

*Draft Environmental Impact Assessment Report*

*FOR*

**Environmental Clearance for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA)**

*At*

*Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri,  
District-Darjeeling West Bengal- 734434*



*Project Proponent*



*Prepared by*

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EIA execution Period: January, 2021 – April, 2022

Report Released By: Mr. Ram Sushil Mishra

In the capacity of: EIA Coordinator

Signature:



## PURBANCHAL CONCAST PVT. LTD.

An ISO 9001 Certified Company

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CIN No. : U27310WB2011PTC166829  
PAN No. : AAGCP1723L  
GST No. : 19AAGCP1723L1Z7

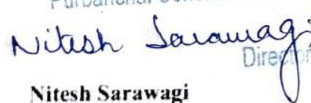
### TO WHOM IT MAY CONCERN

I, Nitesh Sarawagi, on behalf of M/s Purbanchal Concast 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 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) at Kashiram Jote, Phulbari Ghoshpukur Bypass, Siliguri, District-Darjeeling West Bengal- 734434".

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

Yours sincerely,

For Purbanchal Concast Pvt. Ltd.

Purbanchal Concast Pvt. Ltd.  
  
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ANNEXURE V:	Electricity Agreement
ANNEXURE VI:	Ground Water permission & application
ANNEXURE VII:	Raw data of Baseline monitoring

## EXECUTIVE SUMMARY

### 1.0 Introduction

**Purbanchal Concast Private Limited (PCPL)** was established in 2011 to manufacture mild steel pipes, hollow sections, profiles, guides and structures to meet the ever increasing requirements of the infrastructure and engineering industries. The objective was to build an integrated facility from Blooms/billets to the finished products.

PCPL is strategically located off the Asian Highway near Siliguri at Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434 having an easy access for to and fro movements. Currently the existing production facility is spread over an area of 41735.88 Sq.M.

The existing project has received Consent to Establish vide letter no. N427/WPB/SRO/NOC/Dar/P-140-2011 dated 09-12-2011. The unit has obtained CTE and CTO from WBSPCB which is a statutory authority. Consent to Operate for the existing unit was accorded by West Bengal State pollution Control Board vide letter no. C248/WPB/SRO/Dar/P.139.2015 dated 13-10-2017. The validity of CTO is up to 31/12/2022.

According to the order of MoEF&CC vide F.No. IA-J-11013/8/2019-IA-II(I) dated 22<sup>nd</sup> October 2020, Project Proponents have decided to obtain Environmental Clearance for the existing Rolling mill and along with that they are also applying for obtaining Environmental Clearance for installation of Induction furnace and other changes.

PCPL had applied for expansion of existing rolling mill and installation of induction furnace which was considered in the 40<sup>th</sup> REAC meeting for Industry-1 dated 15.07.2021, wherein after detailed deliberation, the Committee recommended that MoEF&CC may take an appropriate view regarding processing this request as it has been received after the deadline due to Covid-19 pandemic situation.

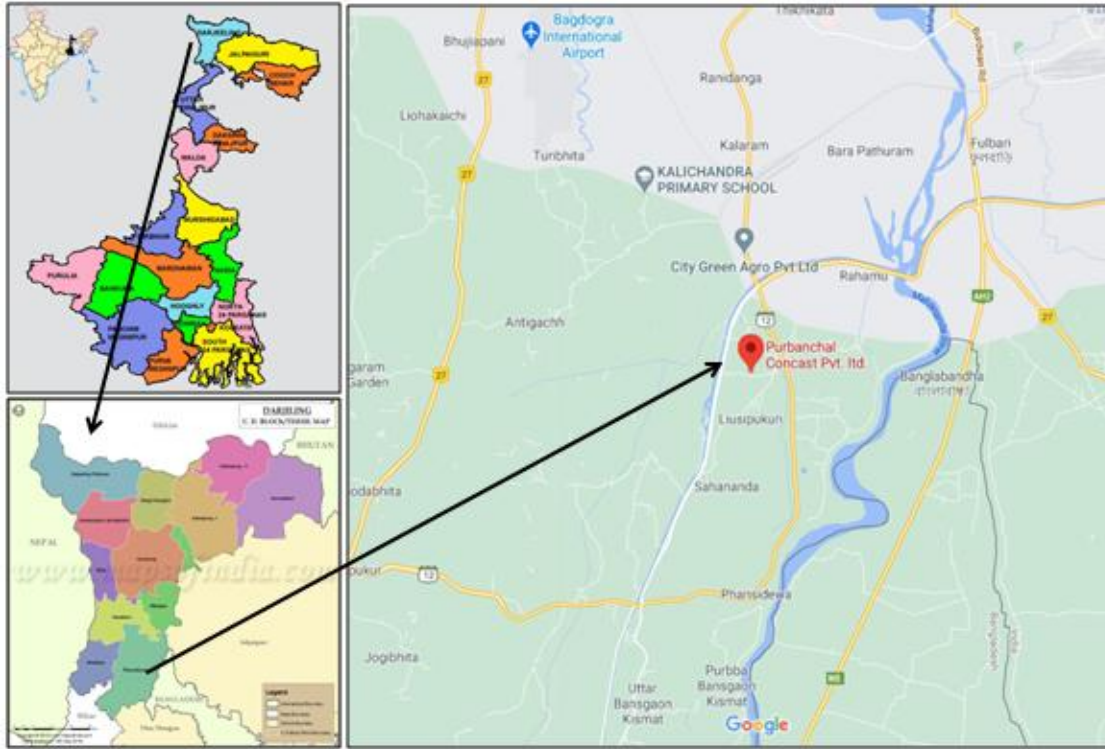
In this circumstances, as the proponent is facing tremendous financial loss, they have requested to grant TOR only for the production of 200000 TPA MS Billets / Ingots by installing 3X15T Induction Furnaces with CCM and a 1x25 TPH Rolling Mill with hot charging facility for production of Rolling Mill products within their existing premises. This proposal has been considered in the 2<sup>nd</sup> EAC meeting of Industry -1 sector held on 22.03.2022 and TOR has been granted on 11<sup>th</sup> April, 2022. The TOR letter is attached as **Annexure-I**.

### 1.1 Project Location

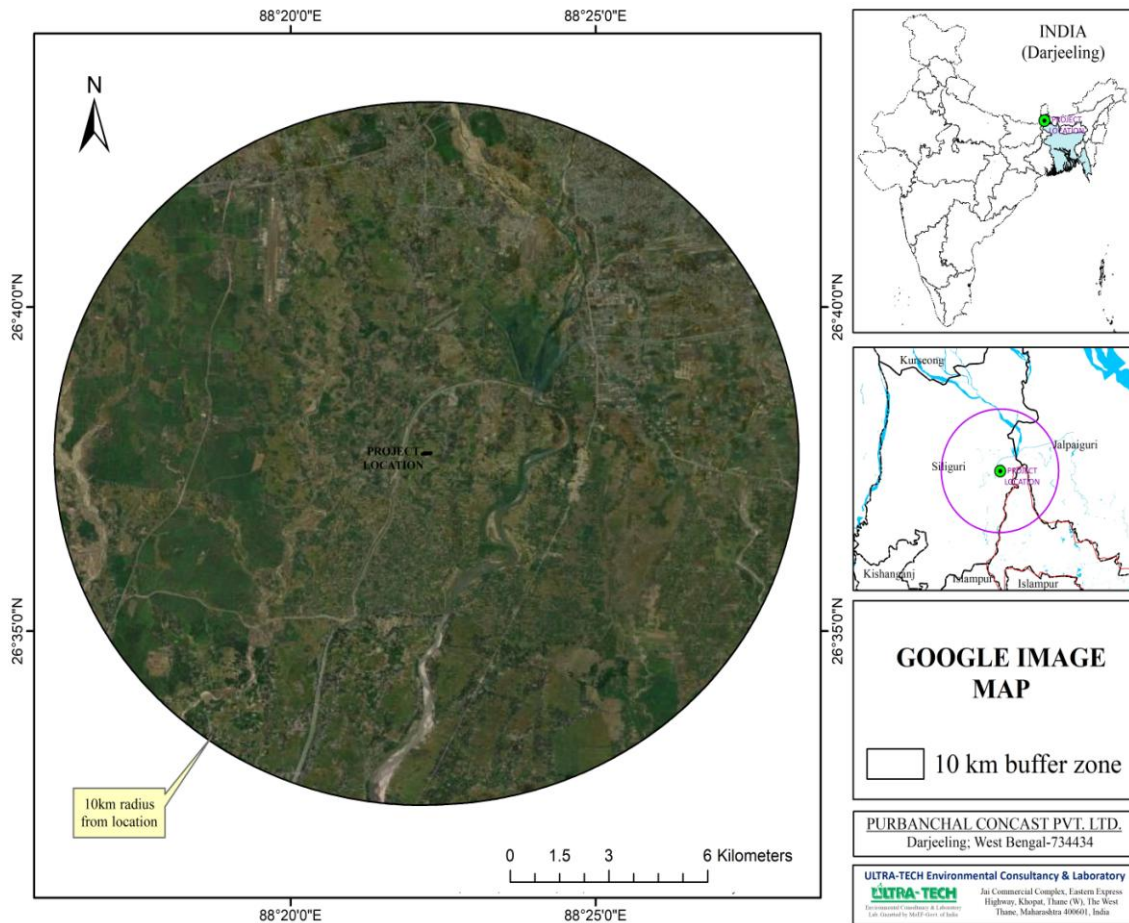
The proposed project will be done within the existing steel plant of M/s. Purbanchal Concast Private Limited is located at at Kashiram Jote, Phulbari Ghoshpukur Bypass, Siliguri, District - Darjeeling West Bengal - 734434

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.

