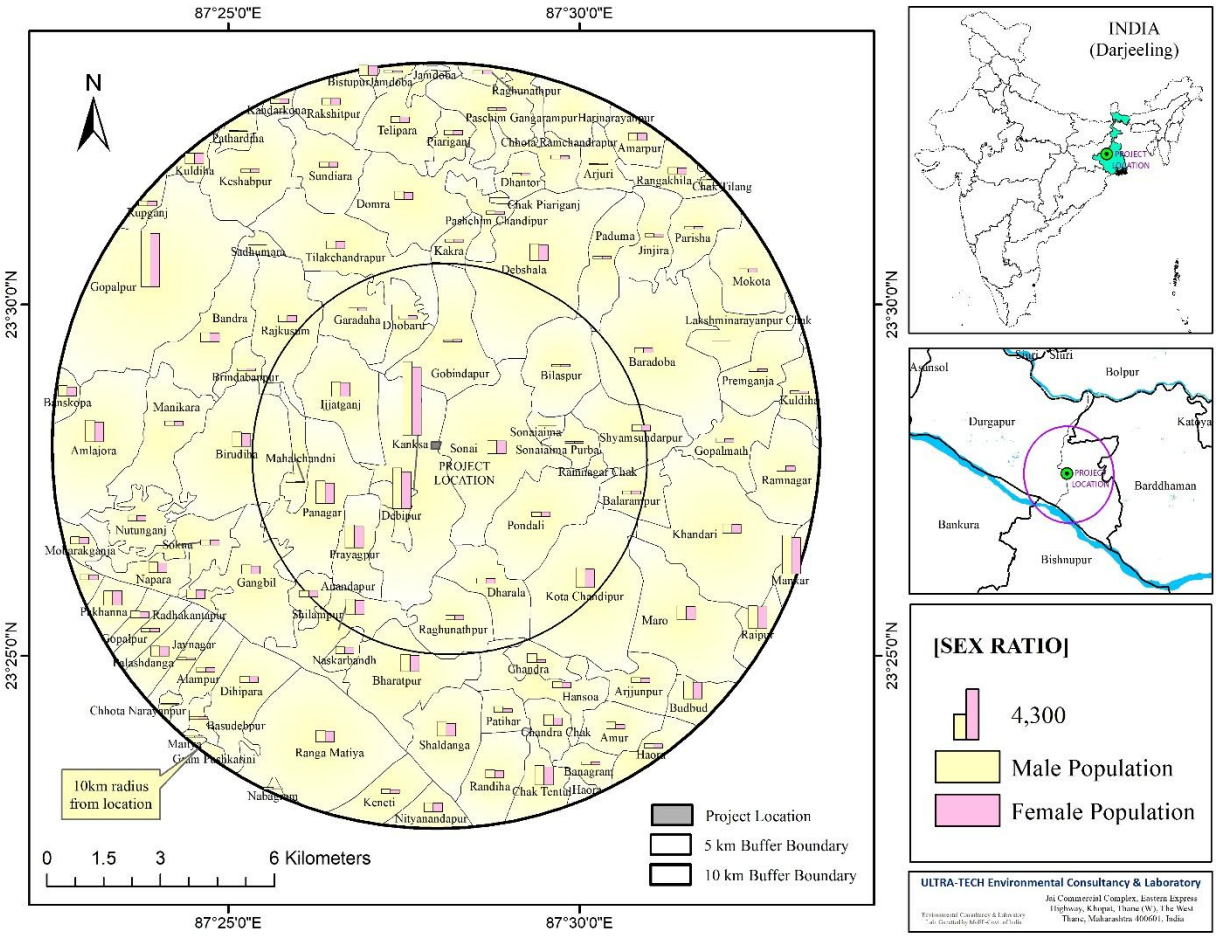


Figure 3.18: Male-Female population share depicting the Sex ratio of the study area.

4.1 Child Population [0-6 Age Group]

The infant population encompasses the proportion of the world's total population in the age group of 0-6 years, which is a significant measure since it overlooks a fragile segment of the population. Child population Compared to the Indian Census defined as a population of children aged 0-6 years. Since the population of this age group is counted in the overall population of the country and the states, it is very important to provide reliable statistical statistics for the population of this age group on policies and services in the education sector, the health sector, etc. The fall in the overall child population since the Census 2001 is 5.030.327, with a reduction in rural child population of 8.885 relative to the rise in urban child population recorded as 3.855. Figure 4.1 displays the bar diagrams of the male-female population aged 0-6 years in the research field. The male in Figure 4.1 reveals that the male population in the age group 0-6 years is higher than the female population in the region around the project location. Other than this, the map is seen in Figure 4.2., which shows the village-wise concentration of 0-6 age group, i.e. the infant population in the research area around the project site. The concentration of children in the age group 0-6 years was divided into five groups in Figure 4.2, which indicates that the maximum population of 0-6 years of age is concentrated in the project location of Kanksa (2038) on the central portion, followed by the village of Gopalpur (1511) where the project location is situated.

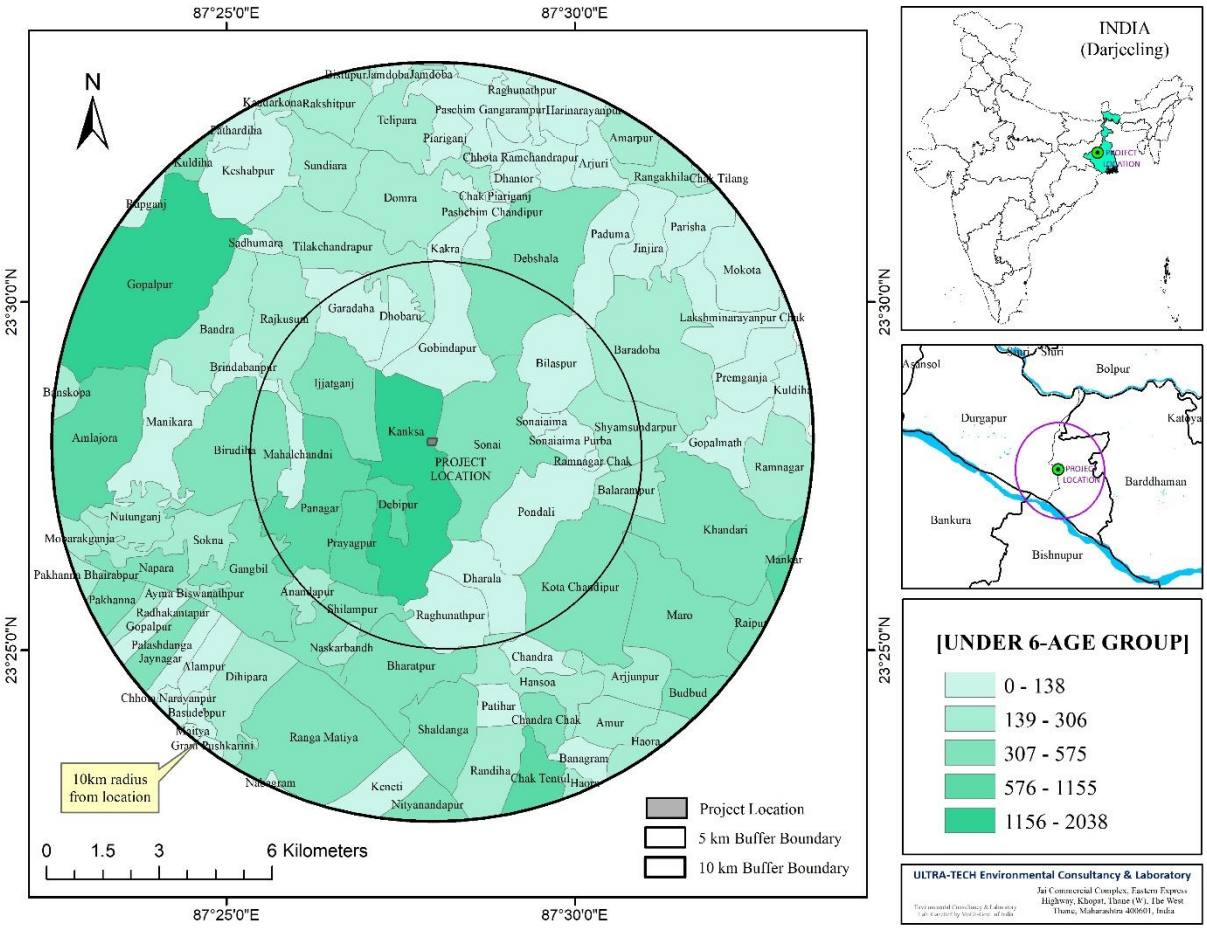


Figure 3.19: Concentration of Child population (0-6 age group) of the study area.

5.1 **Households**

The household consists of one or two people living in the same dwelling and eating meals. It may also consist of a single-family or a different group of individuals. Housing is considered to have many households if food or living room is not shared. A dwelling is known to include several households whether food or living room is not shared. Households are the basic unit of study in many social, microeconomic, and government models, and are important for economics and inheritance. Household models include couples, mixed families, shared accommodation, group homes, boarding houses, multi-occupancy homes. Figure 5.1 indicates the village wise concentration of households in the sample area chosen by a distance of 10 km from the project location. Based on the concentration of households within the 10 km range of the study area, a map of the study area has been prepared. The highest number of households in the village of Kanksa (3263) in the central portion of the study area and where the project location is situated. In comparison, a substantial number of households are situated in the centrally located blocks adjacent to the project location, other than the village of Gopalpur situated in the north-western section of the study area. The other villages in the sample region have a moderate to smaller number of households.

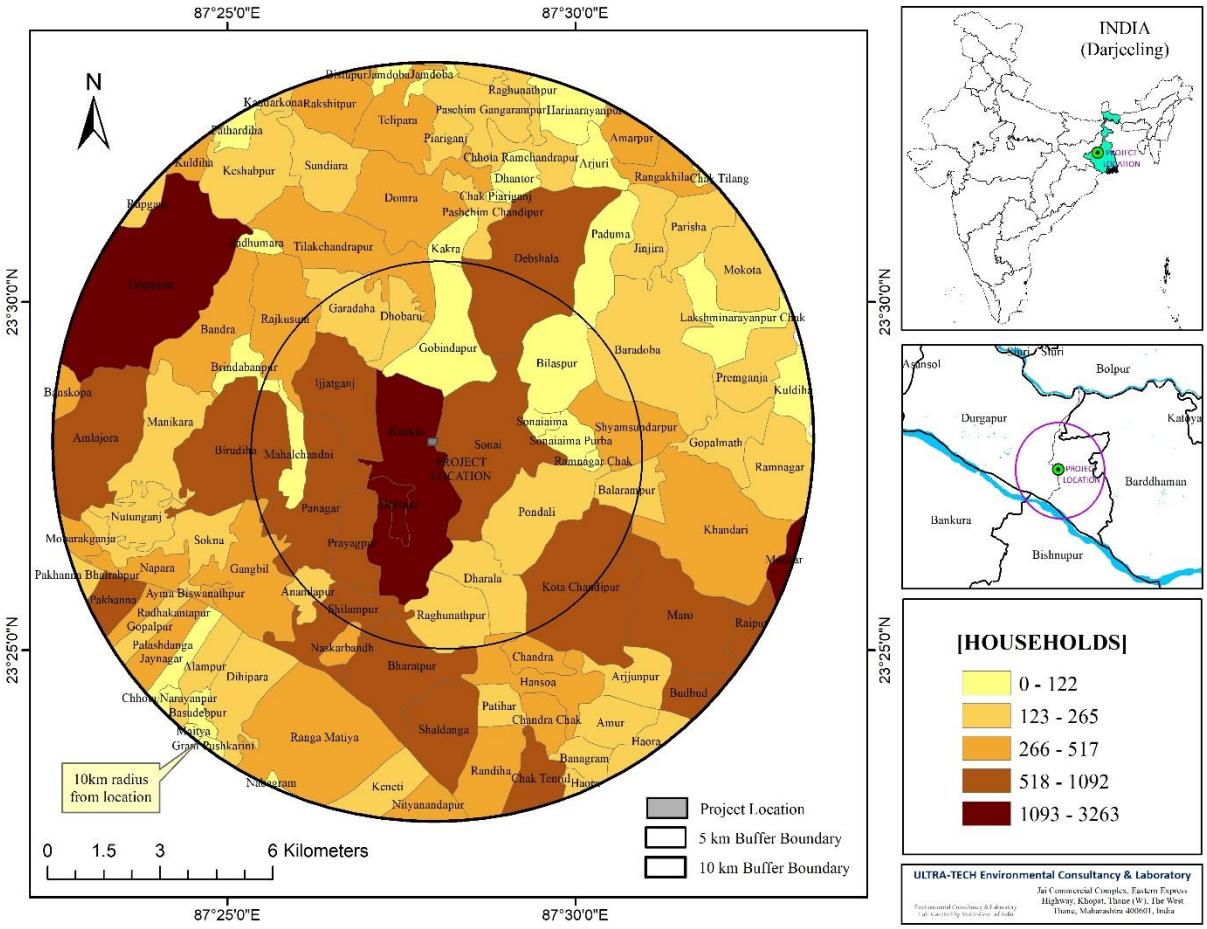


Figure 3.20: Household map of the study area.

6.1 Caste Population

The 2011 Socioeconomic and Caste Census (SECC) was conducted for the 2011 Indian Census. The 2011 Socioeconomic and Caste Census was approved by the Manmohan Singh Government after a debate in both Houses of Parliament in 2010. Figure 6.1 demonstrates the caste division of the sample area according to the requirements of the Indian Census. The pie diagram in Figure 6.1 indicates that 71% of the total population is in the scheduled caste group. Other than this, 29 % of the total population fell under the categories of Schedule Tribes.

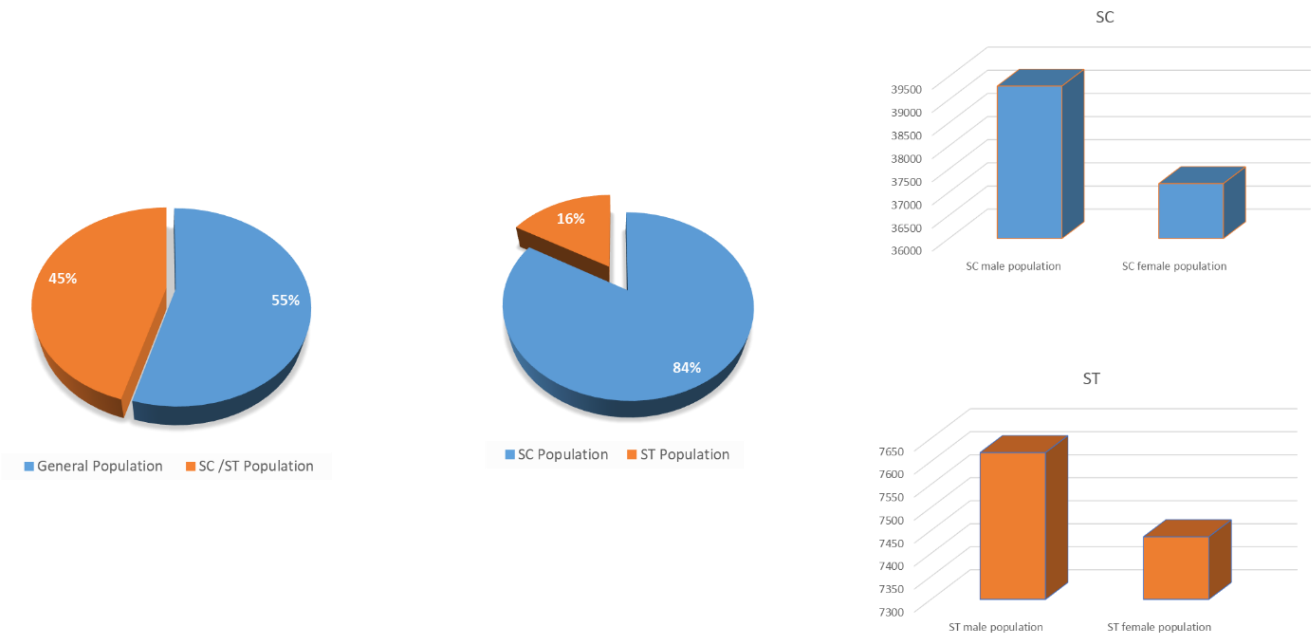


Figure 3.21: Pie diagram and Bar-Diagram showing the percentage share of General and SC/ST caste populations.

Scheduled Caste (SC) and Scheduled Tribes (ST) are officially recognized groups of Indian citizens. Words are recognized in the Constitution of India and the classes are categorized in one or the other of the divisions. They have been known as the Depressed Classes for most of the period of British rule in the Indian subcontinent. Figure 6.1 shows the separate population division, especially among the SC and ST Population of the study area, according to the parameters of the Indian Census. The simple bar diagram in Figure 6.1 reveals that 96 per cent of the SC/ST population is in the SC division (Scheduled Caste). Apart from this, just 4 per cent of the global population is in the ST group (Schedule Tribes). The simple bar diagrams in Figure 6.2 show the Schedule Caste male-female population share of the study area, where the SC male population is 39294 and the SC female population is 37187. Then the simple bar diagrams in Figure 6.1 show the Schedule Tribe male-female population share of the study area, where the ST male population is 7619, and the SC female population is 7436.

Other than this, Figure 6.3 indicates the concentration and distribution of the SC and ST Population as well as the proportion of SC/ST male and female populations in the form of separate comparative bar diagrams for different villages located in the sample field, chosen from the project position by a radius of 10 km. In the village of Kanksa, where the project site is situated, the SC population is 3671, including the male-female Population of 1891 and 1780. The highest SC population is Gopalpur (6665) village, consisting of a male-female population of 3389 and 3276. While the village of Ramnagar has the largest Population of ST 3631, with a male-female population of 565 and 591. Figure 6.2 reveals that whilst there is an irregular distribution of the SC/ST population from one village to another.

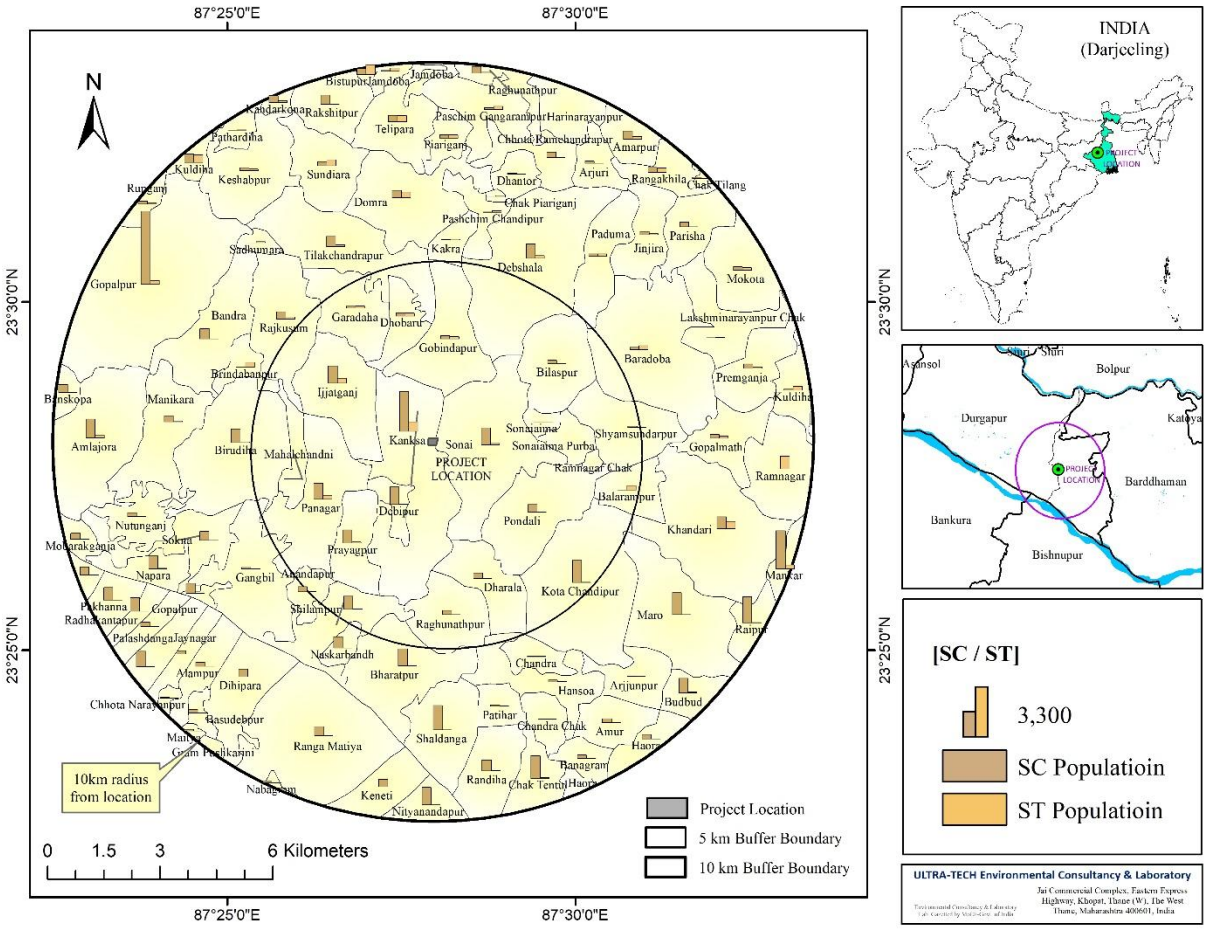


Figure 3.22: Male-Female population share depicting the SC/ST population of the study area.