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**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.1: Brief of Project, Geographical Location and Environmental Setting around Project Site**

Particulars	Details			
Geographical Coordinates	<b>Point</b>	<b>Latitude</b>	<b>Longitude</b>	
	A	26.628835°	88.369272°	
	B	26.627442°	88.369566°	
	C	26.627593°	88.370109°	
	D	26.627625°	88.371800°	
	E	26.628800°	88.371778°	
	F	26.628744°	88.372421°	
	G	26.629341°	88.371468°	
H	26.629057°	88.369785°		
Topsheet No.	78B/6			
Production Capacity	<b>Name</b>	<b>Config.</b>	<b>Production Capacity</b>	
	Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA	
	Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA	
	Continuous Casting Machine (CCM)	1X2 Strand		
Estimated project cost	21 Crores			
Man Power	Existing – 135 Proposed - 165			
Elevation	Highest – 105 MSL; Lowest – 103 MSL.			
Land use	Industrial Land			
Nearest Habitation/ Town	Siliguri Aerial Distance – 10.43 Km, NE Road Distance – 19.8 Kms			
Nearest Airport	Bagdogra International Airport Aerial Distance – 7.16 kms WSW Road Distance – 18.6 km			
Nearest Highway	<b>S. No.</b>	<b>Particulars</b>	<b>Distance (Km)</b>	<b>Direction</b>
			<b>(From Project Boundary)</b>	
	1.	NH 31	6.05	W
	2.	NH31 D	0.58	W
	3.	AH 2	8.62	N
	4	Fulbari Ghoshpukur Bypass	0.59	W
5	Rishi Road	0.62	E	

Nearest Railway Station from project boundary	<b>S. No.</b>	<b>Name</b>	<b>Distance, Direction (From Project Boundary)</b>	
	1.	Nijbari Railway Station	3.41 Km, SW	
	2.	Bagdogra Railway Station	8.9 kms NW	
Power supply	<b>Phase</b>	<b>Demand (kVA)</b>	<b>Source</b>	
	Operational	For proposed project up to 10000 kVA power will be required. Back-up Power: DG Set 1x45 kVA (existing) 1x320 kVA	WBSEDCL	
Nearest Dispensary, Govt. Hospital and Educational Facility	<b>Category</b>	<b>Name</b>	<b>Distance (Kms)</b>	<b>Direction</b>
	Hospital	Phansidewa Block Primary Health Centre	4.28	S
		Navjeevan Hospital & Rural Health Centre	5.8	SW
		Maharaja Angesan Hospital	5.56	NE
		Desun Hospital Siliguri	6.92	NNE
		North Bengal Medical College	7.12	NNE
	School	Kinajote Promary School	0.72	N
		Gyan Bikash Academy	0.73	ESE
		Nazrul Satabarshiki Vidyalaya High School	1.03	SE
	College	Ghoshpukur College	1.47	SE
		Vidyasagar College of Education	2.01	SE
Narayana Junior College		5.56	NE	
Water demand and supply	<b>Category</b>	<b>Requirement (KLD)</b>		
	<b>Total Water</b>	128		
	<b>Fresh Water</b>	47		
	<b>Recycled Water</b>	81		
Water demand will be met from Ground Water.				
Nearest tourist places	Darjeeling -47 Kms N			
Defence installations	None within the study area.			
Archaeological Features	None within the study area.			
Ecological Sensitive Zones	Mahananda Wildlife Sanctuary (ESZ Boundary) -11.82 Kms towards N			
Nearest Forests	Baikunthapur Forest-19 Kms towards NE			

Nearest streams/ rivers/ water bodies (from project boundary)	<b>S. No.</b>	<b>Particulars</b>	<b>Distance (Km)</b>	<b>Direction</b>	
				<b>(From Project Boundary)</b>	
	<b>Water Bodies</b>				
	1.	Mahananda river	2.68	E	
	2.	Tista sub canal	2.55	E	
	3.	Tista Canal	0.6	W	
Seismic zone	As per the 2002 Bureau of Indian Standards (BIS) seismic zone map of India, categorized as “High” Zone-IV.				
Nearby Industries	<b>Name of Industry</b>		<b>Distance From Project</b>	<b>Direction</b>	
	Numaligarh Refinery Limited		3.8	N	
	L&T GSRP		1.73	NE	
	Eva Exotica Pvt. Ltd.		2.37	NE	
	Foothills Tea Factory		0.55	N	
	Ply Factory		0.72	NE	
	Maa Durga Tea Factory		0.89	N	
	Linde India Ltd.		2.2	NE	
	Mahananda Food Pvt. Ltd.		2.31	NE	
Harvet Tea Company Factory		1.64	SE		

## 2.0 Project Description

Considering the future growth potential of steel market and domestic and international level, M/s Purbanchal Concast Pvt. Ltd. has proposed to install 3X15T Induction Furnaces with CCM and 1x25 TPH Rolling Mill with hot charging facility for production of MS Billets / Ingots (200000 TPA) in their existing plant area of 10.31 acres (41735.88 sq.m).

The details of production capacity of the project are listed in **Table E-2**.

**Table E.2: Details of Production Capacity**

Name	Config.	Production Capacity
Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA
Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA
Continuous Casting Machine (CCM)	1X2 Strand	

## 2.1 Land Requirement

The total land available under the ownership of M/s. Purbanchal Concast Pvt. Ltd. is 41735.88 Sq.M. The proposed project activities will be carried out within the existing industrial premises itself. The details of land-use breakup of the existing plant and after the proposed project are given in **Table-E-3**.

**Table E.3: Details of Land use Break-Up**

Land Use	Area (SQM)	Percentage (%)
Shed Area	15410.11	35.37
Induction Furnace Area	2538.00	6.08
Parking Area	759.18	2.10
Service Area	5171.84	12.38
<b>Greenbelt Area</b>	<b>13940.95</b>	<b>33.76</b>
Road & Paved Area	2595.28	6.82
Vacant Area	1320.52	3.49
<b>Total Land Area</b>	<b>41735.88</b>	<b>100.00</b>

## 2.2 Raw Material Requirement

The details of requirement of raw materials, sources and their mode of transport are given in **Table E.4**.

**Table E.4: Details of Raw Material for Ms Ingots/Billets (TPA)**

S. N.	Raw Material	Quantity Required Per Annum (TPA)	Source	Distance from site (Kms)	Mode of Transport
<b>For Rolling Mill Products</b>					
1	MS Billets/ Ingot	203050 (Captive Production 200000 & Outsourced 3050)	--	--	Truck
<b>For Billets</b>					
2	Sponge Iron	175000	Durgapur, Jharsuguda and other local sources	~ 500 to 900 Kms	Truck
3	MS Scrap	45000			
4	Ferro alloy	2350			
5	Pig Iron	1250			

## 2.3 Power and Fuel Requirement

Around 10000 kVA electricity from WBSEDCL will be required for this project. The electricity agreement copy is attached as **Annexure V**.

### Back-up power:

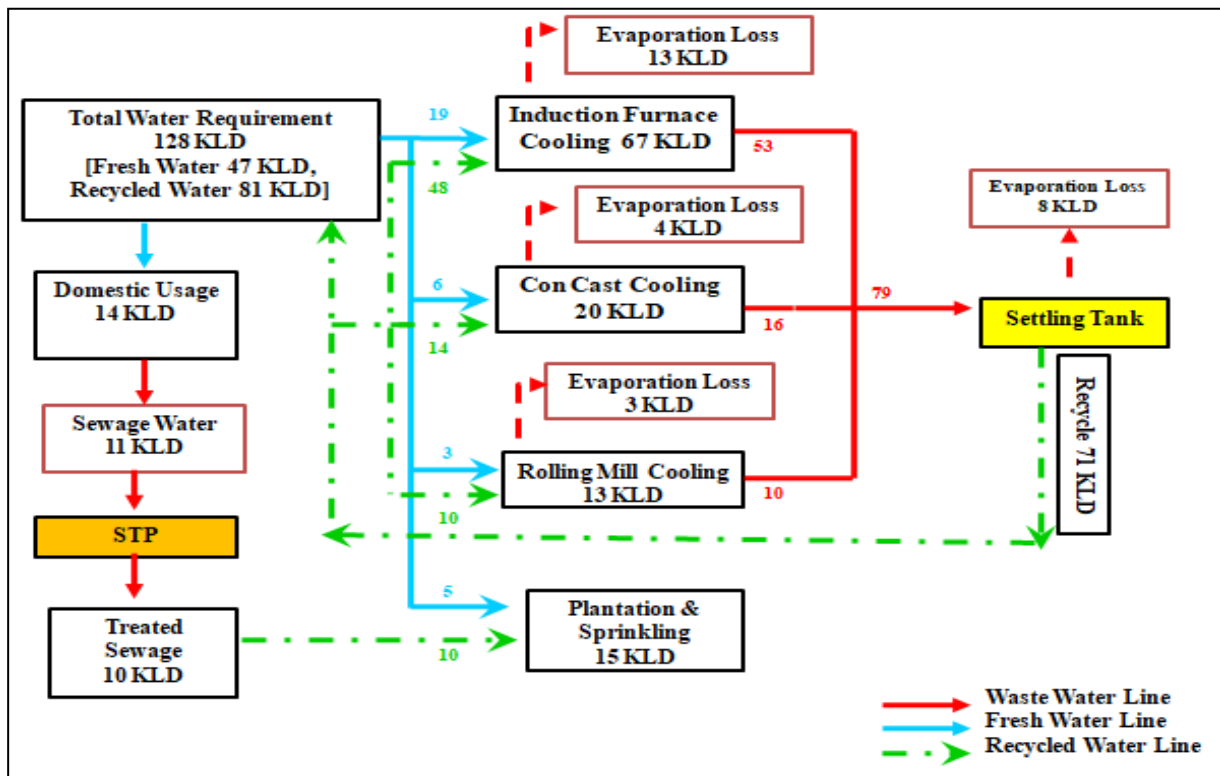
1x320 kVA DG set is proposed to be installed as backup power and another 1x45 kVA DG set is already present in the existing unit, which will be used only in the emergency situation during power failure.

**Table E.6 Details of Fuel Requirement**

Fuel	Machinery	Requirement
HSD	DG Set	80 Lit/Hr

### 2.3 Water Requirement

The total water requirement will be around 128 KL per day, out of which 14 KL will be used for domestic purpose from where around 11 KL sewage water will be generated which will be treated in MBBR technology based STP of 20 KL capacity. For industrial cooling purpose, around 100 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 47 KLD. The source of water is Ground water. The water balance of the project is given in **Figure E-3**.



**Figure E-3: Water balance diagram**

### 2.4 Manpower Requirement

PCPL will generate employment of around 165 full time employees for the proposed project. In the existing plant 135 persons are working now. After this project the total manpower will be 300. The local population will be given preference for employment as per their qualifications; this will improve their living standards and livelihood.

**Table E.7: Details of Manpower**

<b>Employee Category</b>	<b>Existing Employees</b>	<b>Proposed Employment</b>	<b>Total No. of Employees</b>
Factory Employee	55	65	120
Contract Labour	80	100	180
<b>Total Worker</b>	<b>135</b>	<b>165</b>	<b>300</b>

## 2.5 Manufacturing Process Description

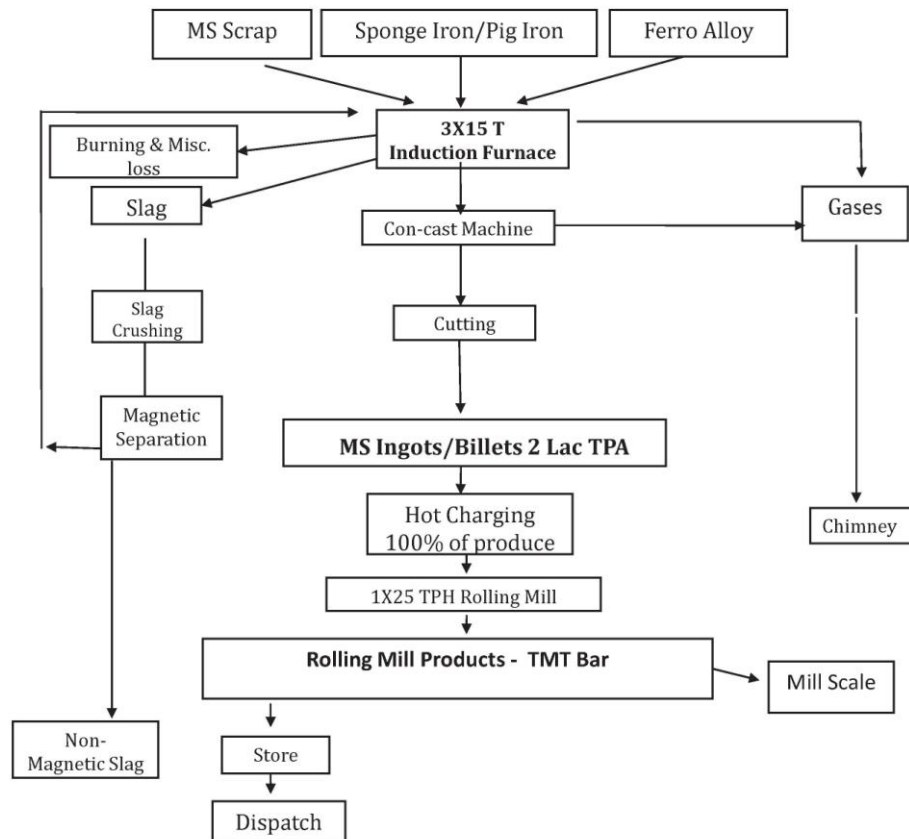
MS Scrap & Sponge Iron form the major raw materials for steel making in the induction furnace. Selected scrap of consistent quality is to be used.

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.

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.

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

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 90 rural and urban inhabitations falls within the study area.

Project site is near to Siliguri city area. Siliguri is a major city in West Bengal that forms "Twin Cities" with the neighboring district capital of Jalpaiguri. The city spans areas of the Darjeeling and Jalpaiguri districts in the Indian state of West Bengal. Known as the "Gateway of Northeast India", Siliguri is popular for three tea, timber and tourism. It is located on the banks of the Mahananda River and the Teesta River at the foothills of the Himalayas. Siliguri is the second largest urban agglomeration in West Bengal, after Kolkata.

#### 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.7**.

**Table E.7: Meteorological Data Recorded at study area**

Period	Wind Speed (m/s)		Temp (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Max	Min	
<b>January 2021</b>	3.7	0.2	27	10	64	37	0
<b>February 2021</b>	6.7	0.0	34.3	10	53	14	0
<b>March 2021</b>	7.8	0.0	40.9	15.3	68	4	0

### 3.2 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<sub>x</sub> and SO<sub>x</sub> 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<sub>2</sub>.
- 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
- 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.

### **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 conserve 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 tipples and truck tippers; 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 existing 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 remain the same.

### Impact on Water Quality & Management

The total water requirement will be around 128 KL per day, out of which 14 KL will be used for domestic purpose from where around 11 KL sewage water will be generated which will be treated in MBBR technology based STP of 20 KL capacity. For industrial cooling purpose, around 100 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 47 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.8**.

**Table E.8: Details of Solid Waste Generation & its management**

Industrial Waste		
Type of Waste	Quantity	Treatment/Disposal
Slag	1726 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	850TPM	Sold to contractor for sinter plant / Reused in the plant
Ash	15 TPM	Land Filling/Will be given to the cement manufacturers
STP Sludge	0.5 Kg/Day	Will be used as manure for gardening
Sludge from Settling tank	6.81 Kg/Day	WBPCB authorized/approved site
Dust from APC System	194 TPM	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

Sludge from Scrubber	0.25TPM	Sludge from scrubber is being used for land filling at Project Site
<b>Municipal Solid Waste (MSW)</b>		
<b>Type of Waste</b>	<b>Quantity (Kg/Day)</b>	<b>Treatment/ Disposal</b>
Wet Garbage	23	To be disposed off as per MSW Rules
Dry Garbage	53	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, DG sets, 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. 21 Crores. An initial budget of Rs.210 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 E.9: Expenditure Proposed for Environmental Protection Activities**

No.	Particulars	Capital Cost in INR (Lakhs)	Recurring Cost in INR (Lakh/Year)
1	Air Pollution Control System	90	20
2	Noise Control System	25	5
3	Green Belt Development	20	5
4	Environment Monitoring and Management	20	15
5	Water Pollution Control System	45	10
6	Occupational Health & Safety	10	25
<b>Total</b>		<b>210</b>	<b>80</b>

## 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 Maharashtra 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 Purbanchal Concast 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**

Purbanchal Concast 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 21 Crores. The project Proponent will allot 1% of the project cost i.e. around 21 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

**Purbanchal Concast Private Limited (PCPL)** was established in 2011 to manufacture mild steel pipes, hollow sections, profiles, guides and structures to meet the ever-increasing requirements of the infrastructure and engineering industries. The objective was to build an integrated facility from Blooms/billets to the finished products.

PCPL is strategically located off the Asian Highway near Siliguri at Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434 having an easy access for to and fro movements. Currently the existing production facility is spread over an area of 41735.88 Sq.M.