7.1 Occupation Structure

Within the occupational system, the entire workforce is split into the overall number of staff and non-workers. Total number of workers can be divided into two groups, i.e. Key staff and minor jobs. The participation rate of total employees shall be specified as the percentage of total workers in the total population. The occupational scenario is the economic condition of the study zone. While the study area is 10 km radius (figure 7.3) from the project site as per the Indian Census 2011 in the study area, as per total figure 7.1, the 99% of the population belongs to the working population, and 1% of the population belongs to non-working population; thus the study area is suitable for setup of project location. Among the 99% of the working population, the main working population is 37% and the marginal working population is 63% out of the working population. In figure 7.1. the separate pie diagrams are representing further subdivisions under the main and marginal workers.

As per the pie diagrams in figure 7.1. The marginal workers are subdivided into Cultivators, Labourers, Household Industries, and Other workers. Among the marginal workers in the study area, 9% of Marginal Cultivators, 68% Marginal Agricultural laborers, 6% Marginal Household Industry workers, and 17% other marginal workers. In the case of the main workers' subdivision, shown in the pie-diagram in figure 7.1. The main workers are

subdivided into Main Cultivators (20%), Main Agricultural Labourers (23%), Household Industries (3%), and Other Workers (54%).

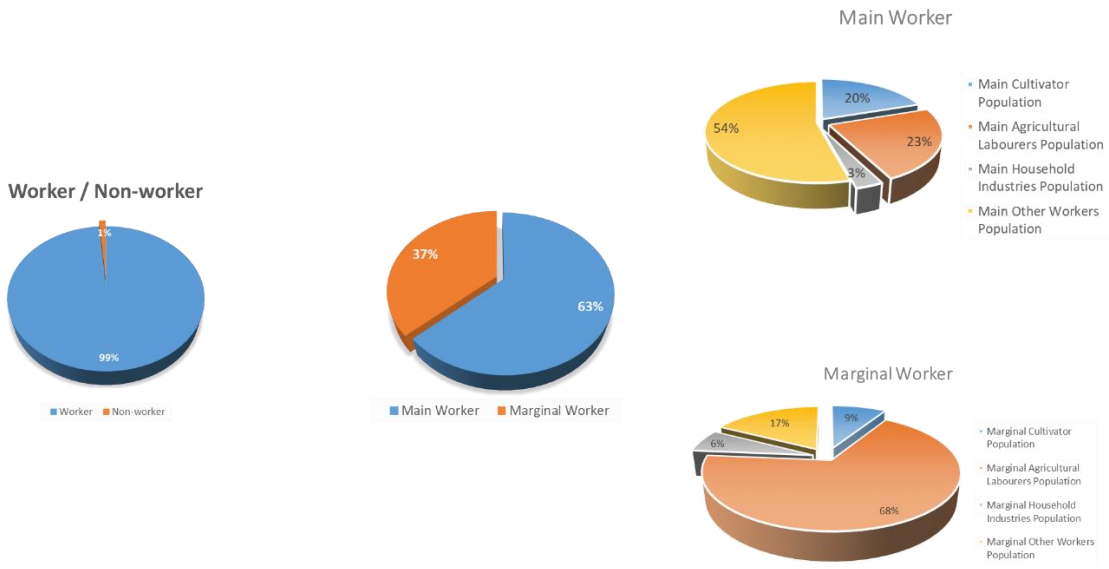


Figure 3.23: Pie diagrams showing Main and Marginal population share and their sub-divisions depicting the occupational structure of the study area.

Figure 7.3 depicts the distribution of employees and non-workers in the population. Male and female employees make up a larger proportion of the workforce than female workers. In the case of non-workers, however, the simple-bar diagrams in figure 7.2 reveal more female non-workers in the study region than male non-workers. The highest concentration of workers is centred in the region Kanksa (11438), where the project location is located, making it suitable for the setup.

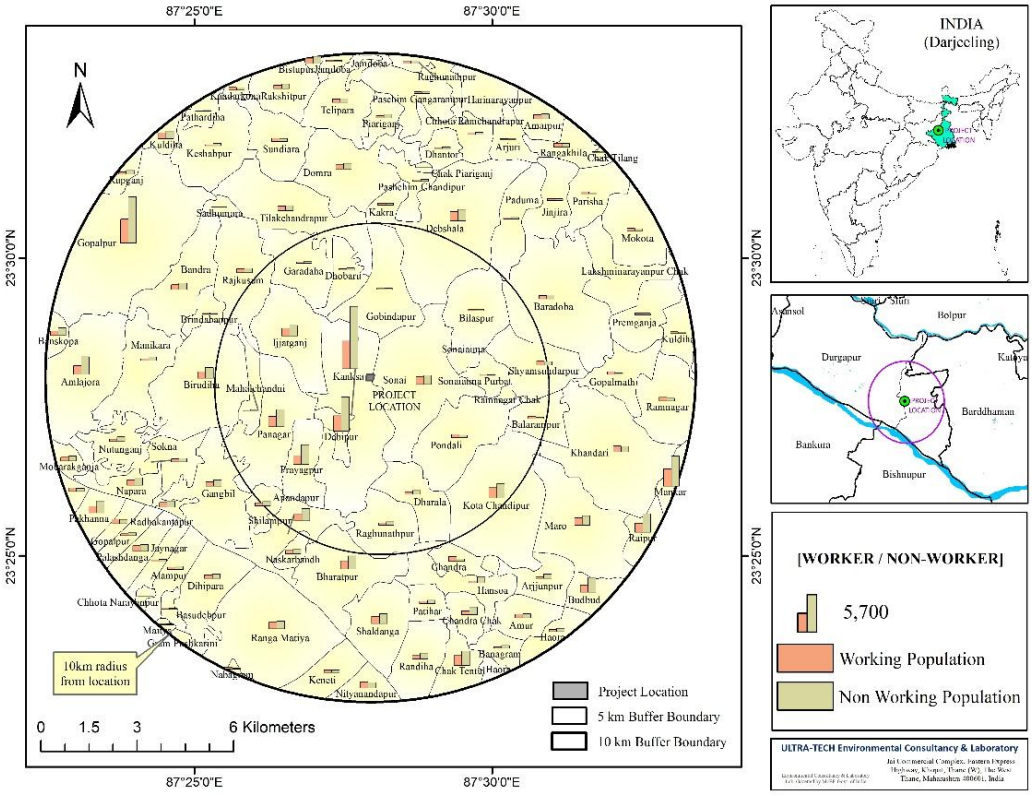


Figure 3.24 : Main and Marginal population share depicting the occupational structure of the study area.

8.1 Educational Status

The literacy rate is characterized by the percentage of the age group population that can read and write. The adult literacy rate is 15 years of age and older, the youth literacy rate is 15 to 24 years of age and the elderly is 65 years of age and older. It is generally assessed by the ability to understand a brief, clear statement about daily life. Generally, literacy often includes numeracy, and a basic evaluation of arithmetic capacity can be integrated into measurement. The literacy rate and the number of literate subjects should be differentiated from functional literacy, a more rigorous literacy measure measured on a spectrum in which several proficiency levels can be calculated. The literacy rate demonstrates the educational status of the study area surrounding the location of the project. Inside the 10 km radius research area (Figure 8.2) of the project site as per the 2011 Indian Census in the study area, as seen in Figure 8.1, the pie diagram indicates that the proportion of the literate and illiterate population is 59%, and 41% in the study area, suggesting that the zone around the project is positive for educational status and literacy. The simple bar-diagram sets display the percentage of literate and illiterate between males and females. As per the bar diagrams in Figure 8.1, the number of illiterate females is higher than that of males. For the literate population, as shown in the bar diagrams in Figure 8.1, the male literate population is higher than that of the female literate population.

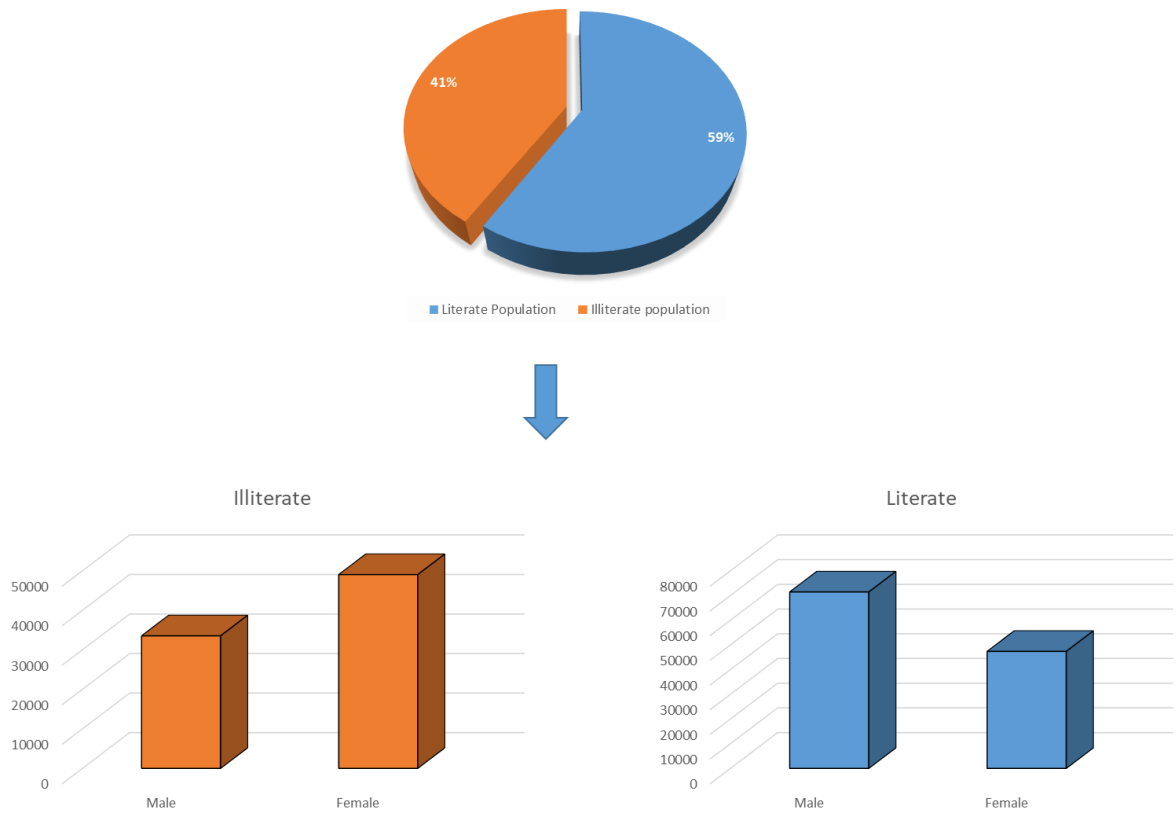


Figure 3.25 : Pie diagrams showing Literate and Illiterate population share and the bar diagrams are showing the further male-female share of literacy and illiteracy.

Besides this, Figure 8.2 indicates the unequal distribution of the literate/illiterate population of males and females in the form of separate comparative bar diagrams for various villages situated in the sample field, chosen from the Laminate project position by a radius of 10 km. The largest number of literate is in the village of Kanksa (11438) on the central portion of the study area, where the site of the project is located, followed by the village of Gopalpur (8445) on the Northwestern edge of the study area.

9.1 Transportation

Kanksa CD Block has 7 bus routes that originate and terminate there. The Bardhaman-Asansol segment of the Howrah-Gaya-Delhi line, the Howrah-Allahabad-Mumbai line, and the Howrah-Delhi mainline all travel through this CD Block, and there are stations at Panagarh and Rajbandh. This CD Block is traversed by NH 19 (formerly NH 2)/Grand Trunk Road. State Highway 14 (West Bengal), which runs from Dubrajpur (in Birbhum district) to Betai (in Nadia district) and includes a stretch of the Panagarh-Morgram Highway, runs through this CD Block. The transportation network of the study area is illustrated in figure 9.1.

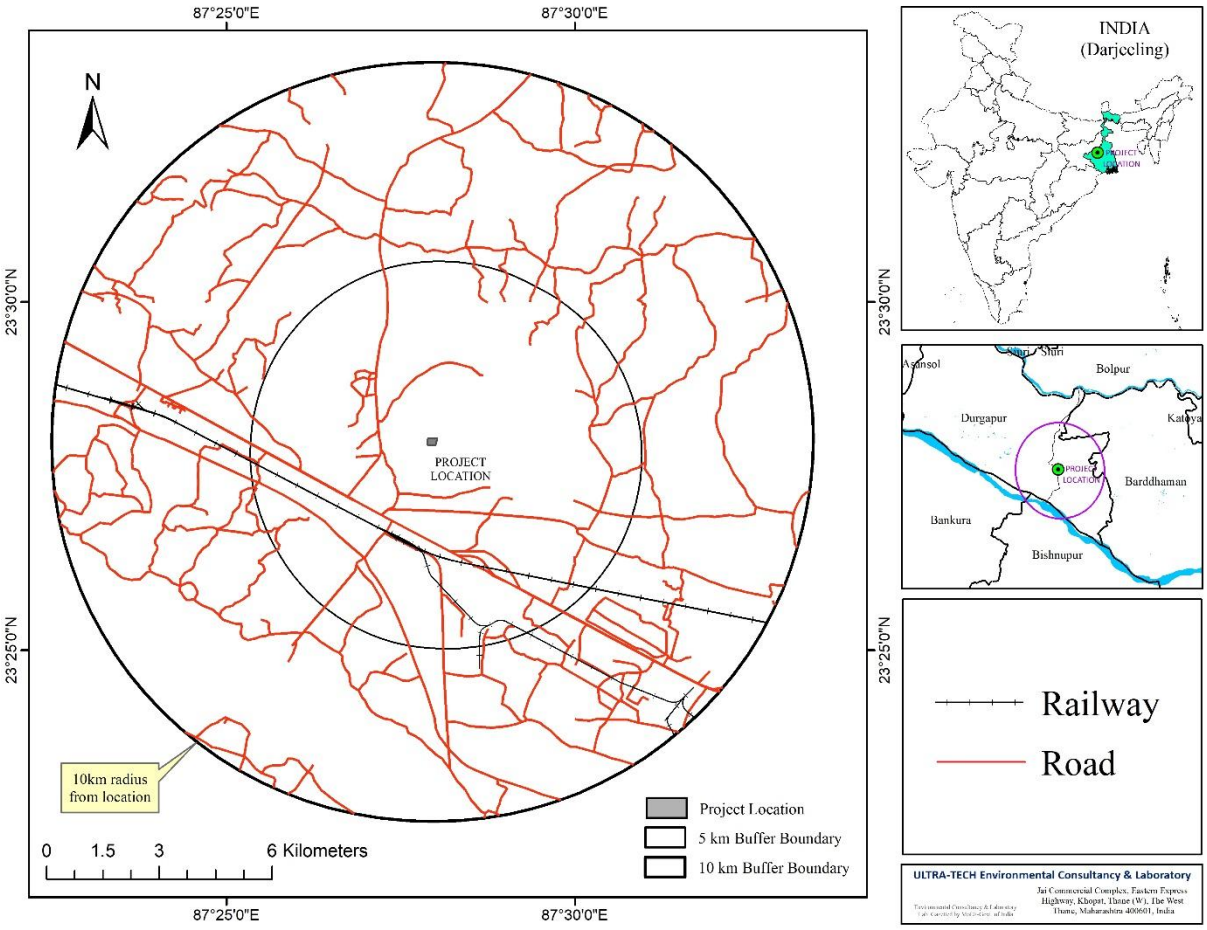


Figure 3.26 : Transport Network of the study area

- **Amenities**

Sl. No.	Amenities	Name/ Type
1	Airport	
2	Bus Stop	Kanksa More
		Sbstc bus stand
3	Railway Station	Panagarh
		Rajbandh
4	ATM	ICICI ATM
		SBI ATM
5	Bank	UCO Bank
		CENTRAL BANK OF INDIA
6	Police Station	Panagarh Military Station
		Kanksa Police Station
	Fire Station	Panagarh Fire Station
7	BDO	Kanksa Block Development Office
8	Primary School	Basudebpur Primary School
		Dhobaghata Primary School

9	High School	Kanksa Girls' High School
		Army Public School, Panagarh
		Kanksa High School
10	College	Kanad Institute Of Engineering & Management
		Rajendranath College of Polytechnic
		Aryabhatta Institute of Engineering & Management
11	Hospital	Panagarh Military Hospital
		Government Hospital Panagarh
12	Medical Store	Ashutosh Medical Store
		Mondal medical

- **Administrative offices**

Administrative	Address	Phone number
BDO Office	Panagarh, West Bengal 713148	0343-2524504
Panagarh Fire Station	Panagarh, West Bengal 713148	0343 2524255
Kanksa Block Development Office	Ijjatganj, West Bengal 713148	0343-2524504

- **Police Stations**

Police station	Address	Phone number
Panagarh Military Station	Kota Chandipur, West Bengal 713402	
Kanksa Police Station	Kanksa, West Bengal 713148	0343 252 4244

- **Post Office**

Post Office	Address	Phone number
Shilampur Post Office	Shilampur, West Bengal 713169	
Birudia post office	Birudiha, West Bengal 713148	

- **ATM**

ATM	Address	Phone number
ICICI ATM	Panagarh, West Bengal 713148	
SBI ATM	Panagarh, West Bengal 713148	

- **Banks**

Bank	Address	Phone number
UCO Bank	Kuldiha, West Bengal 713144	
CENTRAL BANK OF INDIA	VILL&P.O.GOPALPUR, HOUSE OF PRABIRKUMARSHYAM, MAIN ROAD PASCHIM	0343 253 8472
State Bank of India	Panagarh, West Bengal 713148	
ICICI BANK	Panagarh, West Bengal 713148	

- **Educational Institutions**

School Type	School Name	Address	Phone number
Primary School	Basudebpur Primary School	Basudebpur, West Bengal 722111	
	Dhobaghata Primary School	Napara, West Bengal 713148	
	Sisu Varati School	Shilampur, West Bengal 713169	
	Aymadanga Sishu Sikkha Kendra	West Bengal 713148	
	Keten Primary School	Palashdanga, West Bengal 713148	
High School	MOBAROCK GANJ E.P. SCHOOL	Mobarakganja, West Bengal 713148	
	premganj School	Premganja, West Bengal 713144	
	Kendriya Vidyalaya Panagarh	Panagarh, West Bengal 713420	0343 251 3017
	Mamoon National School, Girls Unit	Shyamsundarpur, West Bengal 713148	075849 16064
	BIRUDIHA HIGH SCHOOL	Birudiha, West Bengal 713148	
	Kanksa Girls' High School	Panagarh, West Bengal 713148	
	Army Public School, Panagarh	Panagarh, West Bengal	0343 653 0315
	Kanksa High School	Debipur, West Bengal 713148	
	Shilampur High School	Shilampur, West Bengal 713169	
	Scholar's Home English Medium School	Panagarh, Jamtala, Shilampur, 713169	
	Shilampur High School	Gangbil, West Bengal 713148	
	Vidyasagar FP School	Gopalpur, West Bengal 713212	070986 29706
	Gopalpur High School	Gopalpur, Durgapur, West Bengal 713212	0343 253 8281
College	Kanad Institute Of Engineering & Management	Vill:Mankar,P.O:Mankar,Dist:Burdwan,Pin:713144	094340 06432
	Rajendranath College of Polytechnic	Gopalpur village, Dist. Burdwan, Durgapur, West Bengal 713212	0343 253 8469
	Aryabhatta Institute of Engineering & Management	Panagarh, West Bengal 713148	098328 04970
	Mankar College	Mankar, West Bengal 713144	0343 251 7269
	Royal College of	Kanksa, West Bengal 713212	

	Nursing Durgapur		
Training Center	Mankar Institute Of Education And Research	Bhatkunda Road, Mankar, West Bengal 713144	0343 200 1182
	Panagarh Primary Teacher's Training Institute	Panagarh, West Bengal 713148	098009 94149

❖ **Socio-Economic Impacts**

No doubt setting up a project of some sort will significantly impact the socioeconomic and cultural life of the people in the project area. Here an attempt is made to envision and evaluate the tentative results that the project is likely to yield. The possible impacts are described below due to the operation of the project:

- **Positive outcomes**

Mining is the foundation of building the country's economy. As given below the proposed project has the following benefits:

- Mining is the basis of the economy of the country. The following benefits are given as set out below for the proposed project.
- Jobs for local persons.
- Punish the tax on the state government. GST, cessation of wages, levies, etc. in the form of excise duty.
- Stone may be used to build roads, bridges, buildings, etc.
- The generation of the market is coming back.
- Appropriate EMF funds will boost the productivity of the environment.
- CSR funds may be used for the welfare of people in villages.
- The new project would contribute to enhancing the facilities that will attract the company's houses.
- Mining operations will help to establish a local socioeconomic scenario.

- **Negative outcomes**

Due to the planned activity of the project, the population inflow would increase during the construction period. This could lead to a strain on infrastructure resources in the area and an increase in the local population. However, this consequence is of a limited time and a temporary nature only.

- During the construction process, increased levels of dust and other air pollutants can lead to health problems.
- Noise pollution can be caused by vehicle traffic and construction activities.
- Appropriate mining may have detrimental effects on local soil and groundwater.
- Unnaturally high concentrations of chemicals such as arsenic, sulphuric acid, and mercury over a wide area of surface or subsurface water are not taken until sufficient action is taken.
- Runoff containing these chemicals can lead to the destruction of the surrounding vegetation.