The existing project has received Consent to Establish vide letter no. N427/WPB/SRO/NOC/Dar/P-140-2011 dated 09-12-2011. The unit has obtained CTE and CTO from WBSPCB which is a statutory authority. Consent to Operate for the existing unit was accorded by West Bengal State pollution Control Board vide letter no. C248/WPB/SRO/Dar/P.139.2015 dated 13-10-2017. The validity of CTO is up to 31/12/2022.

According to the order of MoEF&CC vide F.No. IA-J-11013/8/2019-IA-II(I) dated 22<sup>nd</sup> October 2020, Project Proponents have decided to obtain Environmental Clearance for the existing Rolling mill and along with that they are also applying for obtaining Environmental Clearance for installation of Induction furnace and other changes.

PCPL had applied for expansion of existing rolling mill and installation of induction furnace which was considered in the 40<sup>th</sup> REAC meeting for Industry-1 dated 15.07.2021, wherein after detailed deliberation, the Committee recommended that MoEF&CC may take an appropriate view regarding processing this request as it has been received after the deadline due to Covid-19 pandemic situation.

In this circumstances, as the proponent is facing tremendous financial loss, they have requested to grant TOR only for the production of 200000 TPA MS Billets / Ingots by installing 3X15T Induction Furnaces with CCM and a 1x25 TPH Rolling Mill with hot charging facility for production of Rolling Mill products within their existing premises. This proposal has been considered in the 2<sup>nd</sup> EAC meeting of Industry -1 sector held on 22.03.2022 and TOR has been granted on 11<sup>th</sup> April, 2022. The TOR letter is attached as **Annexure-I**.

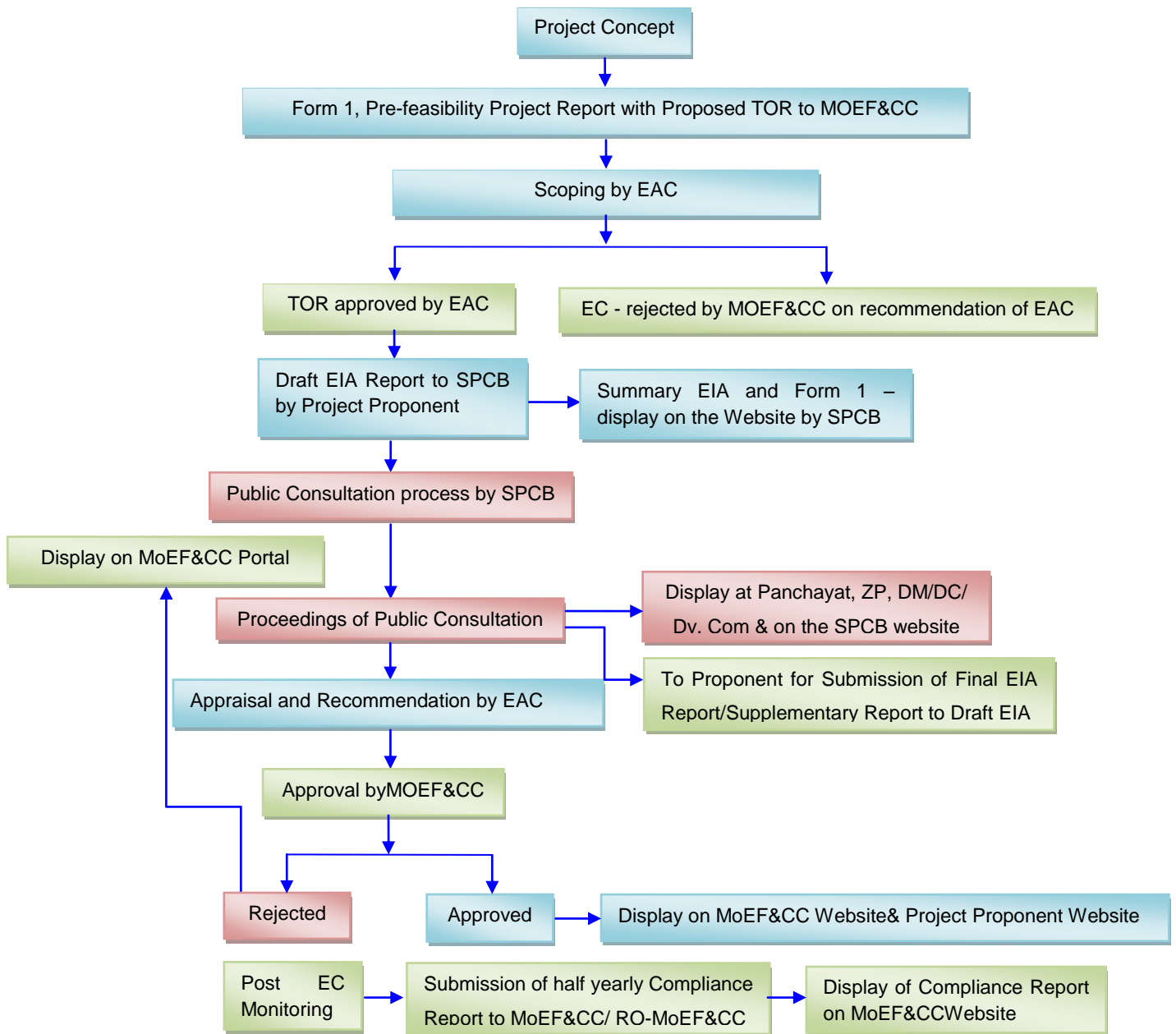
The proposed project will be coming up within its existing plant area 10.31 Acres. The existing Reheating Furnace, Rolling Mill & Tube Mills will remain unutilized. Only the proposed Furnaces & Rolling Mill along with the service utilities will be in operation. The expected capital investment for the proposed project will be around Rs. 21 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 MOEFCC.

## 1.2 Purpose of the Report

The proposed project activity is listed at schedule no. 3(a). under Category “A” of the schedule of the EIA Notification, 2006 as attracts general condition because of the India-Bangladesh International boundary is at a distance of 2.55 Kms (SE) from the project site and appraised at Central Level.

M/s Purbanchal Concast 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 the MoEF&CC, GoI, New Delhi. 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 growing demand of steel market at domestic and international level, M/s Purbanchal Concast Pvt. Ltd. has proposed to install 3X15T Induction Furnaces with CCM and 1x25 TPH Rolling Mill with Hot Charging for production of 200000 TPA MS Billets / Ingots and 200000 TPA Rolling Mill Products respectively.

The proposed project will be coming up within its existing plant area 10.31 Acres. The expected capital investment for the proposed project will be around Rs. 21 Crores.

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

The proposed project activity is listed at schedule no. 3(a). under Category “A” of the schedule of the EIA Notification, 2006 as attracts general condition because of the India-Bangladesh International boundary is at a distance of 2.55 Kms(SE) from the project site and appraised at Central Level

### **About Project Proponent**

M/s Purbanchal Concast Pvt. Ltd. having its registered address at 41, Chowringee Road, Ground floor , Kanak Building, Kolkata. 700071 is a private company engaged with steel trading, manufacturing and transportation business. Name of the director of the company is Nitesh Sarawagi

**Purbanchal Concast Private Limited (PCPL)** was established in 2011 to manufacture mild steel pipes, hollow sections, profiles, guides and structures to meet the ever-increasing requirements of the infrastructure and engineering industries. The objective was to build an integrated facility from Blooms/billets to the finished products.

PCPL is strategically located off the Asian Highway near Siliguri at Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434 having an easy access for to and fro movements. Currently the existing production facility is spread over an area of 41735.88 Sq.M.

### **1.4 Brief Description of the project**

Considering the growing demand of steel market at domestic and international level, M/s Purbanchal Concast Pvt. Ltd. has proposed to install 3X15T Induction Furnaces with CCM and 1x25 TPH Rolling Mill with Hot Charging for production of 200000 TPA MS Billets / Ingots and 200000 TPA Rolling Mill Products respectively in their existing plant area of 10.31 acres (41735.88 sq.m). The proposed project details are given in **Table 1.1**.

**Table 1.1 Detail of Proposed Facilities**

Name	Config.	Production Capacity
Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA
Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA
Continuous Casting Machine (CCM)	1X2 Strand	

### **1.5. Location of the Project:**

The proposed project will be done within the existing steel plant of M/s. Purbanchal Concast Private Limited is located at at Kashiram Jote, Phulbari Ghoshpukur Bypass, Siliguri, District - Darjeeling West Bengal - 734434

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.

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

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

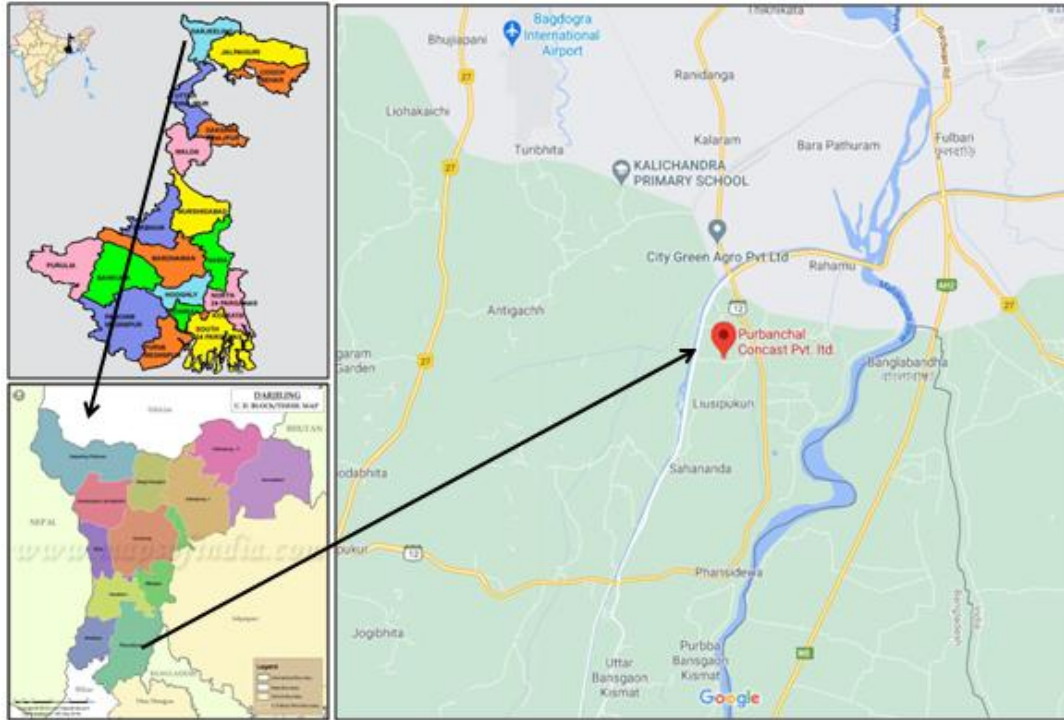
Particulars	Details			
Geographical Coordinates	<b>Point</b>	<b>Latitude</b>	<b>Longitude</b>	
	A	26.628835°	88.369272°	
	B	26.627442°	88.369566°	
	C	26.627593°	88.370109°	
	D	26.627625°	88.371800°	
	E	26.628800°	88.371778°	
	F	26.628744°	88.372421°	
	G	26.629341°	88.371468°	
H	26.629057°	88.369785°		
Topsheet No.	78B/6			
Production Capacity	<b>Name</b>	<b>Config.</b>	<b>Production Capacity</b>	
	Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA	
	Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA	
	Continuous Casting Machine (CCM)	1X2 Strand		
Estimated project cost	21 Crores			
Man Power	Existing – 135 Proposed - 165			
Elevation	Highest – 105 MSL; Lowest – 103 MSL.			
Land use	Industrial Land			
Nearest Habitation/ Town	Siliguri Aerial Distance – 10.43 Km, NE Road Distance –19.8 Kms			
Nearest Airport	Bagdogra International Airport Aerial Distance – 7.16 kms WSW Road Distance – 18.6 km			
Nearest Highway	<b>S. No.</b>	<b>Particulars</b>	<b>Distance (Km)</b>	<b>Direction</b>
			<b>(From Project Boundary)</b>	
	1.	NH 31	6.05	W
	2.	NH31 D	0.58	W
	3.	AH 2	8.62	N
	4	Fulbari Ghoshpukur Bypass	0.59	W
5	Rishi Road	0.62	E	

Nearest Railway Station from project boundary	<b>S. No.</b>	<b>Name</b>	<b>Distance, Direction (From Project Boundary)</b>	
	1.	Nijbari Railway Station	3.41 Km, SW	
	2.	Bagdogra Railway Station	8.9 kms NW	
Power supply	<b>Phase</b>	<b>Demand (kVA)</b>	<b>Source</b>	
	Operational	For proposed project up to 10000 kVA power will be required. Back-up Power: DG Set 1x320 kVA & 1x45 kVA (existing)	WBSEDCL	
Nearest Dispensary, Govt. Hospital and Educational Facility	<b>Category</b>	<b>Name</b>	<b>Distance (Kms)</b>	<b>Direction</b>
	Hospital	Phansidewa Block Primary Health Centre	4.28	S
		Navjeevan Hospital & Rural Health Centre	5.8	SW
		Maharaja Angesan Hospital	5.56	NE
		Desun Hospital Siliguri	6.92	NNE
		North Bengal Medical College	7.12	NNE
	School	Kinajote Promary School	0.72	N
		Gyan Bikash Academy	0.73	ESE
		Nazrul Satabarshiki Vidyalaya High School	1.03	SE
	College	Ghoshpukur College	1.47	SE
		Vidyasagar College of Education	2.01	SE
Narayana Junior College		5.56	NE	
Water demand and supply	<b>Category</b>	<b>Requirement (KLD)</b>		
	<b>Total Water</b>	111		
	<b>Fresh Water</b>	45		
	<b>Recycled Water</b>	66		
Water demand will be met from Ground Water.				
Nearest tourist places	Darjeeling - 47 Kms N			
Defence installations	None within the study area.			
Archaeological Features	None within the study area.			
Ecological Sensitive Zones	Mahananda Wildlife Sanctuary (ESZ Boundary) -11.82 Kms towards N			
Nearest Forests	Baikunthapur Forest-19 Kms towards NE			

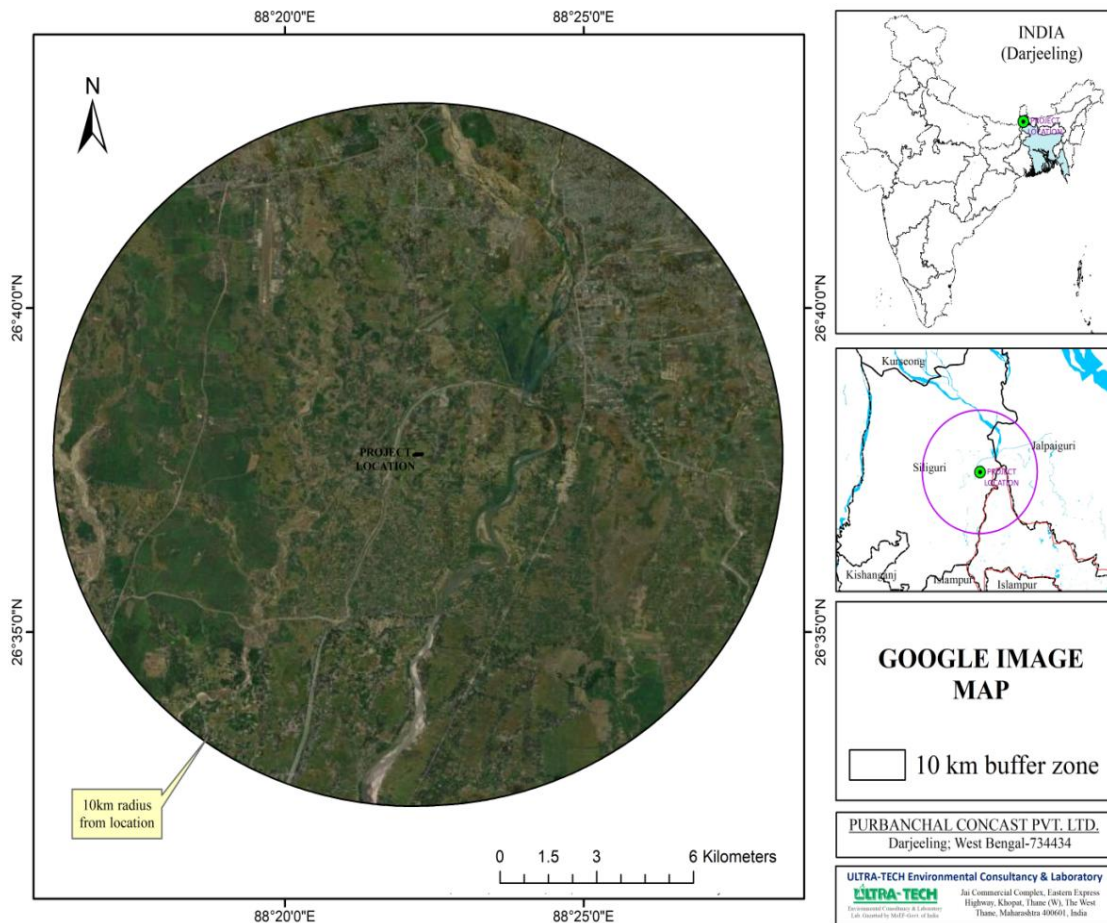
Nearest streams/ rivers/ water bodies (from project boundary)	<b>S. No.</b>	<b>Particulars</b>	<b>Distance (Km)</b>	<b>Direction</b>
				<b>(From Project Boundary)</b>
	<b>Water Bodies</b>			
	1.	Mahananda river	2.68	E
	2.	Tista sub canal	2.55	E
	3.	Tista Canal	0.6	W
Seismic zone	As per the 2002 Bureau of Indian Standards (BIS) seismic zone map of India, categorized as “High” Zone-IV.			
Nearby Industries	<b>Name of Industry</b>		<b>Distance From Project</b>	<b>Direction</b>
	Numaligarh Refinery Limited		3.8	N
	L&T GSRP		1.73	NE
	Eva Exotica Pvt. Ltd.		2.37	NE
	Foothills Tea Factory		0.55	N
	Ply Factory		0.72	NE
	Maa Durga Tea Factory		0.89	N
	Linde India Ltd.		2.2	NE
	Mahananda Food Pvt. Ltd.		2.31	NE
Harvet Tea Company Factory		1.64	SE	