- **Mitigating intervention**

To mitigate the adverse impacts likely to occur in the local area due to the proposed and current project activities, an effective mitigation plan must be established. The following recommendations are as follows:

- **Before and after the initial phase:**

- The contact with the local community should be institutionalized and carried out daily. The forum will provide opportunities to address local critical issues and to train programmers for shared benefits.
- Relevant Information on the planned and current development plan, community services, etc should be conveyed to the local community in the form of booklets and audio-visuals.
- According to the expectations of the local citizens, staff, project officials, should carry out CER activities in the local region

❖ **Step of Operation:**

- Plan supporters should take appropriate precautions to ensure that the environment is secure and healthy during the construction process.
- Appropriate drinking water, toilet and bathing facilities should be made available on the project site.
- In order to regulate air pollution and thus avoid adverse health effects, water is sprinkled/spread to suppress dust during the construction process.
- Proper living arrangements with sufficient facilities for residential labor should be provided.
- Appropriate preparation and awareness-raising events should be carried out in such a way that workers understand the importance of wearing personal protective equipment.
- The first aid and medical services will be given to all the persons concerned working on the site. 4
- Collectively, colony management would include transporters, drivers, builders, watchmen, fitters, machine operators. Preference should be given to local citizens for all of this.

3.11 Traffic Survey

The traffic survey, to ascertain the traffic density in the study area was conducted on the junction of NH-19 (Panagarh Bypass) and the connecting road to project location of Kamaldeep Ispat Pvt. Ltd. The composition of Traffic includes two wheelers, three wheelers, four wheeler (Passenger Cars) and four wheeler like heavy vehicles like Trucks, Lorries, Bus, etc. The recommended PCU Factors for various types of vehicles on Urban Roads has been adopted from IRC 106-1990 guidelines as shown in **Table 3.25**.

Table 3.25: Recommended PCU Factors on Urban Roads

Types of Vehicles	Passenger Car Equivalency (PCE)
Motor Cycle or Scooter (2-Wheeled)	0.75
Passenger Car, Pick-up van	1
Auto-rickshaw (3-Wheeled)	2.0

Light Commercial Vehicle	2.0
Truck or Bus	3.7
Bicycle	0.5

Thus, volume of vehicles was estimated as: PCU unit = No of vehicles* x PCE of those particular.

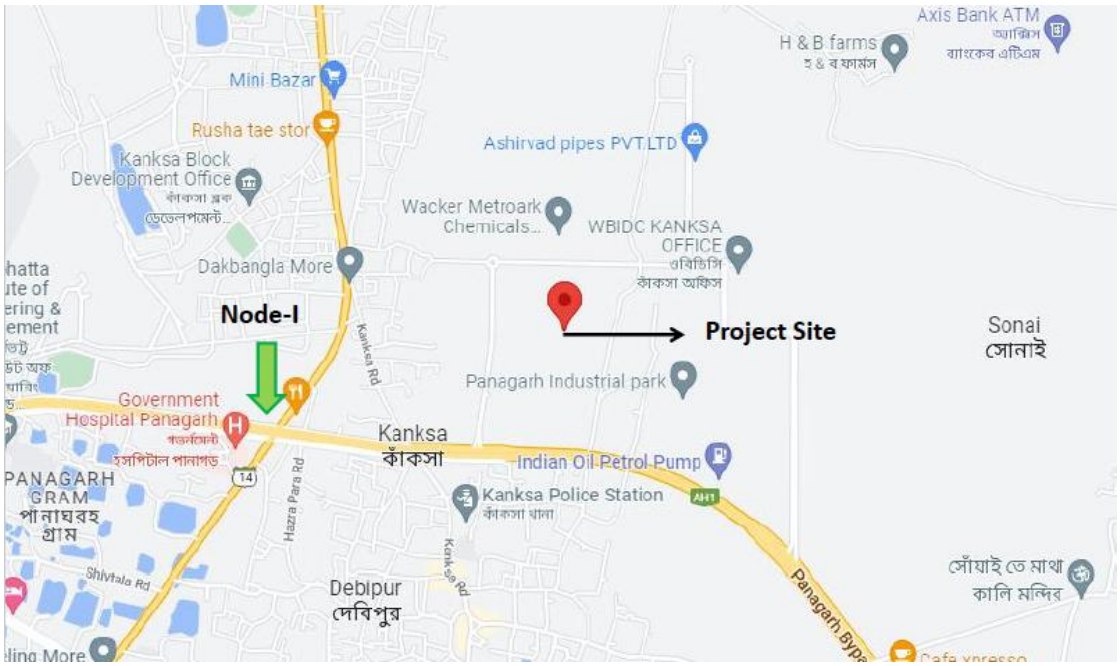


Figure 3.27: Location of the Node for Traffic Survey

Traffic study was carried out at 1 node at the junction of NH-19 and the connecting road (Panagarh Bypass) to project location of Kamaldeep Ispat Pvt. Ltd. as shown in **Figure 3.21.**

Node-1

Data was collected by physically counting the number of vehicles plying in both directions at Node 1. The hourly counts were carried out for the different type/category of vehicles. The variation in the traffic flow at the given road along with the number of vehicles during peak hour & lean hour is presented in the **Table 3.26** and **Figure 3.22.**

Table 3.26: Traffic Survey, Node I

	During Lean Hrs.	**During Lean Hrs. Vehicles in PCU's**	**During Peak Hrs.**	**During Peak Hrs. Vehicles in PCU's**
Two Wheelers	81	60.75	138	103.5
Three Wheelers	55	110	105	210
Cars/Jeeps	72	72	120	120
Bus/ Trucks/Lorries	88	325.6	168	621.6
Total	**296**	**568.35**	**531**	**1055.1**

Lean Hrs: Before 8.00 hrs (morning), 13.00 to 17.00 hrs afternoon & after 21.00 hrs (evening)
Peak Hrs: Between 8.00 to 13.00 hrs& 17.00 to 21.00 hrs in the evening

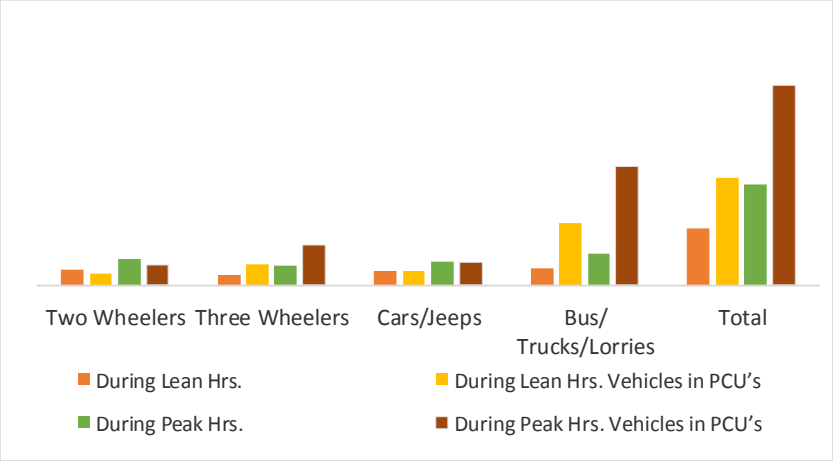


Figure 3.28: No's of vehicles during peak hour & lean hour

3.11.1 Existing Traffic Scenario & Level of Service

Capacity of road as per IRC = 3600 PCU's/hr
Total Volume in PCUs during Peak Hours = 1055.1
Existing Volume/Capacity ratio = 1055.1/3600= 0.29
The level of service is **"B"** that is Very Good**.**

Table 3.27: Level of Service

Sl. No.	Existing Volume/Capacity	Level of Services
1	0.0 to 0.2	"A" (Excellent)
2	0.2 to 0.4	"B" (Very Good)
3	0.4 to 0.6	"C" (Good)
4	0.6 to 0.8	"D" (Fair)
5	0.8 to 1.0	"E" (Poor)

During the proposed project an addition of ~30 trips per day (i.e. 15 trucks per day to and fro) of trucks is envisaged. To understand that impact due this addition the following modified scenarios on the access roads is discussed. The Node I is shown in the **Figure 3.25**.

3.11.2 Modified Traffic Scenario & Level of Service

15 additional trucks *i.e.* 30 trips assume to enter and exit during peak hrs for the proposed project (worst case scenario).

Node I: ~15 trucks of 30 additional volume in PCU will be 3.7x30/9 = 12.33 per hour during peak hours.

Traffic Flow at **Node I**

Total volume during peak hours in PCUs after completion of the project (V) = 1055.1+ 12.33 = 1067.43

Capacity of Road as per IRC (C) = 3600 PCU's/hr

Modified Existing Volume/Capacity ratio will be (V/C) = 1067.43/3600 = 0.30. The level of service of the road will remain **"B"** after the proposed project that is **"Very Good".**

The above results indicated that the post project scenarios will contribute to addition in existing traffic, the level of service will continue to be **"Very Good".** Traffic will continue to run smoothly without congestion and no widening of road is anticipated.

CHAPTER 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Introduction

Identification of impacts and mitigation measures of the same in Environmental Impact Assessment study helps in quantification and evaluation of impacts. During baseline study several impacts can be identified but it is necessary to identify the critical impacts both positive and negative on various components of the environment that are likely due to installation of induction furnace & CCM within the Proposed land area of M/s Kamaldeep Ispat Pvt. Ltd at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal. The environmental impacts can be categorized as either primary or secondary. Primary impacts are the ones that are caused directly due to the project activity on environmental attributes, whereas secondary impacts are indirectly induced.

The construction and operational phase of the project activity comprises various activities, each of which may have either positive or negative impact on some or other environmental attributes.

The proposed project activities would impact on the environment in two distinct phases:

- During construction phase - Temporary or short-term impact
- During operation phase - May have long term impact

4.2 Impact Assessment

4.2.1 During Construction Phase:

This includes the following activities related to installation of Induction Furnace, CCM etc.

Impact on Land use

The proposed plant operates in an area of 10 acre i.e. 40469.58 sq.m under the ownership of the project proponent and there are no forests or ecologically sensitive land within the existing site.

The current proposal will take place within the land allotted by WBIDC within Panagarh Industrial Park. No residential or habitation areas are proposed to be acquired, hence no displacement of residential areas.

Construction of additional facilities will lead to permanent change in land use pattern at the plant site as direct impacts. The proposed project involves installation of 4 nos. of Induction Furnace and CCM, Rolling mill and Re-heating furnace within the project premises.

The environmental pollution impacts during installation phase would be temporary and are expected to gradually stabilize by the time of commissioning of proposed activity. There are

no sensitive locations such as archaeological monuments, sanctuaries, national parks, critical pollution zones etc., within 10 km radial distance around the existing plant site.

No major changes in land use pattern of study area (region) will occur due to the plant activities. Hence, no major impact is envisaged on land use pattern of the plant site.

Impact on Soil

No blasting is envisaged for either levelling or during foundation work since the site is plain and needs very little grading, filling and levelling. Apart from localized construction impact at the plant site, no adverse impacts on the soil in the surrounding area are anticipated.

Impact on Topography

It is proposed to level the area allocated for the proposed activities and to use the earthen material excavated, for the proposed additional construction itself. There will not be any tall structures except the stacks for plume dispersion. Also, the contours of natural drainage will not be disturbed. In the view of the above, there will not be any major impacts on the topography of the project site.

Impact on Air Environment

Impacts of construction activities on air quality are cause for concern mainly in the dry months due to conditions for formation and entrainment of dust particles. The main sources of emission during the construction period are the movement of equipment at site and dust emitted during the leveling, grading, earthworks, foundation works and other construction related activities. The dust emitted during the above mentioned activities will be very less as the land within the installation premises is flat which does not require any major leveling. The excavated soil for foundation pad will be used for leveling. Therefore, the impact will be very less and for short duration. The composition of dust in this kind of operation is, however, mostly inorganic and non-toxic in nature.

Exhaust emissions from vehicles and equipment deployed during the construction phase is also likely to result in marginal increase in the levels of SO_2, NOx, PM, CO and un-burnt hydrocarbons. However, since the increase in the number of vehicles necessary for construction work is small, the consequent emission will be insignificant. It may, therefore, be stated that construction activities may cause changes in the PM levels locally. The impact will, however, be reversible, marginal and temporary in nature.

The impact of such activities would be temporary and restricted to the construction phase. The impact will be confined within the project boundary and is expected to be negligible outside the plant boundaries. Proper upkeep and maintenance of vehicles, sprinkling of water on roads and construction site, providing sufficient vegetation etc. are some of the measures that would greatly reduce the impacts during the construction phase.

Noise Environment

Minor construction traffic for loading and unloading, fabrication and handling of equipment and materials are likely to cause an increase in the ambient noise levels. The areas affected are those close to the site which in this case is within the project area.

At the peak of the construction, marginal increase in noise levels is expected to occur. The activities which produce periodic noise will be foundation for construction of storage vessel for a short period.

Overall, the impact of generated noise on the environment will be insignificant, reversible and local in nature and mainly confined to the day hours.

Hydrology &Water Environment

The plant layout has been prepared in such a manner to follow the general ground profile and not to disturb the general drainage pattern of the area. There will be increased storm water run-off due to increase in the paved area, but proper/suitable arrangements will be made to channelize such excess storm water run-off efficiently that no area in the downstream gets affected by such excess storm water run-off.

The drinking water and sanitation facilities within the premises will be extended to meet the work force requirement. During the construction of the project, the demand during the construction/erection phase for sanitary and drinking purposes will be met from the existing well adjacent to the premises.

The overall impact on water environment during construction phase due to proposed project will be short term, insignificant and reversible.

Socio-Economic Environment

- The proposed project does not involve any displacement of inhabitants for the construction of the steel plant.
- Construction phase could lead to creation of employment and procurement opportunities.
- A multiplier effect will be felt on the creation of indirect employment through the local community establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores garages etc.
- Self- employment options for individuals possessing vocational or technical training skills like electricians, welders, fitters etc, which are likely to be sourced locally;
- There would be influx of workers during construction phase which could lead to pressure on key local infrastructure such as water, healthcare, electricity.
- The construction activity could lead to increased nuisance level from air emissions and noise due to transportation of material and equipment as well as labourers.
- The construction activity could also lead to water stagnation at pockets which may lead to breeding of mosquito and related health impacts.

Biological Environment

The proposed project will be carried out within the land, which is already under possession of M/s Kamaldeep Ispat Pvt. Ltd. The land is industrial and also does not have any flora and fauna of importance. Therefore, the impact of construction activities on terrestrial ecology will be negligible.

4.2.2 During Operation Phase

Impact on Land/Soil Environment

The impacts due to the project on soils are restricted to the construction phase which will get stabilized during operational phase. Minimal dust generation during levelling operation is the only impact on soil during construction phase. Hence, the impact on soil characteristics will be insignificant during this phase.

The major envisaged topographical changes would be limited in immediate vicinity of the proposed project area. The impact is going to be minimum and negligible. The change in topography will be only due to installation of induction furnace and CCM. It will invite positive benefits in the form of land levelling and tree plantations in the vicinity as required.

Solid Waste

The details of industrial and municipal solid waste generation with waste quantities and method of disposal are given in chapter-2. Slag will be generated during processing which is stored in an own area and used for road construction after metal recovery. Dust deposited in the bag filters will be collected and also used for backfilling purpose. Mill Scale from rolling mill will be reused in Induction Furnace. Hence, the impact due to solid waste generation from the plant operation is not envisaged

Impact on Topography

The major envisaged topographical changes would be limited in immediate vicinity of the proposed project area. The impact is going to be minimum and negligible. The change in topography will be only due to installation of induction furnace and CCM. It will invite positive benefits in the form of land levelling and tree plantations in the vicinity as required.

Impact on Climate

The proposed project takes place within the industrial land already possessed by M/s Kamaldeep Ispat Pvt. Ltd. and it does not involve any vegetation land which clearly indicates that, impact on the climatic conditions from the proposed project will be insignificant.

Comparison of regional data with the monitored data reveals that there are not many variations in temperature, relative humidity and predominant wind directions

Identified Impacts on Air Environment

Being a steel melting plant, the major air pollutants are Particulate Matter (PM), Sulphur dioxide (SO2) and Oxides of Nitrogen (NOx). The fugitive dust and gaseous emissions

expected are from raw material handling area, melting unit, casting area, coal storage yard, ash dumping area, transportation of fuel and solid waste.

The dust emissions, if any from the above areas will be fugitive in nature and maximum during summer season (when the wind velocities are likely to be high) and almost nil during the monsoon season. The dust emissions are likely to be confined to the place of generation only. The quantification of these fugitive emissions from the area sources is difficult as it depend on lot of factors such as dust particles size, specific gravity of dust particles, wind velocity, moisture content of the material and ambient temperature etc. Also, there is a high level of variability in these factors. Hence, these are not amenable for mathematical dispersion modelling. However, by proper usage of dust suppression measures, dust generation and dispersion will be reduced.

Prediction of impacts on air environment has been carried out by employing mathematical model based on a steady state Gaussian Plume Dispersion model designed for multiple point sources for short term. In the present case, AERMOD-designed for multiple point sources for short term and developed by United States Environmental Protection Agency (USEPA) has been used for simulations from point sources.

The model simulations deal with dispersion of two major pollutants viz., Particulate matter and Lead emitted from the stacks.

Sources of Emission

Point Source: The major point sources of emission from the proposed project are from the proposed stacks attached to Induction furnaces, Reheating Furnace. Stack emissions would be constituted of mainly PM_{10} & $PM_{2.5}$. The capacity of existing Reheating Furnace is 1x16 TPH and 4x10 T Induction furnace will also be installed.

Area Source (Fugitive Emission): The main sources of fugitive emissions are raw material unloading, raw material handling, material transfer points, storage bins etc. Dust generated from raw material unloading areas and in other areas such as material transfer points etc. dust extraction system with bag filters will be provided to control the particulate emission.

4.2.3 Air Dispersion Modeling

Air Quality Predictions through Mathematical Modelling:

Ground level concentrations (GLCs) have been predicted using ISCST3 software. The application incorporates popular U.S. EPA air dispersion models ISCST3 into one integrated graphical interface. The model uses rural dispersion and regulatory default option as per guidelines on air quality models (PROBES/70/1997-1998) used as regulatory model for statutory clearances for the project and compliance for environmental conditions. Following are the Existing and Proposed facilities as discussed in Table 4.1.

Table 4.1: Detail of Proposed Facilities

Production (Proposed)	
MS Billets	1,32,000TPA
Rolling Mill Products (TMT, Wire Rods, Round,Flat, Squire, Hex – Bars, Angles, Channel, joist etc.)	1,05,600TPA
Installation details	
Induction Furnace	4x10 Ton
Continuous Casting Machine	1X2 Strand and 7 m Dia
Rolling Mill	1x16 TPH
Reheating Furnace	1 x 16 TPH

Input Data for Dispersion Model

Dispersion model uses input data of wind speed, wind direction, ambient temperature, stability classes, mixing height generated at site or obtained from nearest India Meteorological Department along with emission values of pollutants for prediction of impacts on Ambient Air Quality due to existing &proposed projects.

Meteorology – Hourly meteorological data recorded at site for January-February-March 2022 on wind speed, direction, temperature, relative humidity is used as input. Site specific wind-rose for this period is shown in **Figure-4.1**.

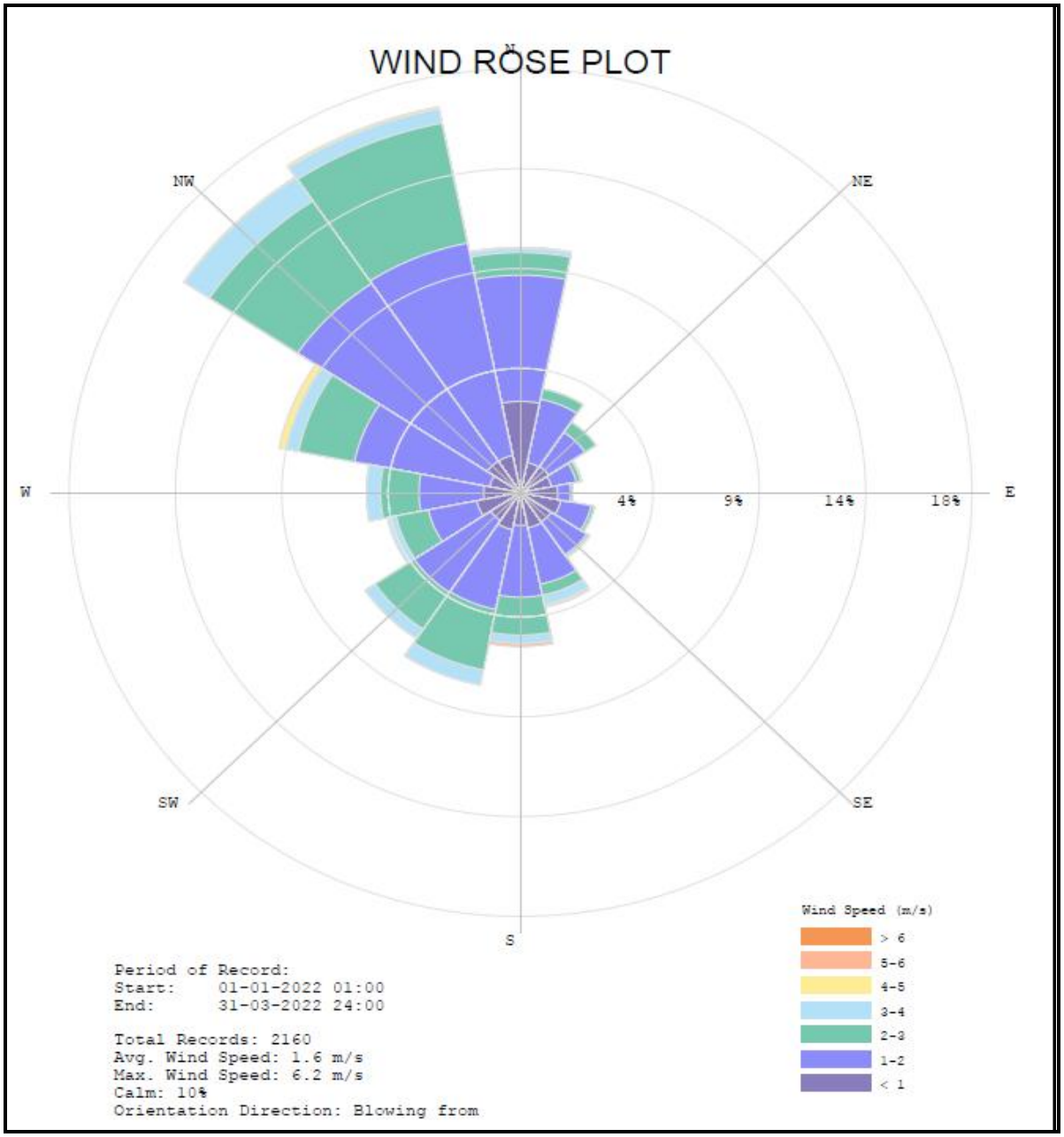


Figure 4.1: Windrose
(Period: January-February-March 2022)

Emission Data

The proposed units has facility of re-heating furnace (1 x 16 TPH) and rolling mills (1 x16 TPH). There is production of TMT bars, Angles (structure), Pipes, Profile and Strips of capacity 77400 TPA. In the proposed Induction furnace (4 x 10Ton), rolling mill (1 x16 TPH), The proposal is for installation of 4X10T Induction Furnace for Manufacturing of M.S. Ingot/Billet (1,32,000 TPA) and Rolling Mill (TMT, Wire Rods, Round, Flat, Square, Hex – Bars, Angles, Channel, joist etc. of 1,05,600 TPA) from each unit. Stack & Emission Data of Existing & Proposed units are given in Table 4.2.