## 1.6 Capital investment

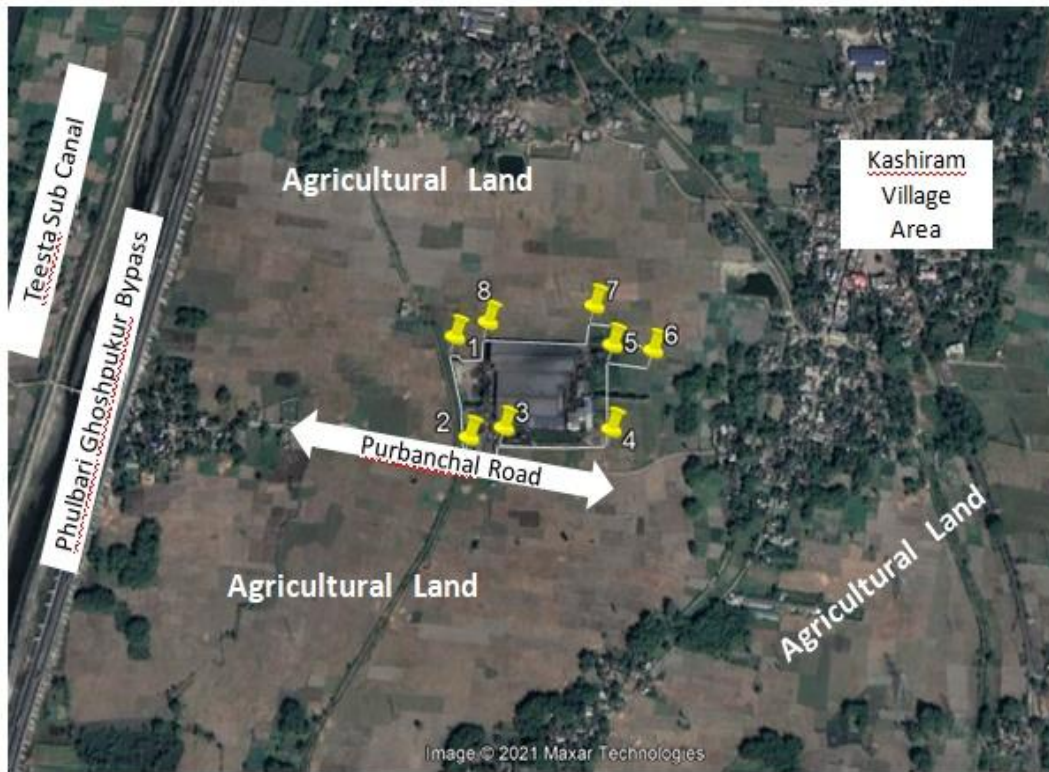
The cost for the proposed project will be around 21 Crores.



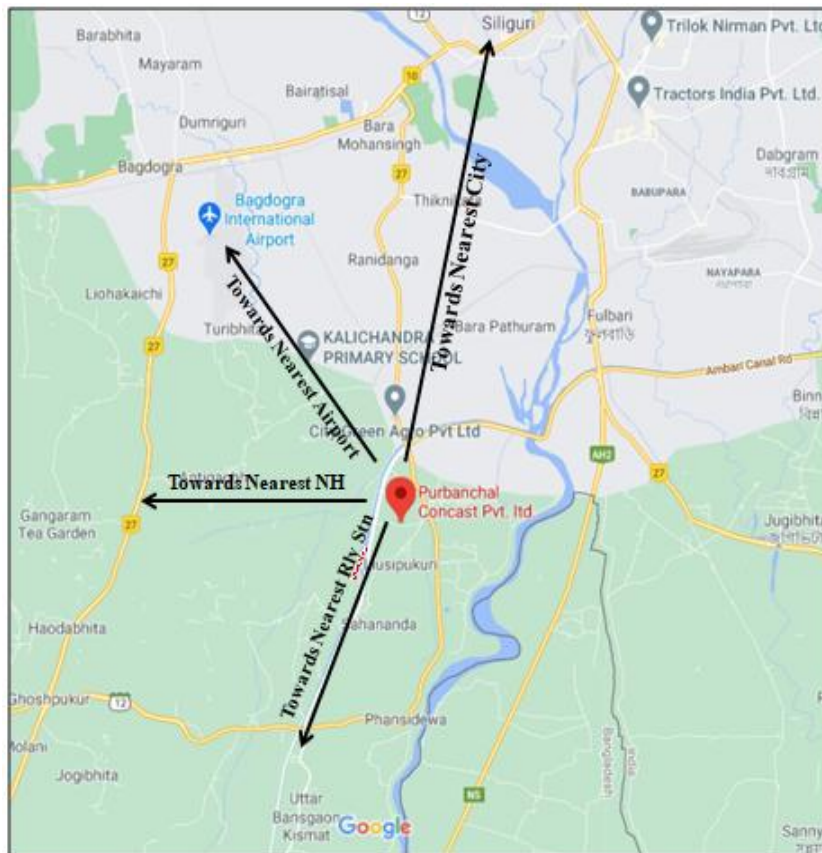
**Figure 1.2: Location Map**



**Figure 1.3: Google Earth Image of 10 KM Study Area**



**Figure 1.4: Google map of the 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

### National

The need for the expansion 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. As per the report of the Working Group on Steel for the 12th Five Year Plan, there exist many factors which carry the potential of raising the per capita steel consumption in the country. These include among others, an estimated infrastructure investment of nearly a trillion dollars, a projected growth of manufacturing from current 8% to 11-12%, increase in urban population to 600 million by 2030 from the current level of 400 million, emergence of the rural market for steel currently consuming around 10 kg per annum buoyed by projects like Bharat Nirman, Pradhan Mantri Gram Sadak Yojana, Rajiv Gandhi Awaas Yojana among others. At the time of its release, the National Steel Policy 2005 had envisaged steel production to reach 110 million tonnes (mt) by 2019-20. However, based on the assessment of the current ongoing projects, both in Greenfield and Brownfield, the Working Group on Steel for the 12<sup>th</sup> Five Year Plan has projected that domestic crude steel capacity in the county is likely to be 140 MT by 2016-17 and has the potential to reach 149 mt if all requirements are adequately met.

*Source: <http://steel.gov.in/overview.htm>. Ministry of Steel, Government of India.*

### 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 **1<sup>st</sup> January 2021 to 31<sup>st</sup> March 2021** and used to identify potential significant impacts. The report is prepared as per the Standard TOR.

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

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 assess 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 the 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**

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

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
<b>TOR Conditions</b>		
<b>A. Standard Terms of Reference</b>		
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. Purbanchal Concast Private Limited Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal PIN – 734434
	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: 21 Crore Time of Completion: - within 24 months after obtaining all the regulatory clearances.
	ii. Product with capacities for the proposed	

SN	Description		Compliance in the Draft EIA Report		
<b>TOR Conditions</b>					
	projects				
	<b>Name</b>	<b>Config.</b>	<b>Production Capacity</b>		
	Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA		
	Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA		
	Continuous Casting Machine (CCM)	1X2 Strand			
iii.	If expansion project, details of existing products with capacities and weather adequate land is available for expansion, reference of earlier EC if any		Not Applicable.		
iv.	List of raw materials required and their source along with the mode of transportation				
<b>S. N.</b>	<b>Raw Material</b>	<b>Quantity Required Per Annum (TPA)</b>	<b>Source</b>	<b>Distance from site (Kms)</b>	<b>Mode of Transport</b>
<b>For Rolling Mill Products</b>					
1	MS Billets/ Ingot	203050 (Captive Production 200000 & Outsourced 3050)	--	--	Truck
<b>For Billets</b>					
2	Sponge Iron	175000	Durgapur, Jharsuguda and other local sources	~ 500 to 900 Kms	Truck
3	MS Scrap	45000			
4	Ferro alloy	2350			
5	Pig Iron	1250			
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 (71 KLD) will be recycled. Domestic waste water (11 KLD) will be generated and will be treated in MBBR technology based	

SN	Description	Compliance in the Draft EIA Report		
<b>TOR Conditions</b>				
			STP of 20 KL.	
		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)	<b>Particulars</b>	<b>Demand</b>	<b>Source</b>
		Water	Total: 47 KLD Fresh: 128 KLD	Ground Water
		Power	10000 kVA	WBSEDC L
		Man Power	Existing: 135 Proposed: 165	Local
viii	The project proponent shall furnish the requisite documents from the competent authority in support of drawl of ground water and surface water and supply of electricity.	Electricity Agreement & Ground Water permission are given in <b>Annexure V &amp; VI</b> respectively.		
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	Copy of existing CTE & CTO is attached as <b>Annexure II &amp; III</b> respectively.		