Table 4.2: Stack & Emission Data of Existing & Proposed units

Parameter	Unit	Separate Stack attached to each I.F
No. of Stacks	No.	2
Fuel	Electricity	Electricity
Ht. of stack	m	30
Temp. of flue gas	^oC	180
Vel of flue gas	m/sec	10.0
Dia. of stack at top	m	2.25
Emission Rate of PM	g/s	3.924 (150 mg/Nm^3)
Air Pollution Equipment	--	Bag filter

Hourly meteorological data recorded at site for January to March 2022 on wind speed, direction and temperature, cloud cover and missing height are used as input. Site specific wind-rose for this season is shown in above figure. For the site-specific mixing heights CPCB document PROBES/88/2002-2003 is followed.In the short-term simulations, the incremental ground level concentrations are estimated to obtain an optimum description of variations in concentrations within 10 km radius w.r.t. all point sources

In the short-term simulations, the incremental ground level concentrations were estimated to obtain an optimum description of variations in concentrations within 10 km radius w.r.t. stack attached to proposed I.F. as center.

1.2 Prediction

The predicted results for PM are tabulated below in **Table-4.3** while dispersion trend is shown as isopleths through **Figure-4.2** for PM.

Table-4.3: Predicted and Resultant 24-Hourly Short Term Ground Level Concentration

Concentrations are expressed in **µg/m^3**

Pollutants	Incremental Concen-trations	Baseline Concen-trations**	Resultant Concen-trations	CPCB Limit for Industrial, Residential, Rural & Other Area
PM	0.398	69	69.398	100

** - Avg. Baseline concentration in study area

Resultant concentrations at AAQM locations after operation of plant are tabulated in **Table-3**.

1.3 Impact Assessment

Ambient air quality in study area w.r.t. PM is within NAAQS 2009 as seen from Table-4.2 and 4.3. Hence, any significant impact is not envisaged.

2.0 Mitigation Measures

Ambient air quality will be within NAAQS 2009 as mentioned above. Bag filter and Cyclone with scrubber are proposed as air pollution control measures to proposed furnaces. Also, stack of adequate height i.e., 30 m are proposed to disperse flue gases.

Table-4.4: Resultant Ambient Concentrations of PM at AAQM Locations after Operation of Plant

Concentrations are expressed in µg/m^3

Parameter → **AAQM Stations ↓**	**Baseline Conc.**	**Incremental Conc.**	**Resultant Conc.**	**CPCB Limit for Industrial, Residential, Rural & Other Area**
Project Site	80	0.003	80.003	100
Sonai	67	0.008	67.008	
Shyamsunder	67	0.001	67.001	
Bilaspur	71	0.02	71.02	
Paschim Kanska	67	0.001	67.001	
Kota	67	0.086	67.086	
Kanksa	68	0.001	68.001	
Anuragpur	67	0.001	67.001	

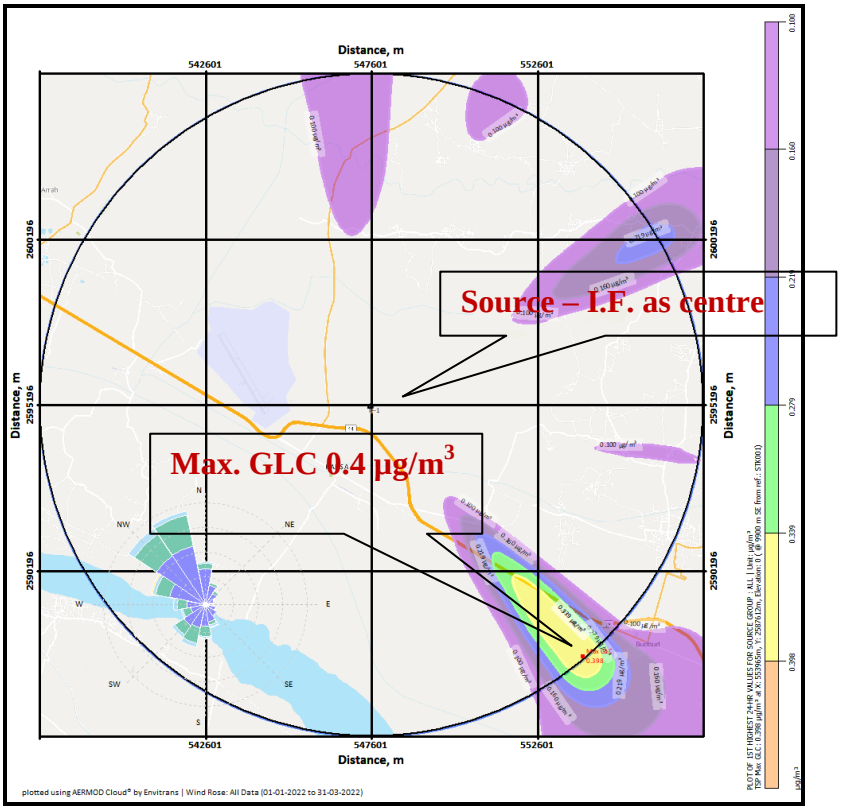


Figure-4.2 : Short Term 24 Hourly Incremental GLCs of PM

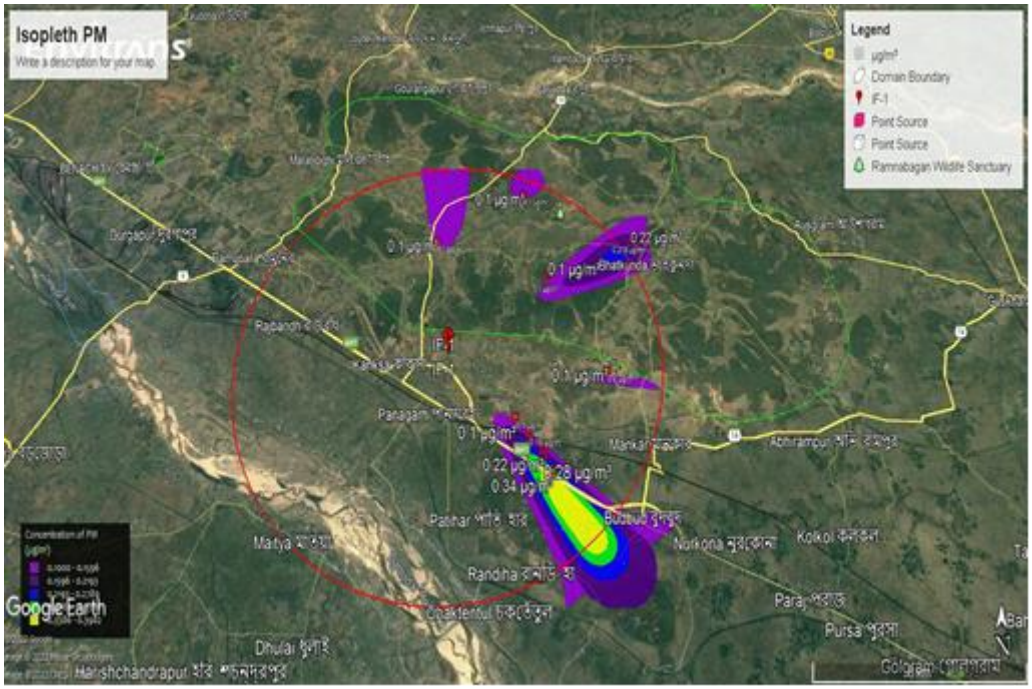


Figure-4.3 : Short Term 24 Hourly Incremental GLCs of PM

The following measures will be adopted for controlling the fugitive dust emission within to plant premises,

- The roads within the premises shall be sprinkled with water at a regular interval to avoid the dust generation.
- To ensure that all transportation vehicles carry a valid PUC (Pollution under Control) Certificate.
- Proper servicing & maintenance of vehicles is being carried out.
- Adequate green belt covering area greater than 33% of total plot area shall be developed in the project site.
- Ambient air quality shall be regularly monitored to ensure the air pollution devices are working efficiently.
- In case of APCD failure, operation shall be stopped by consulting plant engineer and safety officials.
- Dust from Bag filters shall be stored in bags, dedicated closed room for storage of ash in bags is recommended.
- Greenbelt development with higher APTI index plants, shall be done at max incremental locations to reduce impact of pollutants.
- Sufficient suction hoods shall be provided at charging point of furnace to avoid higher concentration at work environment

Noise Environment

The major noise generating sources are from the steel melting section, rolling mill section, transformer, machine shop, loading & unloading operation.

Considerable noise develops in the entire rolling mill section from the gearbox of the rolls and straightening machines, from pressure water pumps, from shear and saws, from throwing finished products into a pit and from stopping movements of the material with metal plates. The noise levels at the source for these units will be in the range of 85-90 dB (A).

Water Environment

The total water requirement will be around 97 KL per day, out of which 12 KL will be used for domestic purpose from where around 9 KL sewage water will be generated which will be disposed through septic tank.

For industrial cooling purpose, around 75 KLD water will be required from where around 71 KL water will be recycled. Another 15 KLD water will be required for plantation and sprinkling purpose. For the cooling makeup water and other purpose, total fresh water requirement will be 43 KLD.

The required water will be supplied by PHE.

Impact on Socio-Economic Environment

The setting up of any kind project would undoubtedly include significant impact on socio-economic and cultural life of the people in the project area. Here, an attempt is made to visualize and discuss such tentative impacts likely to be induced by the project. The likely impacts due to project activity are described below:

Positive Impacts

- The project does not involve any displacement of inhabitants and so issues like resettlement and rehabilitation does not figure.
- There was a growth in indirect jobs and business opportunities to the local and surrounding people such as worker, machine operator, contractors, transporters and raw material suppliers etc. due to the project in the area.
- Demands of community services and create additional employment for the poor strata of society by way of security guard, driver, servant, sweeper, gardener etc.

Negative Impacts

- Due to the project activity, influx of population may increase during the construction phase. This may lead to strain on infrastructure facilities in the factory premises and surrounding area as well as increase in population at local level. However, this impact is only for the short duration and temporary in nature.
- During construction phase, increase level of dust and other air pollutants may lead to health problems.

- Vehicular traffic and construction activities may create noise pollution.

Impacts on Ecological Environment

There are no trees, shrubs, herbs and climbers on project site. Due to lack of proper habitat, animal biodiversity, including insects, is meagre.

Impact on Flora

Due to construction activities and movement of vehicles, particulate matters in the surrounding air will be increased. Particulate matter in a form of dust may affect photosynthesis, respiration, transpiration and allow penetration of phototoxic gaseous pollutants in plants. Dusts at the levels of 2.5 to104 µg/m3 usually block stomata, thereby reducing photosynthesis, degradation of chlorophyll-a etc. Similar effects have been reported for mango trees (Mangifera indica) at 4.5 to 30.0 µg/m3 of dust. The average baseline levels of particulates of PM 2.5& PM10, up to a distance of 10 km in the surrounding air of the project site are about 0.629 and 1.02 µg/m3 respectively. It thus, appears that the trees in the locality or in the city are already in stress due to activities other than the proposed project.

Impact on Fauna

Nocturnal insects are strongly attracted to light sources that emit large amounts of UV radiation (blue fluorescent lights, black lights and mercury lamps). Behaviours, such as flight and mating are inhibited in such insects that are exposed to bright light at night. Light toxicity occurs when the retinas of compound eyes of an insect are exposed to UV radiations, damaged and structurally degenerated. Insects gather around these lamps at high densities instead of navigating naturally. Moths (Lepidoptera) are the major nocturnal pollinators of a diverse range of plant species in diverse ecosystems across the world. Artificial night lighting might in turn affect the provision of pollination by moths.

4.3 Impact Mitigation Measures

4.3.1 During Construction Phase

Land/Soil Environment

The following mitigation measures shall be adopted for soil environment:

- After completion of the construction phase, the surplus earth shall be utilized to fill up the low-lying areas, the rubble shall be cleared and all unbuilt surfaces will be reinstated;
- Greenbelt development and related activities shall be taken up during construction phase itself so that plantation will grow to adequate height by the time of plant commissioning. Thus, greenbelt will be effective in containing the fugitive emissions during operation, if any;
- Species selected in this plantation shall be fast growing and they shall be adaptable to local conditions. Their ability to combat localized pollution is the prime factor for their selection and placement in the planting grid/pattern.

- Most of the varieties shall be eco-friendly i.e., generate lot of oxygen while helping reduce/absorb gases and dust; Entire plant shall be aesthetically landscaped and as much as possible natural gradient shall be maintained;
- There shall be minimum concreting of the top surfaces so that there is a scope for maximum groundwater recharge due to rainfall; and Plantation outside the plant premises, in the nearby villages shall be encouraged by supplying free saplings to the villagers.
- Usage of appropriate monitoring and control facilities for construction equipment's deployed
- All hazardous waste shall be securely stored, under a shed for eventual transportation and disposal to the authorized dealers
- The solid waste generation due to workers working at site will be segregated and will be transported and disposed of to waste disposal facility
- Chemicals/Paints etc. used during construction phase will be stored safely

Air Environment

- Checking of vehicles and construction machinery to ensure compliance to Indian Emission Standards
- Transportation vehicles, DG sets and machineries to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NO_X and SO_X within the limits established by WBPCB
- Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow
- Use of good quality fuel and lubricants will be promoted. Moreover, low sulphur content diesel shall be used as fuel for DG sets to control emission of SO_2
- Water sprinkling shall be carried out to suppress fugitive dust during earthworks and along unpaved sections of access roads
- Attenuation of pollution/ protection of receptor through strengthening of greenbelt/ green cover
- PUC certified vehicles will be used to avoid the exhaust emission.

However, the construction activities will be for temporary period and hence, its impact on the existing ambient air quality as well as vegetation will be reversible. Dust emissions are likely to be confined within the limited area.

Noise Environment

- No noise polluting work in night shifts
- Pumps – Enclosure in acoustic screen, allowing for engine cooling and exhaust, use of anti-vibration mounting, flexible couplings of hoses, maintaining adequate inlet pressure
- Provision of Intake mufflers, unidirectional fan for Cooling and enclosures for electrical motors
- Provision of ear plugs for labour in high noise area
- Provision of barricades along the periphery of the site

- ❖ All contractors and subcontractors involved in the construction phase shall comply with the CPCB noise standards[1]
- ❖ Activities that take place near sensitive receptors to be carefully planned (restricted to daytime, taking into account weather conditions etc.)
- ❖ Vehicles and generator set to be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them
- ❖ Use of suitable muffler systems/ enclosures/ sound proof glass panelling on heavy equipment/ pumps/ blowers
- ❖ In case of steady noise levels above 80-85 dB (A), initiation of hearing conservation measures
- ❖ Strengthening of greenbelt for noise attenuation may be taken up, etc.

Water Environment

- ❖ Water Avoidance of wastage of curing water
- ❖ Use of tanker water for construction activity.
- ❖ Provision of toilets for labour
- ❖ The earthwork (cutting and filling) will be avoided during the rainy season and will be completed during the summer season. Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken.
- ❖ Soil binding and fast growing vegetation will be grown within the plant premises to arrest the soil erosion

Biological Environment

Biodiversity will be increased by developing green belt in about14864.49 Sq. m by plantation of varieties of trees and shrubs, within and around the project site will remarkably enhance biodiversity of flora and fauna.

The standard stipulated by CPCB for $PM_{2.5}$ is 60 µg/m3 (annual average) and the same, based on the epidemiological studies, is recommended as 10 µg/m3 (annual) by WHO. Thus predicted levels of particulate matters are well within the limits. As a precautionary measure, certain measures must be adhered to minimize the dust levels.

- Sprinkling of water and fine spray from nozzles at regular intervals to suppress the dust.
- Use of covering sheets to prevent dust dispersion from the vehicles, used for carrying construction materials at site.
- Use of covering sheets for covering construction materials, stored at site.
- Vehicles having pollution under control certificate should be allowed to play in the site.

[1] http://CPCB.nic.in/divisionsofheadoffice/pci2/Noise-vehicle.pdf
http://cpcb.nic.in/divisionsofheadoffice/pci2/noise_rules_2000.pdf

Socio-Economic Environment

- ❖ Employing local people for construction work to the maximum extent possible.
- ❖ Providing proper facilities for domestic supply, sanitation, domestic fuel, education, transportation etc. for the construction workers.
- ❖ Barricades, fences and necessary personnel protective equipment such as safety helmet, shoes, goggles, gloves, harness etc. will be provided to the workers and employees.
- ❖ Constructional and occupational safety measures to be adopted during construction phase of the industry.
- ❖ The health of workers will be checked for general illness; first time upon employment and thereafter at periodic intervals, as per the local laws and regulations.
- ❖ The workers will be diagnosed for respiratory functions at periodic intervals and during specific complaints etc. Medical Aid as per Factory Act and Panel doctor facility will be provided to the workers.
- ❖ Job rotation schemes will be practiced for over-exposed persons. Insignificant impact is expected on the workers health and safety during the operation phase stage.

4.3.2 During Operation Phase

➢ ***Impact Mitigation Measures for Land/Soil Environment***

- ❖ Installation of drainage ditches at project site to prevent erosion
- ❖ Used oil shall be securely stored, under a shed for eventual transportation and disposal to the authorized dealer by WBPCB
- ❖ The solid domestic waste shall be segregated and stored within the premises temporarily and then will be disposed off as per MSW rules.

- ***Solid waste Generation & Management***

Table 4.5: Details of Solid Waste Generation & Management

Industrial Waste		
Type of Waste	**Proposed**	**Treatment/Disposal**
Slag	1140 TPM	Slag will be crushed and metal part will be recovered by magnetic separator and rest part will be used for road construction.
Mill Scale	2640 TPA	Sold to contractor for sinter plant
Sludge from Settling tank	1.88 TPA	WBPCB authorized/approved site
Dust from APC System	128TPM	Dust will be packed in HDPE bags and stored in godown and the same is to be used in land filling/sold to authorized vendor for production of fly ash bricks
Municipal Solid Waste (MSW) -Kg/Day		
Type of Waste	**Quantity**	**Treatment/ Disposal**
Wet Garbage	16.26	To be disposed off as per MSW Rules
Dry Garbage	10.84	To be disposed off as per MSW Rules

- ***Impact Mitigation Measures for Air Environment***

Fugitive Emission Control Measures:

The fugitive emissions from the plant operations will be controlled through the following control measures:

Raw material handling areas are major source for fugitive emissions. Most of the time, sources of fugitive emissions will be the transfer and junction points, product hopper area and loading points. Bag filter will be provided with appropriate suction devices to control the fugitive emissions. In areas where provision of bag filter and other control device is not feasible, water spraying arrangements will be made, particularly in coal storage yard, wagon tipple and truck tippler; Industrial Vacuum cleaner will be used to control fugitive emission. Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission. The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions; and Usage of respiratory protective equipment by all employees to be ensured.

The impact of fugitive emissions from the proposed project on air quality of the region is insignificant.

Gaseous Emission Control Measures:

A 360° swing suction hood is provided just above crucible at required height to have effective suction of gases and fumes. Flue gases from the furnace will be passed through hood into duct and through duct to spark arrestor. The exiting pollution control equipment of Wet scrubber will be replaced by bag filters to remove the pollutants from the proposed induction furnaces and for reheating furnace, the wet scrubber provided will be remain the same.

Technical Specifications of Spark Arrestor & Bag Filter is provided below:

Table 4.6: Specifications of Spark Arrestor & Bag Filter

Spark Arrestor	
Total gas volume	40,000 Nm^3/hr
Temperature	180°C (Inlet)
Pressure drop through Spark Arrestor	50 mmWC
Overall dimension of Spark Arrestor	1m dia x 1.5m long
Inlet velocity	16.7 m/sec
Rotary air lock	400 mm x 400 mm
Geared Motor for rotary air lock valve	0.37 KW, 30 rpm
Bag Filter Unit	
Gas volume	40,000 Nm^3/hr
Air to cloth ratio	1.43 $m^3/min/m^2$
Total filtration area	465.74 m^2
No. of filter bags	270 nos.

No. of Module	1 no.
No. of filter bags in each module	270 nos.
Compressed air quantity	40 m^3/hr at 6-8 kg/cm^2
Pressure drop across bag filter	150mmWC
Temperature	100°C - 130°C
Size and quantity solenoid valves	40NB/18 nos.
Size of rotary air lock	400 x400 mm
Geared motor rating of rotary air lock	0.37 KW 30 rpm
Pulse interval	10-30 sec
Expected outlet particulate matter after APC system	Below 50 mg/m^3

The bag house will be an equipment that will ensure filtration of particulates nuisances, dust from the induction furnace and will ensure that the system will give emission levels less than 50 mg/Nm3 well specified within the pollution control limits.

Impact of Transport on the Environment

The transportation in the proposed project doesn't create any significant impacts to the environment. There will be a frequent movement of trucks in the plant premise for the transportation of raw materials and products but the proposed project involves only a small increase in truck numbers which will never make a significant impact.

The vehicular movements can discharge SO_2, NO_X and particulate emissions due to combustion engines. The emission from the vehicular movements can be controlled by good management practices of the vehicles.

Vehicles used of transportation will be equipped with novel engine for reducing emissions. Low sulphur-High Speed Diesel will be used for fuelling vehicles. Periodical maintenance of vehicles with emission testing will be carried out.

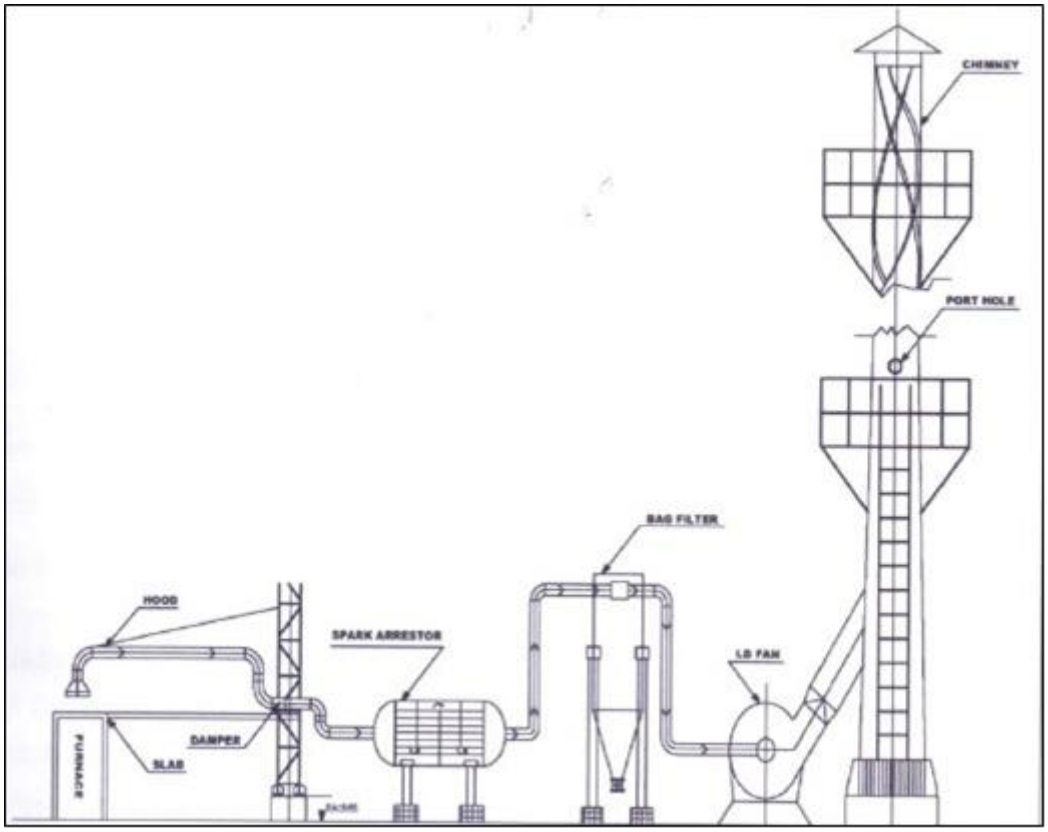


Figure 4.4: Schematic Diagram of APC devices

Additionally the following measures will be taken as mitigative measures of air impact

- Periodically monitoring of dust concentration level in the chimney and taking corrective steps if the concentration is not as per acceptable limit. The particulate concentration from the outlet of APC will remain within 30mg/Nm^3.
- 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 and inside roads.
- Ambient air quality monitoring in and around the premises will be carried out as per direction by West Bengal Pollution Control Board (WBPCB).
- All the internal roads shall be asphalted to reduce the fugitive dust due to truck movement
- Transportation vehicles, generators and machineries to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NO_X and SO_X within the limits established by CPCB
- Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow
- Attenuation of pollution/ protection of receptor through strengthening of greenbelt/ green cover
- PUC certified vehicles will be used to avoid the exhaust emission.

- **Impact Mitigation Measures for Noise Environment**

During normal operation of various plants, turbine, compressors, rolling mills, casting machines, blower, purging and blow downs, the ambient noise levels are expected to increase significantly with the attributes of the respective equipments. Normally the noise will be restricted to the close area of the respective equipments. The equipments will be designed based on the OSHA standards and noise close to these equipments seldom exceeds OSHA standards. Therefore all the equipments in the steel plants will be designed / operated in such a way that the noise level shall not exceed 85 dB(A) as per the requirement of OSHA (Occupational Safety and Health Administration).

It may so happen that noise level during operation of certain equipments may increase beyond the OSHA norms. In such cases actions as elaborated in Environment Management Plan will be taken to minimize and eliminate such occasions. In addition to these, the following measurements will be followed to minimize the noise effect

- The following control measures will be implemented for the proposed project:
- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures, acoustic louvers, slots etc;
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, transformer etc. will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units; and
- Furnace operators will be protected by enclosing the source of noise with sound deadening material or by providing sound-proofed shelters.
- Construction of noise protection wall at the scrap yard.
- Adequate greenbelt development is also being developed in the plant boundary of the steel plant.

Impact Mitigation Measures for Water Environment

The water balance and wastewater generation details have been described in Chapter 2. As the manufacturing process will be operated only on the dry process, water is mainly used at certain stages in the process like machinery cooling, scrubber make up and domestic needs.

The domestic sewage water (12KLD) will be treated in Septic tank and Soak pit.

The wastewater from the cooling processes is directed in the Settling Tank and will be reused for cooling purpose after necessary settling of particulate matters, if any. Around 15 KLD water from cooling process is lost through evaporation. No wastewater will be discharged outside the plant premise. Hence, there will be no impact on the water regime due to the wastewater generation from the plant operation.

- ❖ Provision of Storm water drainage system with adequate capacity, Proper maintenance of storm water drainage.
- ❖ Rain water harvesting shall be promoted. Rainwater from the catchment area of the buildings and hardscape / paved area will be harvested and stored in the underground storage tank of 125KL.

The total rainwater harvesting potential is 29939.86 m^3/annum.

Biological Environment

Unless essential, excessive light during night hours should be strictly avoided. Use of yellow lights is suggested in open areas.

Socio-Economic Environment

In order to mitigate the adverse impacts likely to arise in the surrounding area due to proposed project activity, it is necessary to formulate an effective mitigation plan. The suggestions are as follows:

Before Commencing and During Initial Phase:

- ➢ Communication with the local community should be institutionalized and done on a regular basis. The forum could provide opportunities to discuss local critical issues and prepare programmers of mutual benefits
- ➢ Information regarding the proposed development plan, community programmes etc. should be communicated to the local community in the form of booklets and audio-visuals.
- ➢ As per the expectations of the local people, project authorities should implement CSR / CER activity in nearby villages.

Construction Phase:

- ➢ Project proponent should take appropriate steps to keep environment clean and healthy during construction phase.
- ➢ Provision of adequate drinking water, toilet and bathing facilities should be made available on project site.
- ➢ Water shall be sprinkle/spread to suppress dust during construction phase to control air pollution and thereby avoid adverse health impact.
- ➢ Proper living condition with appropriate facilities for residential labors should be provided (if applicable).
- ➢ Proper Training and awareness programme should be carried out so that the workers understand the importance of wearing the personal protective equipment's.

Operation Phase:

- ➢ Because of proposed development of Project Company production will increased.

- The colony management collectively will need more Technical manpower, Non-Technical manpower, administration staff, Security Guard, Gardeners, Sweepers, Plumbers, Fitters, Housekeeping staff, and Drivers etc. Preference should be given to local people for all this.
- The project authority should help in promoting local people for livelihood commensurate with their will, skill and abilities by utilizing the minimum amount.
- The economic growth and availability of more job opportunities in the area will lead to be improvement in lifestyle and social status of the surrounding people.
- The social status of the people can change only when there is economic growth in the society.

4.4 Summary of Environment Impacts and Mitigation Measures

The summary of the Impacts and Mitigation measures for the above-mentioned environmental attributes is as summarized in **Table 4.10.**

Table 4.7: Summary of Impacts and Mitigation Measures

Activity	Environmental Attributes	Causes	Impact Characteristics			
			Nature	Duration	Reversibility	Significance & Mitigation measures
Transportation of construction on materials	Air quality (SPM & RPM)	Transportation of construction material in trucks & exhaust emission from vehicles	Direct Negative	Short Term	Reversible	Medium, Regular emission checks will be 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 accidents
Construction activities / laying of roads	Air quality (SPM & RPM)	Operation of construction machinery, welding & others	Direct Negative	Short Term	Reversible	Insignificant, if regular water sprinkling can be done
	Noise levels	Generation from use of machinery	Direct Negative	Short Term	Reversible	Insignificant, if properly maintained machineries can be used and PPEs to be provided to workers
	Land use	Setting up of proposed project	Direct Negative	Short Term	Reversible	Insignificant, because the proposed project will be carried out within existing plant premises
	Ecology	Loss of vegetation	Direct Negative	Short Term	Reversible	Insignificant, No cutting of trees and green belt Development is envisaged.

Activity	Environmental Attributes	Causes	Impact Characteristics			
			Nature	Duration	Reversibility	Significance & Mitigation measures
Handling & Transportation of raw material	Air	Transportation of raw material to the Site. (Dust Emission)	Direct Negative	Short Term	Irreversible	The covered dumper and trained transporter /driver will be engaged for the transportation of the raw materials.
	Air	The raw material is emptied to the Raw material storage yard. While unloading there is dust emission released into the atmosphere (Dust Emission).	Direct Negative	Long Term	Reversible	The unloading will be done in covered area. More over there will be water sprinkling system. So that minimum dust emission will occur. The Impact will be insignificant. Beside, the management will also ensure proper usage of the personal protective equipments by the workers to avoid any exposure to dust.
	Land	Spillage of raw material on the land	Direct Negative	Long Term	Reversible	The raw material storage yard will be made of RCC. Hence 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 appropriate APC system so, the impact will be insignificant. If no APC system is installed there will be high impact. If proper water sprinkling system is installed then the impact due to fugitive emission will be insignificant.
Waste water	Water	Only Domestic	Direct	Long	Reversible	In the process there will be

Activity	Environmental Attributes	Causes	Impact Characteristics			
			Nature	Duration	Reversibility	Significance & Mitigation measures
discharge		waste water	Negative	Term		requirement of water in cooling and no water will be discharged. So, as a whole it can be said that there will be no impact due to production process. Beside this there will be discharge of domestic waste water which will be taken into Septic Tank so this will not cause any impact on the water environment of the area.
Green Belt	Air	Dispersion of Air emission from stationary sources along with Fugitive emission	Positive	Long Term	Reversible	Very High positive Impact due to development of a proper green belt along the periphery of the premises.
Rain Water Harvesting	Water	Minimization of fresh water	Positive	Long Term	Reversible	Because of the RWH system, requirement if fresh water can be minimized
Employment	Socio Economic	Direct & Indirect Employment	Direct Positive	Long Term	Reversible	Positive Impact due to hiring of manpower from the nearby area. Substantial benefits in the form of contracts to local agencies for different services Employment generation in transport sector as several local conveyance trips and trucks loadings will be handled every day.

The above table can be summarized as shown in below matrix as **Table 4.11**.

Table 4.8: Overall Matrix

Environmental Impact / Environmental Area	No Effect	Positive Effect	Negative Effect	Beneficial	Adverse	Problematic	Short-term	Long-term	Reversible	Irreversible
Soil characteristics	✓									
Natural drainage	✓									
Conformity to Regional Plans	✓									
Air quality			✓				✓		✓	
Ground water	✓									
Surface water	✓									
Noise			✓				✓		✓	
Wild Life	✓									
Endangered Species	✓									
Natural vegetation		✓						✓		
Exotic vegetation		✓						✓		
Demography	✓									
Recreation	✓									
Health & safety		✓		✓				✓		
Regional economy		✓						✓		
National economy		✓						✓		
Public Facilities				✓						
Public services		✓						✓		
Transportation			✓				✓		✓	

4.5 Conclusion

From the above discussion it can be concluded that proposed project activity at The proposed project site is located at Plot No. A20, Panagarh Industrial Park, District-Paschim Burdwan, West Bengal-713148 by Kamaldeep Ispat Pvt. Ltd. shall not create any significant negative impact on physical features, Water, Noise and Air Environment. The proposed project shall generate additional direct and indirect employment and indirect service sector enhancement in the region and would help in the socio-economic up-liftment of the local area as well as the state.

CHAPTER 5: ANALYSIS OF ALTERNATIVE SITES AND TECHNOLOGY

5.1 Analysis of Alternative Sites

The proposal will take place within the existing plant premises itself. Therefore, no additional land will be acquired for the proposed project

- Availability of additional open space;
- It's an industrial land, so no forest land is involved;
- Nearby and Railway Station
- Absence of ecologically/environmentally sensitive areas within 10km radius;
- Manpower availability from nearby areas;
- Nearby to all local supplying industries.

Based on the above criterion, alternate site analysis is not required for the proposed e activity.

5.2 Alternative Technology

The technologies mentioned in chapter 2 for production of MS Billet/Ingots & TMT Bars are very well proven technology for over a period of time all over the world. In view of the above no technological failures are anticipated. Hence no alternative technologies are considered.

CHAPTER 6: ENVIRONMENTAL MONITORING PROGRAMME

6.1 Introduction

Environmental Management is nothing but resource management and environmental planning is just the same as development planning. They are just the other side of the same coin. The resource management and development planning look at the issue from narrow micro-economical point of view while environmental management views the issue from the broader prospective of long term sustained development option, which ensures that the environment is not desecrated.

For the effective and consistent functioning of the project, proper environmental monitoring programme shall be continued to be carried out at the proposed project in manufacturing of MS Billets/Ingots & TMT Bars.

The programme includes the following:

- Environmental Monitoring
- Personnel Training
- Regular Environmental audits and Correction measures
- Documentation–standards operation procedures Environmental Management Plan and other records

6.2 Environmental Monitoring

The environmental monitoring is an important part in terms of assessing the implementation of pollution control equipments is installed in the industry to abate and reduce the pollution level at site. The sampling and analysis of the environmental attributes will be as per the guidelines framed by Central Pollution Control Board (CPCB) / West Bengal Pollution Control Board (WBPCB).

Work of monitoring shall be carried out at the locations to assess the environmental health in the post period. A post study monitoring programme is important as it provides useful information on the following aspects.

- It helps to verify the predictions on environmental impacts presented in this study.
- It helps to indicate warnings of the development of any alarming environmental situations, and thus, provides opportunities for adopting appropriate control measures in advance.

The monitoring programmes in different areas of environment, outlined in the next few sections, have been based on the findings of the impact assessment studies described in Chapter 4. Post study monitoring programme have been summed up in **Table 6.1.**

Table 6.1: Environmental Monitoring During Project Construction Stage

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1	Air Emissions	All equipment's are operated within specified design parameters	Random checks of equipment logs/ manuals	Periodic
		Vehicle trips to be optimized to the extent possible	Vehicle logs	Periodic during site clearance & construction activities
		Maintenance of Induction Furnace emissions to meet stipulated standards	Particulate and Gaseous emissions (SO2, , CO, NOx)	Periodic emission monitoring
		Ambient air quality within the premises of the proposed unit to be monitored	The ambient air quality shall conform to the standards for PM_{10}, $PM_{2.5}$, SO_2, NO_x, and CO	As per CPCB / WBPCB requirement or on monthly basis whichever is earlier
2	Noise	List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order	Equipment logs, noise reading	Regular during construction activities
		Night working is to be minimized.	Working hour records	Daily records
		Generation of vehicular noise.	Maintenance of records of vehicles	Daily records
		Noise to be monitored in ambient air within the plant premises.	Spot noise recording	As per CPCB/ WBPCB requirement or on quarterly basis whichever is earlier
3	Wastewater Discharge	No discharge to be made to surface water, groundwater or soil.	No discharge hoses shall be in vicinity of	Periodic during construction activities

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
			watercourses.	
4	Soil Erosion	Protect topsoil stockpile where possible at edge of site.	Effective cover in place.	Periodic during construction activities
5	Drainage and wastewater Management	Ensure drainage system and specific design measures are working effectively. The design to incorporate existing drainage pattern and avoid disturbing the same.	Visual inspection of drainage and records thereof	Periodic during construction activities
6	Waste Management	Implement waste management plan that identifies and characterizes every waste arising associated with proposed activities and which identifies the procedures for collection, handling & disposal of each waste arising.	Comprehensive Waste Management Plan should be in place and available for inspection on-site. Compliance with MSW Rules, 2016 and Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2016	Periodic check during construction activities
7	Health	Employees and migrant labour health check ups	All relevant parameters including HIV	Regular check ups
8	Loss of flora and fauna	Re-vegetation as per Forest guidelines	No. of plants, species	During site clearance

Table 6.2: Environmental Monitoring During Project Operation Stage

Sr. No	Particulars		Monitoring Frequency	Method of Sampling	Important Monitoring Parameters
I	**A. Air Pollution & Meteorology**				
	A	Stack Monitoring			
	1	Induction Furnace	Once	Online	Flue gas temp., velocity, flow, dust conc., SO2, NOx
	B. Ambient Air Quality Monitoring				
	1	3 - 4 No. of AAQ locations	Twice in a week	24 hr.	As per NAAQs 2009 PM, SO_2, NOx,
	C. Meteorology				
	1	Wind speed, direction, temperature, relative humidity, atmospheric pressure, rainfall etc shall be monitored at plant.			
II	**A. Water quality**				
	1	Ground Water	Once in a month	Grab	Parameters specified under IS:2295 (Class C) and IS:10500,
III	**Industrial Noise Levels**				
	1	Near administrative office	Once in 5 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	2	Pump house			Noise levels in dB(A)
	1	Four locations	Once in three months for the industry Once in each season for ambient noise levels	24 hr continuous with one hr interval	Noise levels in dB(A)
IV	**Soil Quality**				
	1	Inside the plant	Pre-Monsoon and Post Monsoon season	Grab	Physio-chemical parameters

6.2.1 Ambient Air Quality

Monitoring of ambient air quality at the proposed Steel Plant site shall be continued to be carried out on a regular basis to ascertain the levels of PM_{10}, $PM_{2.5}$, SO_2& NO_X in the atmosphere; ambient air quality shall be monitored as per **Table 6.1** & **6.2**.

6.2.2 Surface Water Quality

Water quality constitutes another important area in the post study monitoring programme. The nearest water bodies are Damoder River at a distance of 7.5km towards South. Contamination of surface water in the vicinity of the proposed Steel area during the operation is not possible as there will not be any discharge of waste water from the plant site.

6.2.3 Noise Level

Ambient noise levels have been monitored at 8 stations inside and outside the plant during baseline season for day time and night time.

6.3 Reporting Schedules of the Monitoring Data

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site and data thus generated shall be regularly furnished to the state/central regulatory authorities. The frequency of reporting shall be once in every six months to the local state PCB officials and to Regional office of MoEF & CC. The Environmental Audit reports shall be prepared for the entire year of operations and shall be regularly submitted to regulatory authorities.

6.4 Cost Provision for Environmental Measures

The total project cost for the proposed project is about 63.50 Crores. An initial budget of Rs.127 Lacs to be made on the following heads as included in the project cost in the proposed project. The recurring cost is estimated to be around Rs. 80 lakhs per annum.

Table 6.3: Cost of Environmental Protection Measures

No.	Particulars	Amount in INR, Lakhs	
		Capital Cost	Recurring Cost
1	Air Pollution Control System	90	10
2	Noise Control System	10	5
3	Green Belt Development	30	10
4	Environment Monitoring and Management	20	10
5	Water Pollution Control System	30	20
6	Occupational Health& Safety	15	10
	Total	**195**	**65**

CHAPTER 7: ADDITIONAL STUDIES

The outlines of the proposed project, the pre –project environmental status and the impact assessment along with proper mitigation measures have been duly addressed in the previous Chapters. This Chapter briefly encompasses the additional aspects that were also dealt upon while conducting EIA study for the proposed project to be sited at Plot No. A20, Panagarh Industrial Park, Panagarh, District-Paschim Burdwan, West Bengal.