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
	<p>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</p> <p>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 / 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.</p>	
4	<b>Site Details</b>	
	<p>i. Location of the project site covering village, Taluka/ Tehsil, District and state, Justification for selecting the site, wheather other sites are considered.</p>	<p><b>Location:</b> J.L. No.: 83 Plot No. &amp; Dag No.: 1007 to 1015, 1022, 1104 Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal No other sites were considered as the land required for the proposed project is already under possession of M/s Purbanchal Concast Pvt. Ltd. Details of proposed alternative sites are given in Chapter -5 of the EIA/EMP report</p>
	<p>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</p>	<p>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 &amp; 2 of EIA/EMP report.</p>

SN	Description	Compliance in the Draft EIA Report			
<b>TOR Conditions</b>					
	environmentally sensitive places)				
iii	Co-ordinates (lat-long) of all four corners of the site	Point	Latitude	Longitude	
		A	26.628835°	88.369272°	
		B	26.627442°	88.369566°	
		C	26.627593°	88.370109°	
		D	26.627625°	88.371800°	
		E	26.628800°	88.371778°	
		F	26.628744°	88.372421°	
		G	26.629341°	88.371468°	
		H	26.629057°	88.369785°	
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 EIA/EMP report.			
v.	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.	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			
vi.	Photographs of the proposed and existing (if applicable) plant site. If existing, shows photographs of plantation / greenbelt, in particular.	Photographs of the proposed plant sites are shown in Plate 2.4 of Chapter - 2 of EIA/EMP report			
vii.	Land use break up of total land of the project site (identified and acquired), government / private – agricultural, forest, wasteland, water bodies, settlements, etc				
		<b>Land Use</b>	<b>Area (SQM)</b>	<b>Percentage (%)</b>	
		Shed Area	15410.11	35.37	
		Induction Furnace Area	2538.00	6.08	
		Parking Area	759.18	2.10	
		Service Area	5171.84	12.38	
		<b>Greenbelt Area</b>	<b>13940.95</b>	<b>33.76</b>	
		Road & Paved Area	2595.28	6.82	
		Vacant Area	1320.52	3.49	
		<b>Total Land Area</b>	<b>41735.88</b>	<b>100.00</b>	
viii	A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of	<b>Name of Industry</b>	<b>Distance From Project</b>	<b>Direction</b>	
		Numaligarh	3.8	N	

SN	Description	Compliance in the Draft EIA Report																											
<b>TOR Conditions</b>																													
	the study area.	<table border="1"> <tr> <td>Refinery Limited</td> <td></td> <td></td> </tr> <tr> <td>L&amp;T GSRP</td> <td>1.73</td> <td>NE</td> </tr> <tr> <td>Eva Exotica Pvt. Ltd.</td> <td>2.37</td> <td>NE</td> </tr> <tr> <td>Foothills Tea Factory</td> <td>0.55</td> <td>N</td> </tr> <tr> <td>Ply Factory</td> <td>0.72</td> <td>NE</td> </tr> <tr> <td>Maa Durga Tea Factory</td> <td>0.89</td> <td>N</td> </tr> <tr> <td>Linde India Ltd.</td> <td>2.2</td> <td>NE</td> </tr> <tr> <td>Mahananda Food Pvt. Ltd.</td> <td>2.31</td> <td>NE</td> </tr> <tr> <td>Harvet Tea Company Factory</td> <td>1.64</td> <td>SE</td> </tr> </table>	Refinery Limited			L&T GSRP	1.73	NE	Eva Exotica Pvt. Ltd.	2.37	NE	Foothills Tea Factory	0.55	N	Ply Factory	0.72	NE	Maa Durga Tea Factory	0.89	N	Linde India Ltd.	2.2	NE	Mahananda Food Pvt. Ltd.	2.31	NE	Harvet Tea Company Factory	1.64	SE
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Linde India Ltd.	2.2	NE																											
Mahananda Food Pvt. Ltd.	2.31	NE																											
Harvet Tea Company Factory	1.64	SE																											
ix.	Geological features and geo-hydrological status of the study area shall be included	Geological features and Geo-hydrological status of the study area is given in chapter -3 of EIA/EMP report																											
x.	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)	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.																											
xi.	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	The proposed 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																											
xii.	R & R details in respect of land in line with state government policy.	Not Applicable																											
5	Forest and Wildlife related issues (if applicable):																												
i.	Permission approval for the use of forest land (forestry clearance), if any, and recommendations of the state Forest Department.(if applicable).	No forest land is involved in the proposed project site; thus no such permission/approval is required.																											
ii.	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than	No forest land is involved in the proposed project. Land use map based on High Resolution Satellite Imagery (GPS) of the proposed																											

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
	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 I 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 I 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 data 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°C 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 to March 2021) has been given in table 3.5 of section 3.4 of chapter -3

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
ii.	AAQ data (except monsoon ) at 8 location for PM <sub>10</sub> , PM <sub>25</sub> , SO <sub>2</sub> , NO <sub>x</sub> , 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 .	<ul style="list-style-type: none"> <li>➤ One – season data (January 2021 to March 2021) has been generated &amp; collected.</li> <li>➤ AAQ data includes PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO and other parameters relevant to the project were generated.</li> <li>➤ The monitoring stations were selected taking into account the dominant wind direction, population zone and sensitive receptors etc.</li> </ul> <p>The monitoring station selected is as described in Table 3.7 of chapter-3 of EIA/EMP report.</p>
iii.	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAAQM 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 <b>Annexure – VII</b>
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 <b>Annexure – VII</b>
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 EIA/ EMP report. The same has been enclosed as <b>Annexure – VII.</b>
vii.	Noise levels monitoring at 8 locations	Noise level monitoring was carried out at 8

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
	within the study area.	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 <b>Annexure – VII.</b>
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 <b>Annexure – VII</b>
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 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	The main source of emission will be the proposed stacks attached to the Induction Furnace and DG set. The stack heights will be given as the CPCB norms.

SN	Description	Compliance in the Draft EIA Report
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	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 treated in STP and reused for Plantation.
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 128 KLD (fresh water requirement 47 KLD and recycled water 81 KLD) and waste water generation will be 90 KLD (79 KLD industrial and 11 KLD domestic). Domestic waste water will be STP and reused for plantation and 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 action plan for control of emissions to meet standards.	The stack emission detail along with action 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

SN	Description		Compliance in the Draft EIA Report	
<b>TOR Conditions</b>				
			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 33.76% 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 activities at the project site to conserve fresh water and reduce the water requirement from other sources.	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 4.7, of the Chapter 4 of EIA/EMP Report.	
	xi.	Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.		
	<b>No.</b>	<b>Particulars</b>	<b>Capital Cost in INR</b>	<b>Recurring Cost in INR</b>

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
		<b>(Lakhs)</b>
		<b>(Lakh/Year)</b>
1	Air Pollution Control System	90
2	Noise Control System	25
3	Green Belt Development	20
4	Environment Monitoring and Management	20
5	Water Pollution Control System	45
6	Occupational Health & Safety	10
<b>Total</b>		<b>210</b>
		<b>80</b>
xii.	Action plan for post – project environmental monitoring shall be submitted.	Action Plan for Post –Project Environmental monitoring has been given in Chapter-6 of EIA/ EMP report.
xiii.	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 .	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.
8	Occupational health	
i.	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 .	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:- <ul style="list-style-type: none"> <li>All employees will be trained, educated and encouraged to follow best and safe work practices.</li> </ul>
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	<ul style="list-style-type: none"> <li>Personnel Protective Equipments like face mask, earmuffs, ear plugs, gloves, safety goggles and safety boots are being provided.</li> <li>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.</li> </ul>

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
	age ,sex, duration of exposure and department Wise .	
	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? If so, it may be detailed in the EIA report.	Addressed in Chapter 10 of the EIA/EMP 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 .	
	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 conditions? Details of this system may be given.	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.
	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

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
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. The ToR valid till 11/04/2026. The EIA-EMP report along with Public Hearing proceedings will be submitted within that time.
<b>The following general points shall be noted:</b>		
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 of all material in Regional languages shall be provided.	Complied
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	Complied

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
	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.	
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 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	Complied
<b>B. Additional Terms of Reference</b>		
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.

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
3	Details on installation of Continuous Emission Monitoring System with recording with proper calibration system	Will be complied
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.
<b>Specific TOR</b>		
i.	Project proponent shall prepare layout plan showing all internal roads minimum 6m width and 9m turning radius with proper looping for smooth traffic flow, including fire tender as per NBC. Road network shall connect all service areas in layout. This drawing shall include area statement showing plot area, area under roads, parking, green belt with calculations and % with respect to plot area of project site and proper indexing.	Complied. The modified Layout Plan is given in Figure 2.1 of Chapter 2 of the EIA-EMP Report.