7.1 Environmental Risk Assessment

The safety and protection of people, equipment and the environment is a serious concern in engineering industries. Steel Plants have recognized the significance of Safe Working Environment and are progressively trying to prevent hazardous events, avoid production & manpower losses and other fallouts associated with industrial accidents by conducting risk assessment, onsite & off site management plan and adopting the safety measures as proposed. This also assists industries to enhance employee knowledge of operations, improve technical procedures, maintain accurate process safety information and increase overall facility productivity. This Chapter, accordingly, gives an outline of the associated environmental and other risk prone hazards, their assessment and remedial measures. It also describes an approach to emergency planning to be adopted by the Plant management.

7.1.1 Objectives

The objectives of environmental risk assessment are governed by the following, which excludes natural calamities:

a) Identifying the potential hazardous areas so that adequate design safety measures can be adopted to reduce the likelihood of accidental events.
b) Identifying the stakeholders and evaluating their risk along with proposing adequate control techniques.
c) Identifying the probable areas of environmental disaster which can be prevented by proper design of the installations and its controlled operation.
d) Managing the emergency situation or a disastrous event, if any, during the plant operation. Environmental risk assessment is a systematic approach for identification, evaluation, mitigation and control of hazards that could occur as a result of failures in process, procedures, or equipment. Increasing industrial accidents, loss of life & property, public scrutiny, statutory requirements and intense industrial processes, all contribute to a growing need to ensure that risk management is conducted and implemented.

Managing a disastrous event would require prompt action by the operators and plant emergency staff using all their existing resources like deployment of fire-fighting equipment, operation of emergency shut off valves, water sprays etc.

Minimizing the immediate consequences of a hazardous event include cordoning off, evacuation, medical assistance and providing correct information to the families of the affected persons and local public to avoid rumours and panic.

Lastly, an expert committee is required to probe the cause of such an event, even if it is a "near miss" situation, note the loss incurred/would have been incurred, and suggest remedial measures for implementation so that in future such events or similar events do not recur.

7.1.2 Definition of Environmental Risks

The following terms related to environmental risks are defined before reviewing the environmental risks:

Harm	Damage to person, property or environment.
Hazard	Situation that poses a level of threat to life, health, property, or environment. A hazardous situation that has come to pass is called an incident. Hazard and possibility interact together to create risk. An environmental hazard is thus going to be a set of circumstances, which leads to direct or indirect degradation of environment and damage to the life and property.
Risk	The probability of harm or likelihood of harmful occurrence and its severity. Environmental risk is a measure of the potential threats to the environment, life and property
Consequence	Effect due to occurrence of the event, which may endanger the environment permanently or temporarily and, or, loss of life and property.
Environmental Disaster	The consequence can extensively damage any one or all the four components of the environment, namely, (i) physico-chemical, (ii) biological, (iii) human and (iv) aesthetics.

7.1.3 Identification of Hazards

This is an early check of major hazards, which are of risk potential - including the potential for disastrous interactions of the various plant operational activities. This checklist, though not strictly speaking a Hazard and Operability Study (HAZOP) would considerably facilitate a full scale HAZOP Study for final drawing up of risk management measures when the 'design-freeze' stage commences. The identification of hazards anticipation for the proposed project activities are presented below in **Table** below.

Table: 7.1: Hazard Identification for the proposed steel plant

Group	Item	Nature of Hazard	Hazard Potential	Remarks
Raw materials	Water treatment chemicals like	Toxic	Major	Bio-Corrosive

Group	Item	Nature of Hazard	Hazard Potential	Remarks
handling	acids/alkalis			
	Lube oil/grease	Fire	Moderate	Flammable
Production Units				
Steel Making	Release of untreated BOFs wastewater	Toxic	Major	Severe pollution of surface water
	BOFG Handling	Fire	Major	Fire Hazard
	Hot Liquid, steel and slag handling	Heat Radiation	Major	Bio-Corrosive
Rolling Mills	Gas firing	Fire	Major	Fire Hazard
	Release of untreated wastewater	Toxic	Major	Severe pollution of surface water
Utilities				
Fuel Gas	Gas leak	Fire &Toxic	Major	Fire & Co Pollution
Electric Power Supply	Short circuit	Fire	Major	Fire Hazard
Liquid Fuel	Fuel handling & storage area	Fire & Toxic	Major	Fire Hazard
Hydraulic Oil & Lubricant	Accidental discharge of hydraulic oil under pressure	Fire & Toxic	Moderate	Fire & Personal Injury

From the Table, it may be observed that major on -site emergency situation may occur from the chemicals storage and handling, fuel gas handling, molten metal and slag handling, acids and alkali storage and handling and electrical short-circuit. The off-site environmental disaster may arise if large -scale fire or explosion occurs, the effect of which extends beyond the plant boundary. The off -site environmental disaster may take place due to significant environmental degradation for a sustained period.

7.1.4 Environmental Risk Evaluation

From environmental hazards point of view, risk analysis (RA) acts as a scrutinizing vehicle for establishing the priority in risk management that concerns human health and environmental quality in general. Though the proposed facilities are not manufacturing, storing or handling any potentially hazardous/toxic chemicals a scheduled in Manufacture, Storage and Import of Hazardous Chemicals (MSIHC)

Rules, 1989 and its amendments thereof, the proposed facility would have installations, such as, storage and handling of fuel oil, and fuel gases. Environmental Qualitative

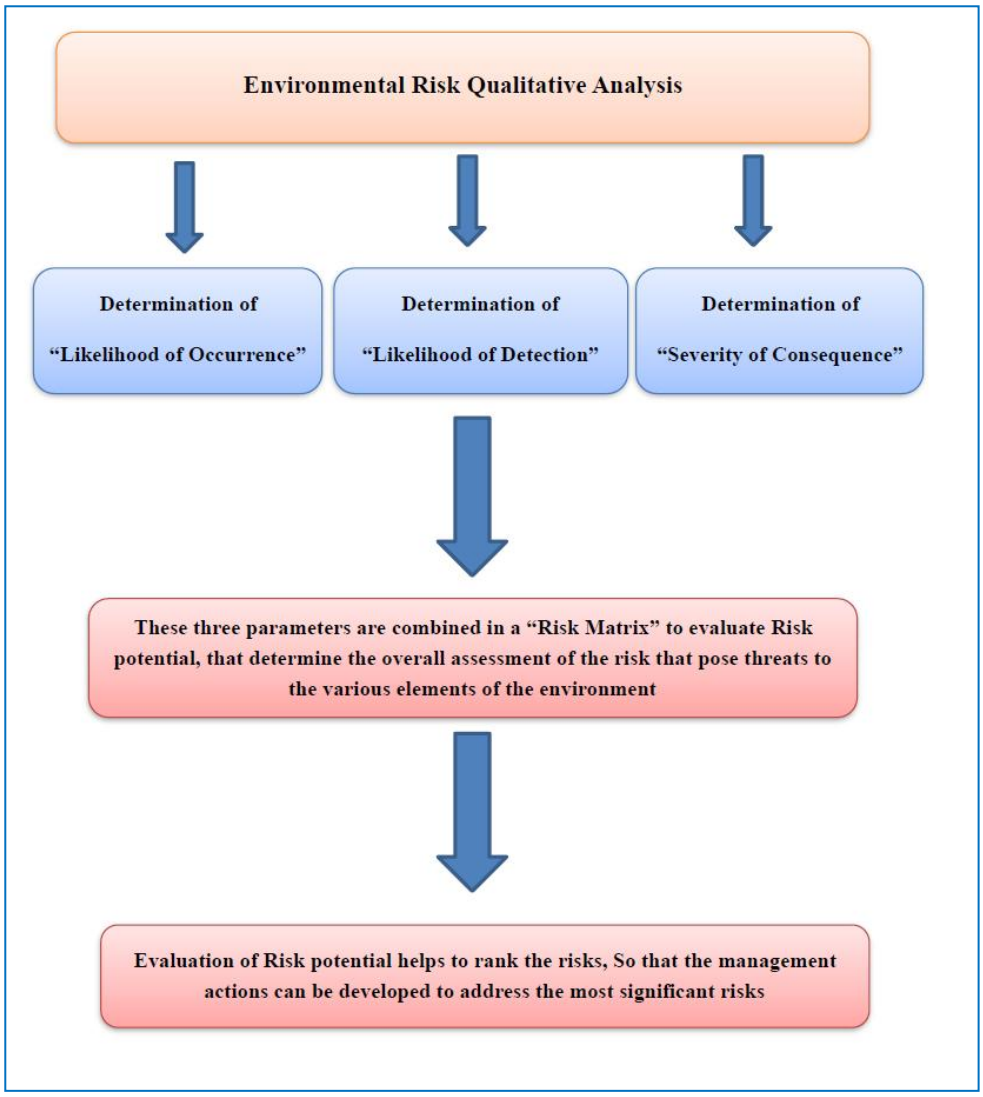


Figure 7.1: Environmental Risk Qualitative Analysis

As revealed in the chart in the preceding page, raw materials & consumable chemicals, and processing of the same in various production units, along with relative risk potential analysis is made on the following three factors using a P/I (Probability/ Impact) analysis methodology.

- Likelihood of Occurrence
- Likelihood of detection
- Severity of Consequence

Each of these factors is graded and complied to determine the risk potential. The factors governing the determination of relative risk potentials are presented in **Table 7.2.**

Table 7.2: Relative Risk Potential

[A]		[B]		[C]	
Likelihood of Occurrence		**Likelihood of Detection**		**Severity of Consequence**	
Criteria	**Rank**	**Criteria**	**Rank**	**Criteria**	**Rank**
Very High	5	Very High	1	None	2
High	4	High	2	Minor	4
Moderate	3	Moderate	3	Low	6
Low	2	Low	4	Moderate	8
Very Low	1	Very Low	5	High	10

RISK POTENTIAL (RP) = (A+B) x C

Based on the above stated criteria for assessing the risk, each probable event has been evaluated by addressing several questions on the probability of event occurrence in view of the in -built design features, detection response, operational practice and its likely consequence. A summarized list of environmental risk potential for the likely events is presented in **Table 7.3.**

The present risk potential evaluation is primarily based on human errors or faulty operation or failure of the control systems.

Table 7.3: Risk Potential Evaluation

Sl. No	Event	Likelihood of Occurrence	Likelihood of Detection	Severity of Consequence	Risk Potential
1	Fuel gas leaks from Pipelines/Valve	High (4)	Low(4)	High(10)	80
2	Unsafe disposal of oily waste of rolling mills	High (4)	Low(4)	Moderate(8)	64
3	Occurrence in static electricity /electric spark in milling room	Very low(1)	Very low(5)	High(10)	60
4	Leakage of acids/alkalis	Low(2)	Very low(5)	Moderate(8)	56
5	Uncontrolled dust emissions/ failure of emission control system	High (4)	Moderate(3)	Moderate(8)	56
6	Wet scrubbers running dry	Low(2)	Moderate(3)	High(10)	50
7	Oil Waste/Oil sludge handling	Low(2)	High(2)	Moderate(8)	32
8	Splashing of molten metals slag	Low(2)	Very High(1)	High(10)	30
9	Release of untreated wastewater	Low(2)	Very High(1)	High(10)	30
10	Collapsing of acid alkali tanks	Low(2)	Very High(1)	High(10)	30

From the above Table, it appears that some events carry risk potential above 50. These would be considered as hazardous events, where effective safe-design for operation and maintenance is highly essential to reduce the risk.

Table 7.4: Summary of Risk Analysis

Sl.No	Scenario Envisaged	Risks/causes	Consequence	Probability of Occurrence
1	Fire in fuel oil storage	Ignition of Oil	Major fire	Occasional
2	Catastrophic Rupture of LDO / FO storage Tank	Ignition of LDO / FO oil	Jet fire	Remote
3	Bursting/Explosion			
4	Molten metal explosion in Blast furnace & SMS	Puncture of ladle /furnace shell	Explosion & injuries to men working	Remote
5	Fire in Underground cables galleries	Insulation failure & Short Circuit	Major Fire	Remote
6	Boiler Explosion	Over pressure due to failure of Safety devices	Pressure wave / missile effect of exploded pieces	Remote
7	Catastrophic rupture of steam line	Over pressure	Burns to Personnel	Remote

7.1.5 Risk Management Measures

Furnace:

Preventive Measures

- If any job is to be undertaken in EOF & BOF areas where the EOF & BOF gases are toxic, the following procedure has to be laid down to ensure safety of men and the equipment.
- Gas Safety man will accompany the team and will test the atmosphere for the presence of CO, before starting the work.
- If `CO' concentration is found exceeding the safe limit, the job will be undertaken using necessary safety appliances viz., Oxygen Breathing Apparatus/ Blower type Gas mask.
- Any gas cutting/welding job will be undertaken with the clearance from Gas Safety man.

Gas Explosion, Prevention & Preventive measures

Preventive Measures

The following actions will be taken to prevent any gas explosions in case of gas leakage

- For jobs on gas lines/equipment, non-sparking copper tools will used. If such tools are not available, grease coated steel tools will be used. Electrical drill & other electrical equipment will not be used as these can give rise to sparks.
- The gas line will be thoroughly purged with steam before undertaking the job on the same.
- Naked lights will not be used near any de-pressurized gas main or equipment unless the same has been thoroughly purged.
- In case of profuse leakage of gas, action will be taken for water sealing and isolating that portion.
- The approach road to the gas line complex will be kept free from any obstructions.
- The gas line will be thoroughly purged with steam before undertaking the job on the same. Naked lights will not be used near any de-pressurized gas main or equipment unless the same has been thoroughly purged.
- In case of profuse leakage of gas, action will be taken for water sealing and isolating that portion.
- The approach road to the gas line complex will be kept free from any obstructions.
- If gas catches fire due to some leakage, it will be extinguished with plastic clay, steam or water. The portion of gas main affected will be cooled down with water. The valve will not be closed when fire is still there and the pressure in the main will be maintained at minimum 100 mm (WC).
- Gas tapping points of flow or pressure measurement will be cleaned with wooden stick or grease coated wire.
- If lighting is necessary near gas line, Table spark proof electric lamps of low voltage or explosion proof torchlight will be used for enclosed areas.

Hot Metal and Slag

Sudden break out of molten metal & slag may result in heavy explosions, due to their coming in contact with water, thereby causing serious burn injuries to persons and damage to equipment

Preventive Measures

- Any accumulation of water will be prevented in such vulnerable areas.
- In case of minor leakages, the flow of molten metal & slag will be controlled.
- If there is major breakout, the area will be cut off and cordoned.
- Vital connections e.g. water, gas, compressed air, oxygen etc. will be cut off or regulated, as per requirement

7.2 Disaster Management Plan

In the past there have been various disasters which had caused loss of human life, other living beings, property, nature, etc. in various parts of the world. These disasters include those which are naturally occurring, like the earthquake that struck Latur district in Maharastra State in 1993 where loss of human life to the extent of 3000 was recorded or industry related

events that cause serious damage to human life, property and environment. These past situations call for well-co-ordinated actions of individuals and institutions from the local community and this can be achieved only if there is awareness in the community of the possible hazards and the need for mutual preparedness to cope with their consequences. Considering this, the Industry & Environment Office of United Nations Environment Programme has formulated a process known as APELL (Awareness and Preparedness for Emergencies at Local Level).

Main Objectives

- Prevent loss of life or damage to health, social well being, avoid property damage and ensure environmental safety, in the local community
- To localize the emergency
- To minimize the consequences
- To ensure that following concepts are considered, namely rescue, first aid,
- Evacuation, rehabilitation, spreading the information.

ON-SITE EMERGENCY PLAN

Local authorities and industrial personnel play a role when the disaster takes place inside the plant and the effects are confined to the factory premises involving only the people working in the plant. To deal with such eventualities, On-Site Emergency Plan is required and it is the responsibility of the plant to prepare this.

OFF-SITE EMERGENCY PLAN

When an accident takes place in an industry / plant and its effects are felt outside its premises, the situation thus created is called as Off-Site Emergency. In this case, in addition to industry and local authorities, the local community and interest groups also come into play and thus an Off-Site Emergency plan should be made and it is the responsibility of District Authorities and the plant authorities.

Based on above, On-Site Emergency plan and Off-Site Emergency plan for H R Ispat Private Limited Plant has been prepared.

7.2.1 On-Site Emergency Plan

- Controlling the emergency, locating the emergency eliminating the hazard.
- Welfare of persons managing the disaster.
- Rescue operations and treatment of injured.
- Timely evacuation.
- Minimizing damage to property & environment.
- Informing and collaborating with statutory authorities. Informing and co-coordinating with social agencies like Fire Brigade, Hospital authorities etc.
- Informing and assisting relatives.

- Informing the news media. Giving correction information to news media in order to avoid panic among public and create positive feeling among the community.

ORGANIZATION

Organization Chart

Chief Controller of Disasters (Factory General Manager)					
Team-1	**Team-2**	**Team-3**	**Team-4**	**Team-5**	**Team-6**
Area Co-Ordinator	Medical Co-Ordinator	Material Co-Ordinator	Fire-Safety Co-Ordinator	Fire-Safety Co-Ordinator	Security Co-Ordinator
plant Manager	Chief Chemist	Civil Engineer	Civil Engineer	HR Manager	Security Officer

ROLES & RESPONSIBILITIES

1. CHIEF DISASTER CONTROLLER (CHIEF OPERATING OFFICER)

- Take control and declare emergency
- Be there
- Contact Authorities

2. AREA CO-ORDINATOR

- Take steps. Make emergency shut-down of activities. Put everything in safe condition.
- Evacuate.
- Commence initial fire-fighting, till Fire Department comes to take up.
- Identify materials requirements and call Material Manager.

3. MEDICAL CO-ORDINATOR

- Establish Emergency Center, Treat affected persons, Transfer/Remove Patients
- Assign and Deploy staff
- Contact Authorities

4. MATERIAL CO-ORDINATOR

- Dispatch necessary supplies
- Arrange purchases

5. FIRE & SAFETY CO-ORDINATOR

- Overall in-charge for Fire and Safety.
- Coordinate with area coordinator and direct the operations
- Coordinate with City and other fire-tenderers

6. PR & SECURITY CO-ORDINATOR

- Remove crowd

- Arrange gate security
- Contact Police
- Arrange evacuation
- Contact outside Agencies if asked.
- Handle news media
- Mobilize vehicles
- Arrange food, clothing to Officers inside

7. EMERGENCY CONTROL CENTER

- Adequate Internal phones
- Adequate external phones
- Workers tally

8. ACTION ON SITE

- Evacuate. Non-essential people first at assembly point
- Persons accounting
- Record of next-of-kin
- Public relations

9. POST DISASTER ANALYSIS

- Why it happened?
- Whether on-site operations failed? In what respect?
- How to avoid such failure in future?
- Map showing hazardous storages, fire horns, safety equipments, gates and side gates, assembly points, list of persons.
- Report to be submitted in detail to Authorities.
- Compensation arrangements if any, commenced?
- Call suggestions on shortfalls observed.
- Give rewards openly, pull defaulters individually.

HAZARD IDENTIFICATION

Safety Audit will be conducted by qualified technical personnel to study the installation and activities of the industry and to suggest measures to protect personnel and property against the risks. The areas of possible hazardous incident are given for follow up action:

- Fire in storage yard and diesel storage tanks.
- Electric Short circuit and consequent fire accident.
- Any likely sort of explosion in Boiler area
- Puncture of Boiler tubes.
- Furnace explosion
- Bursting of pipeline joints.
- Fall from high level structures

FIRE FIGHTING FACILITIES

a) **Water Hydrant System**

b) **Fire Extinguishers**

Foam Type:

CO_2 Type:

DCP Type:

c) **Fire Protective Appliances**

Two sets of fire safety appliances each consisting of following units are located at store and alcohol storage, respectively.

Face masks & gas masks (2),

Face shield (2),

Helmet (6),

Safety belts (2),

Safety ladder (1)

d) **Fire Brigade**

Fire brigade facilities available at Durgapur city which will be utilized whenever need arises.

7.2.2 On-Site Emergency Management Plan

The On-Site emergency plan will be circulated to all concerned members of emergency teams. It is essential that all concerned familiarize themselves with the overall on-site emergency plan and their respective roles and responsibilities during and in emergency. They should also participate regularly in the mock drills that will be conducted so as to keep themselves and the emergency organization in a state of perpetual preparedness at all times to meet any emergency.

Scope of Onsite Emergency Plan

The plan covers information regarding the properties of the Industry, type of disasters and disaster/accident-prone zones, the actual disaster control plans with authority delegation, controlling and other details. General details like location, project layout, neighbouring entities and the assistance they can render etc., are also provided.

The important elements considered in this plan are

- Statutory requirements
- Emergency organization
- Roles and Responsibilities
- Communications during emergency
- Emergency shutdown & control of situation

- Rescue & Rehabilitation
- Emergency facilities
- Important Information

Emergency

A major emergency in any situation is one, which has the potential to cause serious injury or loss of life, which may cause extensive damage to the structures in the vicinity and environment and could result in serious disruption to normal operation both inside and outside the industry premises. Depending on the magnitude of the emergency, services of the outside agencies may also be required for supplementing the internal effort to effectively handle the emergency and to contain the damage. The Management has to take effective steps to assess, minimize and wherever feasible eliminate the risks to a large extent. Accidents may still occur and it is necessary to be fully prepared to tackle all such emergencies if and when they occur

It is likely that the consequences of such emergencies will be confined to the units concerned or may affect outside. If the consequences are confined within the plant boundary, it is then termed as On Site Emergency and will be controlled by Chief Emergency Controller. In order to generate the plans it is necessary to first determine the kinds of accidents leading to an emergency that can occur in the industry. The most widely used technique in practice is based on experience accumulated over many years and safety audits.

Methodology

- The considerations in an emergency planning include the following: -
- Identification and assessment of hazards and risks
- Hazard, consequence analysis
- Alarm and communication procedures
- Identifying, appointment of personnel & assignment of responsibilities
- Identification and equipping Emergency control centre, Identifying Assembly, Rescue points, Medical facilities.
- Emergency preparedness plan, procedures, steps to be taken before, during and after emergency.
- Formulation of plan and emergency sources.
- Training rehearsal, evaluation and updating the plan.

Structure of Emergency Management

- Noticing the accidents
- Informing declarer of emergency
- Declaration of emergency
- Functions of declarer
- Interaction with outside agencies
- Emergency action plan & chart
- Emergency action plan

In case of major emergency, the steps to be taken immediately by various agencies are all follows.

S.N	Step to be Taken	Agency
1.	Noticing of emergency situation	Operator / Supervisor
2.	Assessment of Situation	Section head
3.	Information to emergency Declarer	HOD
4.	Plant siren for declaring emergency depending on situation	Emergency Declarer
5.	Shutdown of equipments /Plant	Shop Head
6.	Assessment of impact and organizing control measure	Incident /Site Controller
7.	Proper function of control rooms	Emergency Controller
8.	Co-ordination with outside agencies	GM-HR
9.	Control measures at site (Rescue, evacuation, Fire, Firefighting etc.)	Incident Controller
10	Seeking help from outside, nearby factories.	Incident Controller & Safety
11	All clear Signal (After controlling emergency situation)	Emergency Declarer

Infrastructure of Emergency Control Centre

Emergency control centres should therefore contain the following

- An adequate number of external telephones; if possible, one should accept only outgoing calls, in order to bypass jammed switchboards during an emergency.
- An adequate number of internal telephones
- Radio equipment
- A plan of the works, to show:
- Areas where there are large inventories of hazardous materials.
- Sources of safety and first aid equipment.
- The Fire-fighting system and additional sources of water.
- Site entrance and roadways, including up-to-date information on road Traffic.
- Assembly points.
- Vehicle parking and rail sidings.
- Additional work and layout plans detailing alternate routes and affected areas, during an emergency.
- Note pads, pens and pencils.
- A nominal role of employees.
- A list of key personnel, with addresses, telephone numbers, etc.

The emergency control centre should be sited in an area of minimum risk. Suitable location from where clear view of the plant is possible or the control room can be designated as

Emergency Control Centre. All the Site Controller/ Incident Controller Officers, Senior Personnel would be located here or have access to the ECC.

Emergency Medical Facilities

Stretchers, gas masks and general first aid materials for dealing with chemical burns, fire burns, etc., would be maintained in the medical centre as well as in the Emergency Control Room. A range of medicines should be maintained in the ECC/ Medical Centre. Breathing apparatus and other emergency medical equipment should be provided and maintained. The Medical Centre should display poster for treating burns and first aid. Some medicines and facilities to be kept in the medical centre are suggested. The list is indicative and the qualified doctors of the medical centre should use their professional judgment for medical treatment.

Emergency Action Plans

EMERGENCY ACTION PLAN FOR CYLINDER FIRE

- When filled container containing LPG is involved in fire, internal pressure if not relieved, will build up above 70KG/SQ.CM and ultimately rupture the container. Rupture weak by direct flame impingement. Ruptured containers can be propelled at distance by jet action.
- If container's pressure is not raised up to 70KG/SQ.CM, leakage from screwed valve joint can occur due to different expansion of steel and brass.
- Ignition of the escaping gas would aggravate the fire but release of fire reduces the possibility of rupture.
- No attempt should be made to extinguish the burning gas but the container under fire and other containers in vicinity should be kept cool by water spray.
- If the gas leakage does not ignite, the container should be approached from up and removed to the place of safety away from the source of ignition.

EMERGENCY ACTION PLAN FOR ELECTRIC FIRE

- Disconnect the affected areas electric supply.
- Attempt to extinguish fire with the help of CO2, DCP
- If fire is not extinguished, extinguish by spraying water with fog nozzle after ensuring complete isolation of electric circuit

EMERGENCY ACTION PLAN FOR OIL FIRE

- Attempt to extinguish small fire with the help of DCP
- If the fire is not controlled, use water foam to blanket the fire and further action is to be taken

The proposed project will provide elaborate arrangements for managing any incidents of fire

- Water Tender
- Foam Tender

- Portable Pump
- Wireless set
- Water Hoses
- Hot line Telephone etc.

EMERGENCY ACTION PLAN FOR MEDICAL AID

Emergency Action Plan for Electric Shock Casualties Electric Shock Results in irreversible damage to brain cell begins followed by deterioration of the organs.

RESCUE AND FIRST AID

- Do first aid quickly and without fuss and panic
- Switch off the supply if this can be done at once.
- If not possible use a dry stick, dry cloth or other non-conductor to separate the victim from electrical contact.
- The rescuer must avoid receiving shock himself by wearing gloves or using a jacket to pull the victim.
- Always keep in mind that delay in rescue and resuscitation may be fatal.
- Every sound counts.

ARTIFICIAL RESPIRATION

Give artificial respiration if breathing has stopped. There are several methods of artificial respiration, if the victim is not injured over the face, try mouth to mouth.

NATURAL HAZARDS

Emergency Action plan for Tornado/High winds

A. Weather reports will be monitored from broadcast warnings regarding threatening conditions.
B. If the tornado has been sighted or effect is felt, following steps should be taken by plant personnel.
   - Persons will be notified over public address system or through siren.
   - Emergency services will be alerted for assistance.
   - Plant personnel should be advised to assemble in the administration building basement, staff room, recreation room and restrooms.
   - All safety systems should be kept on alert and all nonessential utilities should be put off.
C. After the status is restored, personnel should inspect all the facilities for resource, first aid and damage control activities, damage assessment, and cleanup, restoration and recovery.

Emergency Action Plan for Earthquakes

A. When first tremors are sensed during an earthquake, all personnel should evacuate buildings and assemble at safe place away from structures, walls and falling objects. Emergency shutdown should be declared.
B. Emergency services should be contacted for assistance.
C. After the status is restored, personnel should inspect all the facilities for rescue, first aid and damage control activities, damage assessment, cleanup, restoration and recovery.

Emergency Action Plan for Bomb Threat

- When bomb threat call is received the following measures are to be taken.
- Inform the message to the highest local police authority and seek their assistance for patrolling and security need.
- Inform Controller of Explosives the details and nature of the anonymous message and read operations.
- Request the Local Fire Brigade to position at least on fire tender at the Location immediately.
- Keep the Concerned Department at the Regional Level informed with the developments at regular intervals.
- Alert the Local Government / Private Hospitals and seek their help for providing Ambulances if necessary.

LIST OF COORDINATORS AND THEIR CONTACT NUMBERS

Sr. No.	Name	Designation	Phone No.
1	Mr. Sundip Gupta	Director	9099011219
2.	Mr. Kunal Gupta	Director	9051619965

ADDRESS & TELEPHONE DIRECTORY OF CIVIC AUTHORITIES

S. N.	Name	Designation	Office Ph no.
District Administration			
1	Shri S.Arun Prasad, IAS	District Magistrate	--
2	Shri Sandip Tudu, WBCS(EXE)	Additional District Magistrate(L & LR)	--
Police Administration			
1	Kanksa police Station		0343-2524244

CHAPTER 8: PROJECT BENEFITS

8.1 Project Benefits

The Proposed project will have indirect positive impact on surrounding area which is as mentioned below:

- The proposed project will be carried out on the proposed land of M/s Kamaldeep Ispat Pvt. Ltd.; hence no displacement of people is required
- Substantial Socio-economic benefits
- Good Techno-commercial viability
- Around the project site semi-skilled and unskilled workmen are expected to be available from local population in these areas to meet the manpower requirement during construction phase.
- Infrastructural facilities will be improved due to the project
- Secondary employment will be generated thereby benefiting locals

Thus a significant benefit to the socio-economic environment is likely to be created due to the project.

8.2 Improvements in the Physical Infrastructure

- The project will improve supply position of MS Ingots/Billets and TMT Bar in West Bengal State.
- Maintain continuity of TMT Bar supply to the consumers through distributors.
- The project is expected to accelerate the infrastructure development in and around the area, such as rail, road, transports and communication facilities.
- The proposed project will have numerous induced impacts on services to transport etc. It will also attract other entrepreneur to establish their venture in the region.

Establishment of large developmental projects improve the availability of the physical infrastructures like approach roads, drainage, communication and transportation facilities etc.

8.3 Improvements in the Social Infrastructure

M/S. Kamaldeep Ispat Pvt. Ltd. shall take up some community welfare activities under Corporate Social Responsibility and also improve the social infrastructures like education and health care system etc.

8.4 Employment Potential

The project shall provide employment potential under unskilled, semi-skilled and skilled categories. The employment potential shall increase with the start of construction activities, reach a peak during construction phase and then reduce with completion of construction activities.

The direct employment opportunities with M/s. Kamaldeep Ispat Pvt. Ltd. are extremely limited and the opportunities exist mainly with the contractors and sub-contractors. These agencies will be persuaded to provide the jobs to local persons on a preferential basis wherever feasible.

8.5 CER and Socio-Economic Development

M/s. Kamaldeep Ispat Pvt. Ltd. not only carries out business but also understands the obligations towards the society. The unit is aware of the obligations towards the society and to fulfill the social obligations unit will employ semi-skilled and unskilled labor from the nearby villages for the proposed augmentation project as far as possible. Unit will also try to generate maximum indirect employment in the nearby villages by appointing local contractors during construction phase as well as during operation phase. The Project Proponents will contribute reasonably as part of their Corporate Environmental Responsibility (CER) in and will carry out various activities in nearby villages.

The total estimated cost of the proposed project is 63.50 Crores. The project Proponent will allot 1.5% of the project cost i.e. around 95.25 Lakhs towards the CER activity.

The proposed CER activities are shown in **Table 8.1**, although the heads can be changed on the basis of local demand analysis at the time of Public Hearing.

Table 8.1: Year wise proposed CER Activities by Purbanchal Concast Pvt. Ltd

Sl No.	PROPOSED PROGRAMME	AMOUNT (RS. IN LACS)			
		1st Year	2nd Year	3rd Year	Total
1	Green Belt Development in nearby villages in consultation with local authorities	15	10	12	**37**
2	Street Solar Lighting in nearby areas	10	18	10.25	**38.25**
3	Organising Health check-up camp in nearby area	5	12	3	**20**
Total		**30**	**40**	**25.25**	**95.25**

8.6 Direct Revenue Earning to the National and State Exchequer

This project will contribute additional revenue to the Central and State exchequer in the form of excise duty, income tax, state sales tax or VAT, tax for interstate movement, corporate taxes etc. Indirect contribution to the Central and State exchequer will be there due to Income by way of registration of trucks, payment of road tax, income tax from individual as well as taxes from associated units. Thus, the proposed augmentation project will help the Government by paying different taxes from time to time, which is a part of revenue and thus, will help in developing the area.

8.7 Other Tangible Benefits

Both tangible and non-tangible benefits will result from this activity and many of those are described above. Apart from direct employment, many other benefits will accrue like

- Erosion control by nalla training, terracing and bunding

- Flood control by rain-water arresting, and harvesting
- Aesthetics improvement by general greening with emphasis on biodiversity
- Developed economy strengthens democratic set-up.
- Developed economy brings with it literacy and healthful living
- Improved safety-security in surrounding with better Law and Order
- Symbiosis and sustainable development will be the ultimate objective

CHAPTER 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

Not recommended at the Scoping stage

CHAPTER 10. ENVIRONMENT MANAGEMENT PLAN

10.1 Introduction

The Environmental Management Plan (EMP) provides an essential link between predicted impacts and mitigation measures during implementation and operational activities. EMP outlines the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or mitigate adverse environmental impacts, and the actions needed to implement these measures.

The likely impacts on various components of environment due to the project during developmental activities have been identified and measures for their mitigation are suggested.

The EMP lists all the requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified in the EIA. For each attribute, or operation, which could otherwise give rise to impact, the following information is presented:

- A comprehensive listing of the mitigation measures
- Parameters that will be monitored to ensure effective implementation of the action
- Timing for implementation of the action to ensure that the objectives of mitigation are fully met

The EMP comprises a series of components covering direct mitigation and environmental monitoring, an outline waste management plan and a project site restoration plan. Therefore, environmental management plan has been prepared for each of the above developmental activities.

10.2 EMP during Construction Phase

Environmental pollution during construction stage will be limited and for a temporary period during the construction activity. Construction shall be planned in such a way that excavated material shall be disposed safely. The manpower required for these activities shall preferably be employed from nearby villages so that avenues of employment will be open to local people.

Directly or indirectly all the environmental components get affected due to the construction activity. The following environmental protection and enhancement measures are suggested for implementation by the contractor or the authority during the construction as applicable.

10.2.1 Air Environment

- Checking of vehicles and construction machinery to ensure compliance to Indian Emission Standards
- Transportation vehicles, DG sets and machineries to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NO_X and SO_X within the limits established by WBPCB

- Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow
- Use of good quality fuel and lubricants will be promoted. Moreover, low sulphur content diesel shall be used as fuel for DG sets to control emission of SO_2.
- Water sprinkling shall be carried out to suppress fugitive dust during earthworks and along unpaved sections of access roads
- Attenuation of pollution/ protection of receptor through strengthening of greenbelt/ green cover
- PUC certified vehicles will be used to avoid the exhaust emission.
- However, the construction activities will be for temporary period and hence, its impact on the existing ambient air quality as well as vegetation will be reversible. Dust emissions are likely to be confined within the limited area.
- The hazardous material will be stored, handled & disposed of according to the guidelines of HWMR Rules 2016 and subsequent amendment.

10.2.2 Noise Environment

- No noise polluting work in night shifts
- Acoustic enclosures for DG Sets will be provided as per CPCB guidelines
- Pumps – Enclosure in acoustic screen, allowing for engine cooling and exhaust, use of anti-vibration mounting, flexible couplings of hoses, maintaining adequate inlet pressure
- Provision of Intake mufflers, unidirectional fan for Cooling and enclosures for electrical motors
- Provision of ear plugs for labour in high noise area
- Provision of barricades along the periphery of the site
- All contractors and subcontractors involved in the construction phase shall comply with the CPCB noise standards
- Activities that take place near sensitive receptors to be carefully planned (restricted to daytime, taking into account weather conditions etc.)
- Vehicles and generator set to be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them
- Use of suitable muffler systems/ enclosures/ sound proof glass panelling on heavy equipment/ pumps/ blowers
- In case of steady noise levels above 80-85 dB (A), initiation of hearing conservation measures
- Strengthening of greenbelt for noise attenuation may be taken up, etc.

10.2.3 Water Environment

- Measures will be implemented to prevent seepage of liquid materials into ground where it could contaminate groundwater;
- Ensure prompt cleaning up of accidental spillages
- Measures will be followed to prevent the contamination of hydrological features by diesel, grease, oil, etc. derived from the working area.

- The machinery / equipment will be maintained in a good operating condition;
- Specially designated areas will be created for vehicle maintenance;
- Accidental spillages will be cleaned up promptly.
- Curing water will be sprayed and after liberal curing, all concrete structures will be covered with gunny bags this will conserves water
- Provisions will be made to ensure the construction vehicles stick to the access track to prevent mud & dirt being deposited on roads
- Fence will be constructed around the site to trap sediments whilst allowing the water to flow through.
- All mud & dirt deposited on the roads from the construction activities will be cleaned.
- Adopting good construction and engineering practices will help in mitigating the water pollution.

10.2.4 Land Environment

- After completion of the construction phase, the surplus earth shall be utilized to fill up the low-lying areas, the rubble shall be cleared and all un-built surfaces will be reinstated;
- Greenbelt development and related activities shall be taken up during construction phase itself so that plantation will grow to adequate height by the time of plant commissioning. Thus, greenbelt will be effective in containing the fugitive emissions during operation, if any;
- Species selected in this plantation shall be fast growing and they shall be adaptable to local conditions. Their ability to combat localized pollution is the prime factor for their selection and placement in the planting grid/pattern.
- Most of the varieties shall be eco-friendly i.e., generate lot of oxygen while helping reduce/absorb gases and dust; Entire plant shall be aesthetically landscaped and as much as possible natural gradient shall be maintained;
- There shall be minimum concreting of the top surfaces so that there is a scope for maximum groundwater recharge due to rainfall; and Plantation outside the plant premises, in the nearby villages shall be encouraged by supplying free saplings to the villagers.
- Usage of appropriate monitoring and control facilities for construction equipment's deployed
- All hazardous waste shall be securely stored, under a shed for eventual transportation and disposal to the authorized dealers
- The solid waste generation due to workers working at site will be segregated and will be transported and disposed of to waste disposal facility
- Chemicals/Paints etc. used during construction phase will be stored safely

10.2.5 Biological Environment

The region does not have dense vegetation and land use is dominated by agricultural and industrial activities. Following environmental management measures are recommended to mitigate adverse impacts on biological environment during construction phase:

- Native species will be preferred for plantation in addition to beautification plants/species.

10.2.6 Socio-economic Environment

Given that the project and related developments like construction camps will not be dependent on local resources (power, water), during both construction and operations, the only likely impact on infrastructure would be on the roads, during the construction phase. Considering the high traffic emanating during construction phase an effective traffic management scheme will be put in place to avoid congestion on the nearby and local roads. Local persons will get employment during Construction phase.

10.2.7 Health and Safety

- The movement of heavy equipment will be undertaken with proper precaution to prevent any accidents on the road. Occupational risk shall be minimized at the project site through implementation of a full proof safety system. Speed limit set for movement of vehicles with 20 km/hr on village roads to reduce risks of accidents or injuries.
- Safety training shall be provided to all construction workers on operation of equipment. Security shall also be extended during non-working hours to ensure there is controlled access to the machinery and equipment.
- The contractors shall also be vigilant to detect workers showing symptoms of communicable diseases. Health checkup of the contract labors shall be done/ recorded at times. All illness and incidents shall be reported and recorded.

10.3 EMP during Operation Phase

In order to mitigate the impacts due to proposed capacity of facility on various environmental components, the following environmental management measures are recommended:

10.3.1 Air Environment

Fugitive Emission Control Measures:

The fugitive emissions from the plant operations will be controlled through the following control measures:

Raw material handling areas are major source for fugitive emissions. Most of the time, sources of fugitive emissions will be the transfer and junction points, product hopper area and loading points. Bag filter will be provided with appropriate suction devices to control the fugitive emissions. In areas where provision of bag filter and other control device is not feasible, water spraying arrangements will be made, particularly in coal storage yard, wagon tipple and truck tippler; Adopting good housekeeping practice will also help in control of fugitive emission. Maintaining shop floor and roads in good condition minimizes the chances of fugitive emission. The trucks and other vehicles shall be maintained and serviced regularly

to reduce air emissions; and Usage of respiratory protective equipment by all employees to be ensured.

The impact of fugitive emissions from the proposed project on air quality of the region is insignificant.

Gaseous Emission Control Measures:

A 360° swing suction hood is provided just above crucible at required height to have effective suction of gases and fumes. Flue gases from the furnace will be passed through hood into duct and through duct to spark arrestor. The exiting pollution control equipment of Wet scrubber will be replaced by bag filters to remove the pollutants from the proposed induction furnaces and for reheating furnace, the wet scrubber provided will be remain the same.

Technical Specifications of Spark Arrestor & Bag Filter

Table 10.1: Specifications of Spark Arrestor & Bag Filter

Spark Arrestor	
Total gas volume	40,000 Nm^3/hr
Temperature	180°C (Inlet)
Pressure drop through Spark Arrestor	50 mmWC
Overall dimension of Spark Arrestor	1m dia x 1.5m long
Inlet velocity	16.7 m/sec
Rotary air lock	400 mm x 400 mm
Geared Motor for rotary air lock valve	0.37 KW, 30 rpm
Bag Filter Unit	
Gas volume	40,000 Nm^3/hr
Air to cloth ratio	1.43 $m^3/min/m^2$
Total filtration area	465.74 m^2
No. of filter bags	270 nos.
No. of Module	1 no.
No. of filter bags in each module	270 nos.
Compressed air quantity	40 m^3/hr at 6-8 kg/cm^2
Pressure drop across bag filter	150mmWC
Temperature	100°C - 130°C
Size and quantity solenoid valves	40NB/18 nos.
Size of rotary air lock	400 x400 mm
Geared motor rating of rotary air lock	0.37 KW 30 rpm
Pulse interval	10-30 sec
Expected outlet particulate matter after APC system	Below 50 mg/m^3

The bag house will be equipment that will ensure filtration of particulates nuisances, dust from the induction furnace and will ensure that the system will give emission levels less than

50 mg/Nm^3 well specified within the pollution control limits. The technical specification of bag filter is tabulated in **Table 10.1**.

Impact of Transport on the Environment

The transportation in the proposed project doesn't create any significant impacts to the environment. There will be a frequent movement of trucks in the plant premise for the transportation of raw materials and products but the proposed project involves only a small increase in truck numbers which will never make a significant impact.

The vehicular movements can discharge SO_2, NO_X and particulate emissions due to combustion engines. The emission from the vehicular movements can be controlled by good management practices of the vehicles.

Vehicles used of transportation will be equipped with novel engine for reducing emissions. Low sulphur-High Speed Diesel will be used for fuelling vehicles. Periodical maintenance of vehicles with emission testing will be carried out.

Additionally the following measures will be taken as mitigative measures of air impact

- Periodically monitoring of dust concentration level in the chimney and taking corrective steps if the concentration is not as per acceptable limit. The particulate concentration from the outlet of APC will remain within 30 mg/Nm^3.
- 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 and inside roads
- Ambient air quality monitoring in and around the premises will be carried out as per direction by West Bengal Pollution Control Board (WBPCB).
- All the internal roads shall be asphalted to reduce the fugitive dust due to truck movement
- Transportation vehicles, generators and machineries to be properly and timely maintained and serviced regularly to control the emission of air pollutants in order to maintain the emissions of NO_X and SO_X within the limits established by CPCB
- Minimize idling time for vehicles and adequate parking provision and proper traffic arrangement for smooth traffic flow
- Attenuation of pollution/ protection of receptor through strengthening of greenbelt/ green cover
- PUC certified vehicles will be used to avoid the exhaust emission.

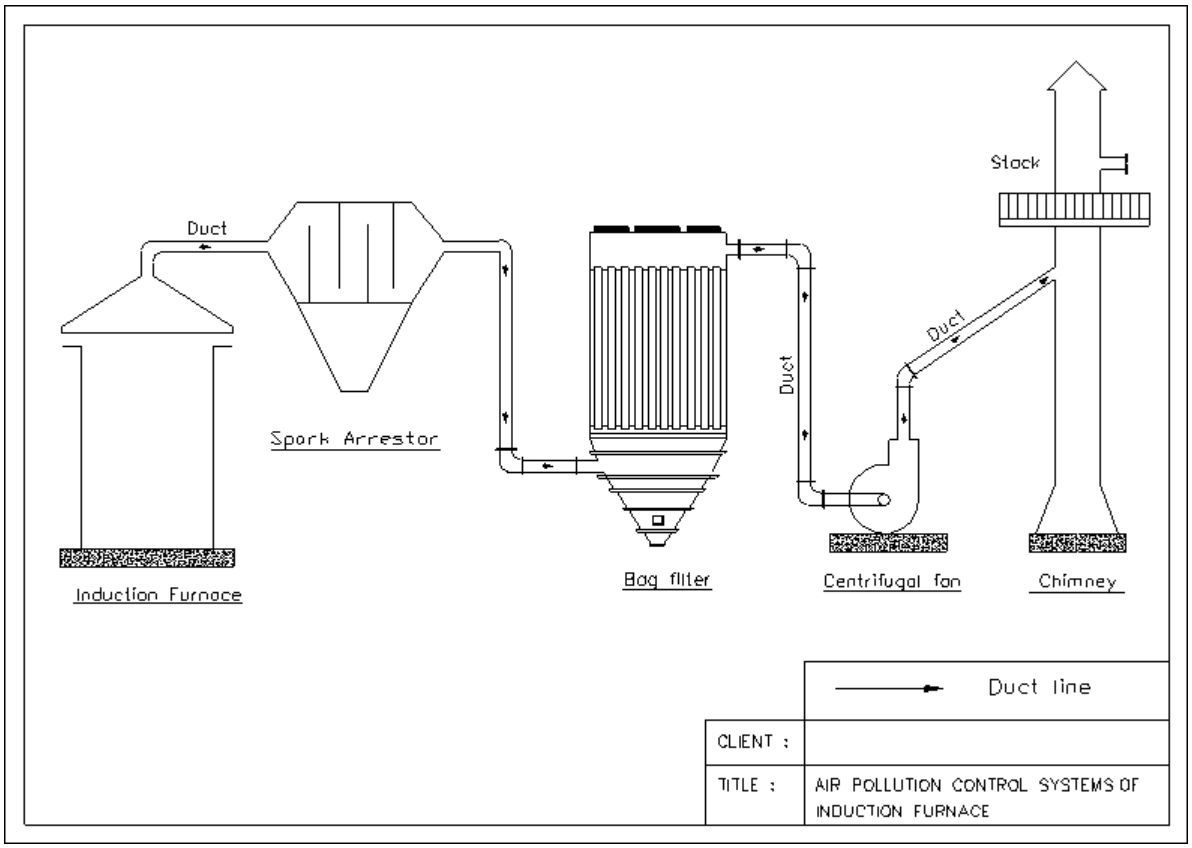


Figure 10.1: Air Pollution Control System

Bag Filter:

In a Jet Pulse Dust collector the dirty gases enter through inlet manifold to the hoppers where separation of coarse dust particles takes place. The remainder will pass with the gases to the filtering space. Bags are secured in the tube sheet through flange and suspended from top. Wire cages are provided to prevent the bags from collapsing. Filtration takes places from outside to inside of bags. Dust particles are deposited on the outside surfaces of the bags while the clean gases pass through the outlet manifold and finally to the atmosphere through ID fan.

The bags are cleaned intermittently through compressed air pulsed in reverse direction. A Short pulse of compressed air is directed downwards from a header into a row of bags; causing the bags to flex and dislodge the dust cake from outside the bags, the dust falls into the hopper by gravity and hence into the dust handling system. One to few rows of bags are pulsed at time after a predetermined period. The entire cleaning cycle is fully automatic and based on time mode. All timings are adjusted in the field to ensure optimum cleaning efficiency and compressed air consumption. The merits of bag filters are:

It can clean gases up to 3 microns level (up to 99%) We can get maximum efficiency by providing good air to clothe ratio (Min of 110cub.m/hr – sq. m) Dust disposal is easy through rotary airlock valve Even though 1 or 2 bags are damaged there will be not be much difference in the efficiency.

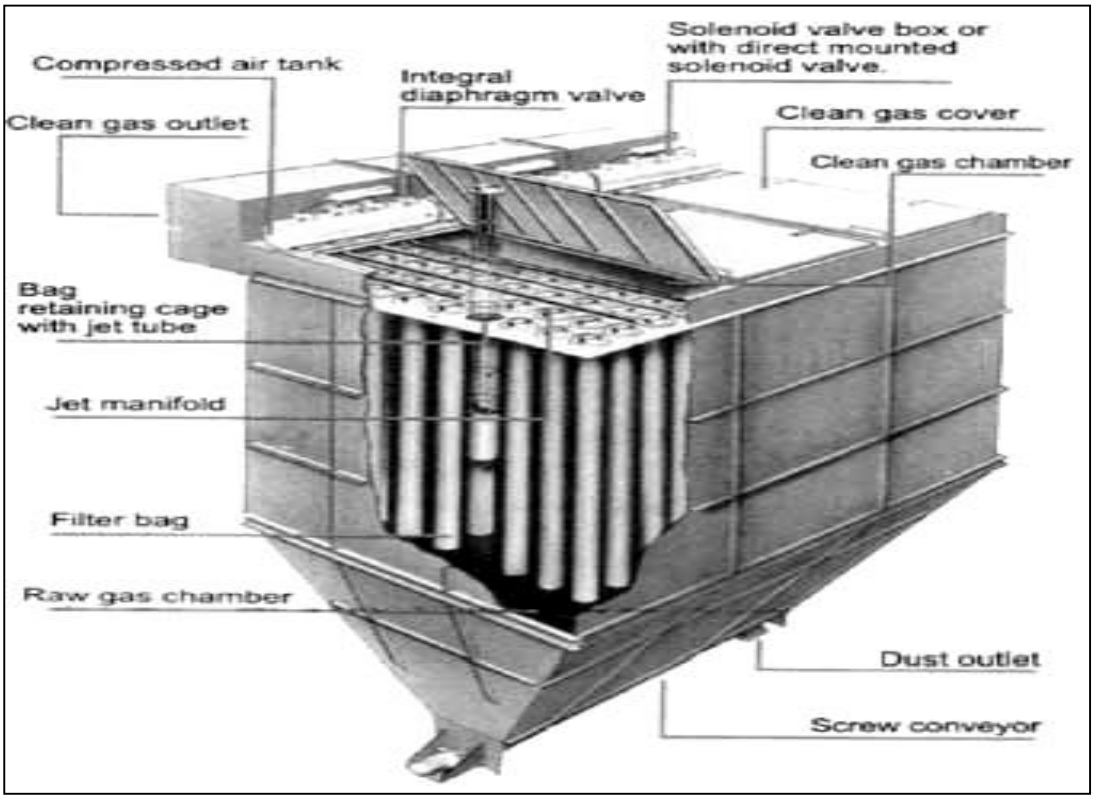


Figure 10.2: Section of Bag Filter

10.3.2 Noise Environment

The following control measures will be implemented for the proposed project:

- All the design/installation precautions as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures, acoustic louvers, slots etc;
- All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources.
- The air compressor, transformer etc. will be provided with acoustic enclosure;
- Other than the regular maintenance of the various equipment, ear plugs/muffs will be recommended for the personnel working close to the noise generating units; and
- Furnace operators will be protected by enclosing the source of noise with sound deadening material or by providing sound-proofed shelters.
- Construction of noise protection wall at the scrap yard.
- Adequate greenbelt development is also being developed in the plant boundary of the steel plant.

10.3.3 Water Environment

The quantity of wastewater generation depends on the quantity of water used for various purposes. As the steel melting plant is a dry process, water is mainly used only for heat management in machineries, for cooling purpose and domestic usage. The domestic sewage (12 KLD) generated.

The wastewater from the cooling processes is directed in the Clean Water Tank and will be reused for cooling purpose after necessary settling of particulate matters, if any. Around 15 KLD water from cooling process is lost through evaporation.

- Provision of Storm water drainage system with adequate capacity, Proper maintenance of storm water drainage.
- Rain water harvesting shall be promoted. Rainwater from the catchment area of the buildings and hardscape / paved area will be harvested and stored in the underground storage tank of 125kl.

10.3.4 Land Environment

- Greenbelt in and around the facility will be strengthened/maintained
- A record w.r.t quantity, quality and treatment/management of solid/hazardous waste shall be continued to be maintained at environmental monitoring cell.

10.3.5 Solid/Hazardous Waste Management

- The municipal solid waste will be disposed off as per MSW rules.
- The hazardous waste generated will be sold to WBPCB authorized recyclers.
- The quantities of the solid waste generation before and after the proposed project are presented in Table 10.3.

Table 10.2: Details of Solid Waste Generation

Industrial Waste		
Type of Waste	**Proposed**	**Treatment/Disposal**
Slag	1140 TPM	Slag will be crushed and metal part will be recovered by magnetic separator and rest part will be used for road construction.
Mill Scale	2640 TPA	Sold to contractor for sinter plant
Sludge from Settling tank	1.88 TPA	WBPCB authorized/approved site
Dust from APC System	128TPM	Dust will be packed in HDPE bags and stored in godown and the same is to be used in land filling/sold to authorized vendor for production of fly ash bricks
Municipal Solid Waste (MSW) -Kg/Day		
Type of Waste	**Quantity**	**Treatment/ Disposal**
Wet Garbage	16.26	To be disposed off as per MSW Rules
Dry Garbage	10.84	To be disposed off as per MSW Rules

10.3.6 Biological Environment

Development of green belt with carefully selected plant species is of prime importance due to their capacity to reduce noise and air pollution impacts by attenuation/assimilation and for providing food and habitat for local micro fauna.

- **Green Belt Development**

For the proposed , the proposed green belt will be extended over an area of 14864.49 Sqm (36.73% green belt) within the plant premises of Kamaldeep Ispat Pvt. Ltd. Plot No A20, District- Paschim Barddhaman of West Bengal. Considering 1500 plants per Ha, around 2230 trees are required to be planted inside the plant. Details of proposed trees are tabulated below:

Table 10.3: List of Trees for proposed plantation

LIST OF TREES PROPOSED FOR PLANTATION					
SL. No.	**COMMON NAME**	**BOTANICAL NAME OF TREES**	**FAMILY**	**QUANTITY**	**SPACING OF TREES**
1	Aam (A)	*Mangifera indica*	*Anacardiaceae*	320	3 m
2	Ashok (B)	*Saraca indica*	*Legumes*	220	3 m
3	Bela (C)	*Aegle marmelos*	*Rutaceae*	180	3 m
4	Jamu (D)	*Syzygium scholaris*	*Apocynaceae*	190	3 m
5	Akash neem (E)	*Millingtonia hortensis*	*Bignonias*	160	3 m
6	Chatim (F)	*Alstonia scholaris*	*Apocynaceae*	120	3 m
7	Nim (K)	*Azadirachta indica*	*Meliaceae*	150	3 m
8	Radhachura (L)	*Delonix regia*	*Caesalpinaceae*	160	3 m
9	Tantul, Tentuli (M)	*Tamarindus indica*	*Caesal pinaceae*	140	3 m
10	Krishnachura (J)	*Caesalpinia pulcherrima*	*Caesalpinaceae*	140	3 m
11	Mandar (G)	*Hibiscus chinensis*	*Mallows*	140	3 m
12	Kamini (H)	*Murraya exotica*	*Rutaceae*	230	3 m
13	Tagar (I)	*Ervatamia divaricata*	*Apocynaceae*	80	3 m
Total proposed tree numbers				**2230**	

10.3.7 Socio-economic Environment

In order to mitigate the adverse impacts likely to arise in the surrounding area due to proposed project activity, it is necessary to formulate an effective mitigation plan. The suggestions are as follows:

Before Commencing and During Initial Phase:

- Communication with the local community should be institutionalized and done on a regular basis. The forum could provide opportunities to discuss local critical issues and prepare programmers of mutual benefits.
- Information regarding the proposed development plan, community programmes etc. should be communicated to the local community in the form of displayPoster, booklets and audio-visuals.
- As per the expectations of the local people, project authorities should implement CSR / CER activity in nearby villages.

Construction Phase:

- Project proponent should take appropriate steps to keep environment clean and healthy during construction phase.
- Provision of adequate drinking water, toilet and bathing facilities should be made available on project site.
- Water shall be sprinkle/spread to suppress dust during construction phase to control air pollution and thereby avoid adverse health impact.
- Proper living condition with appropriate facilities for residential labours should be provided (if applicable).
- Proper Training and awareness programme should be carried out so that the workers understand the importance of wearing the protective safety equipment's.

10.4 CER and Socio-Economic Development

M/s. Kamaldeep Ispat Pvt. Ltd. not only carries out business but also understands the obligations towards the society. The unit is aware of the obligations towards the society and to fulfill the social obligations unit will employ semi-skilled and unskilled labor from the nearby villages for the proposed augmentation project as far as possible. Unit will also try to generate maximum indirect employment in the nearby villages by appointing local contractors during construction phase as well as during operation phase. The Project Proponents will contribute reasonably as part of their Corporate Environmental Responsibility (CER) in and will carry out various activities in nearby villages.

The total estimated cost of the proposed project is 63.50 Crores. The project Proponent will allot 1.5% of the project cost i.e. around 95.25 Lakhs towards the CER activity.

The proposed CER activities are shown in **Table 8.1**, although the heads can be changed on the basis of local demand analysis at the time of Public Hearing.

Table 10.4: Year wise proposed CER Activities by Purbanchal Concast Pvt. Ltd

Sl No.	PROPOSED PROGRAMME	AMOUNT (RS. IN LACS)			
		1st Year	2nd Year	3rd Year	Total
1	Green Belt Development in nearby villages in consultation with local authorities	15	10	12	**37**
2	Street Solar Lighting in nearby areas	10	18	10.25	**38.25**
3	Organising Health check-up camp in nearby area	5	12	3	**20**
Total		**30**	**40**	**25.25**	**95.25**

10.5 Environmental Management Cell

It is necessary to have a permanent organizational set-up charged with the task of ensuring effective implementation of all identified mitigation measures. Conscious of this, an Environment Management Cell will be earmarked for monitoring of pollutants and development of greenbelt as per Environmental Management Plan. The Project proponent will develop the environment cell, consisting of officers from various disciplines to coordinate the activities concerned with the management and implementation of the environmental control measures during construction and operation phase of the plant. They will also develop a well-documented system to monitor and control pollution. Environmental Management Cell (EMC) will meet at least once a month to assess the progress and analyse the data collected for the month. Any deviation/variation noticed shall be immediately taken into consideration for improvement of the same. Yearly action plan of EMP will be updated with respect to results achieved and proposed activities for next year. The organization and responsibility of the Environmental Management Cell (EMC) is presented below in **Figure 10.4**.

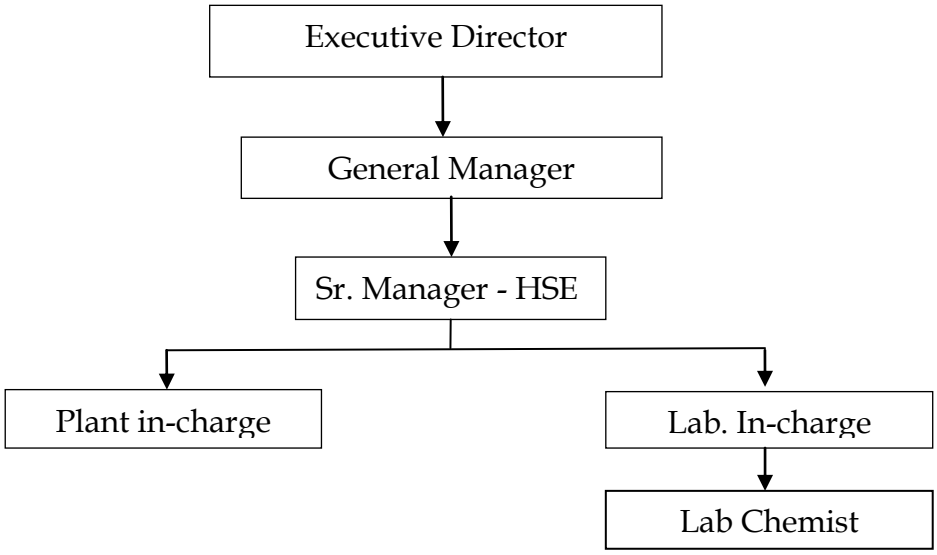


Figure 10.3: Environment Management Cell

CHAPTER 11. DISCLOSURE OF CONSULTANTS ENGAGED

11.1 Consultants Engaged

This EIA report is prepared on behalf of the proponents, taking inputs from proponent's office staff, their R and D wing, Architects, Project Management Professionals etc. by Environmental Consultants **M/s. Ultra-Tech Environmental Consultancy and Laboratory, Thane**.

M/s Ultra-Tech Environmental Consultancy and Laboratory:

Ultra-Tech Environmental Consultancy and Laboratory [Lab Gazetted by MoEF – Govt. of India] not only give environmental solutions for sustainable development, but make sure that they are economically feasible. With innovative ideas and impact mitigation measures offered, make them distinguished in environmental consulting business. The completion of tasks in record time is the key feature of Ultra-Tech. A team of more than hundred environmental brigadiers consists of engineers, experts, ecologists, hydrologists, geologists, socio-economic experts, solid waste and hazard waste experts apart from environmental media sampling and monitoring experts and management experts , strive hard to serve the clients with up to mark and best services.

Ultra-Tech offers environmental consultancy services to assist its clients to obtain environmental clearance for their large buildings, construction, CRZ, SEZ, high rise buildings, township projects and industries covering sugar and distilleries from respective authorities.

Ultra-Tech also provide STP/ETP/WTP project consultancy on turn-key basis apart from Operation and Maintenance of these projects on annual contract basis. Also, having MoEF approved environmental laboratory, Ultra-Tech provide laboratory services for monitoring and analysis of various environmental media like air, water, waste water, stack, noise and meteorological data to its clients all over India and abroad.

The EIA team involved for the proposed EIA Report is as mentioned in **Table 11.1.**

Table 11.1: EIA Team

SN	Name of the expert	Area of functional Expert (NABET Accredited)
1	Mrs. Anjali Singham	EIA Coordinator
2	Mrs. Anjali Singham	Air Quality Modelling
3	Mr. A G Yewale	Air Pollution
4	Mr. Ram Sushil Mishra	Water Pollution
5	Mrs. Deepa Tamhane (Karnik)	Solid Hazardous Waste
6	Mrs. Padmini Shinde	Ecology and Biodiversity
7	Mr. Yogesh Raskar	Socio Economic and Land Use
8	Mr. Debasish Sengupta	Team Member
9	Ms. Ayantika Pyne	Team Member

Functional area experts and assistance to FAE involved in the EIA study for the project is as shown in Table 11.2:

Table 11.2: EIA Coordinator and Functional Area Experts Involved in the EIA

S.N.	Name Of Sector	Name Of Client	Name Of EIA Coordinator	Signature	Functional Area Experts Involved		
					FA	Name/s	Signature
1.	Schedule 3 (a) Category 'B'	M/s. KAMALDEEP ISPAT PVT LTD	Mrs. Anjali Singham		AP	Mr. Adhikrao Govind Yewale	
					AQ	Mrs. Anjali Singham	
					WP	Mr.R.S Mishra	
					EB	Mrs. Padmini Sindhey	
					SE	Mr. Yogesh Raskar	
					SHW	Mrs. Deepa Tamhane (Karnik)	
					LU	Mr. Yogesh Raskar	
					Team Members	Mr. Debasish Sengupta Ms. Ayantika Pyne	

11.2 Laboratory for Analysis

NAME OF LABORATORY	SCOPE OF SERVICES	ACCREDITATION STATUS
M/s. ULTRA TECH	**Monitoring and Analysis of:** • Ambient Air Monitoring • Ground Water(Analysis) • Surface Water (Analysis) • Soil quality (Analysis) • Noise monitoring	Accredited by NABL