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
ii.	Project proponent shall provide plan for Greening and Paving in the plant area to arrest soil erosion and dust pollution from exposed soil surface.	Greenbelt will be developed for arresting soil erosion and paving of plant area will be done to control dust from exposed soil surface. The details of the area utilized for greenbelt & paving is given in Table 2.2 of chapter 2 of the EIA/EMP Report.
iii.	Project proponent shall submit contour map of project site along with drainage disposal system with calculations and drawings supported with proper indexing including rain water harvesting details with calculations mentioning about GW recharge along with relevant drawing.	The contour map of the project site is given in section 3.2.3 of chapter 3 of the EIA/EMP Report. The drainage disposal system is given in the Layout map.
iv.	Project proponent shall submit a study report on Decarbonisation program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments should be measurable and monitorable with defined time frames.	Will be complied.
v.	As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration. In this regard, time bound action plan as per the MoEF&CC Office Memorandum dated 30/09/2020 shall be submitted.	As part of Corporate Environment Responsibility, various activities to be done in the nearby villages. Details of CER activities is given in section 10.4 of chapter 10 of the EIA/EMP Report.
vi.	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.
vii.	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.
viii.	Action plan for developing connecting and	Will be complied.

SN	Description	Compliance in the Draft EIA Report
<b>TOR Conditions</b>		
	internal road in terms of MSA as per IRC guidelines shall be submitted.	
ix.	Action plan to limit the dust emission from all the stacks below 30 mg/Nm <sup>3</sup> shall be furnished.	Action plan to limit the stack emission is described in Section 4.3 of Chapter 4 of the EIA/EMP Report.
x.	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.
xi.	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.
xii.	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.
xiii.	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.
xiv.	Action plan for 90 % Hot Charging of billets/ingots shall be submitted.	Will be compiled.
xv.	An action plan for Green Belt development consisting of 3 tiers of plantations of native species all along the periphery of the project of adequate width shall be raised in 33% of total area with a tree density of not less than 2500 per ha within a time frame of one year shall be submitted. Survival rate of green belt developed shall be monitored on periodic basis to ensure that damaged plants are replaced with new plants in the subsequent years.	Greenbelt development plan is given in section 10.3.6 of chapter 10 of the EIA/EMP Report.

## CHAPTER 2: PROJECT DESCRIPTION

This chapter highlights the features of the proposed 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

M/s. Purbanchal Concast Pvt. Ltd proposes to start production of MS Billets / Ingots and rolling mill products by installing 3X15T Induction Furnaces with CCM and 1x25 TPH hot charging Rolling Mill inside their existing premises at Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434. The proposed project activity is listed at schedule no. 3(a). under Category “A” of the schedule of the EIA Notification, 2006 and attracts general condition as the India-Bangladesh International boundary is at a distance of 2.55 Kms (SE) from the project site and appraised at Central Level. Existing CTE & CTO is attached as **Annexure II** and **III**, respectively.

### 2.2 Need and Justification of the Project

Steel is a basic commodity for all industrial activity and its consumption marks industrial prosperity. The steel industry has tremendous forward and backward linkages in terms of material flow, income and employment generation.

Steel is a core industry and thus its demand is strongly linked to the overall economic activity of the nation. Given the inherent long-term potential of the Indian economy and its cyclical nature, the long-term prospects of the steel industry are fairly comfortable. The demand and production has been growing at a healthy rate for the last few years and the forecast for the next decade and half is also very promising.

### 2.3 Project Location and Layout

The plant of Purbanchal Concast Pvt. Ltd. is located at Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District - Darjeeling West Bengal - 734434. The proposed project will be carried out within the existing plant premises itself in an area of 10.31 Acres. The overall plant layout is shown in **Figure 2.1** and also attached as **Annexure IV**.

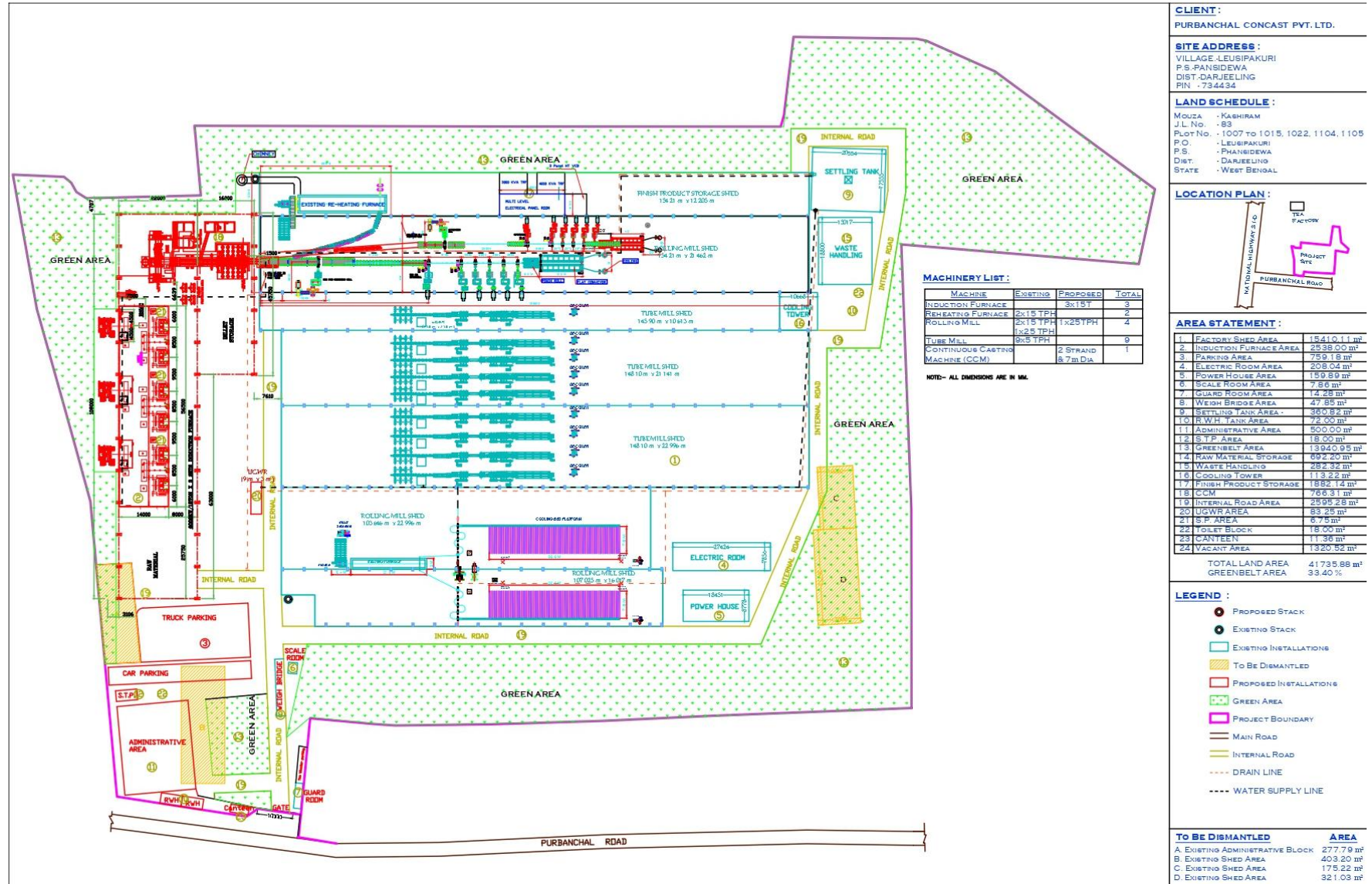


Figure 2.1: Plant Layout Showing Existing and Proposed Project Areas

## 2.4 Size or Magnitude of Operation

Taking into account, reliability of equipment and matching capacities between the different sections of the plant, type of equipment/installation system and the departmental capacities at the plant, have been required. A brief description of the existing and proposed utilities and major equipment is given in the following sections. The details of manufacturing capacity are listed in **Table 2.1**.

**Table 2.1: Details of Production Capacity**

Name	Config.	Production Capacity
Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA
Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA
Continuous Casting Machine (CCM)	1X2 Strand	

### 2.4.1 Land Requirement

The total land available under the ownership of M/s. Purbanchal Concast Pvt. Ltd. is 41735.88 Sq.M. The proposed project activities will be carried out within the existing industrial premises itself. The details of land-use breakup of the plant are given in **Table 2.2**.

**Table 2.2: Land Use of Project Site**

Land Use	Area (SQM)	Percentage (%)
Shed Area	15410.11	35.37
Induction Furnace Area	2538.00	6.08
Parking Area	759.18	2.10
Service Area	5171.84	12.38
<b>Greenbelt Area</b>	<b>13940.95</b>	<b>33.76</b>
Road & Paved Area	2595.28	6.82
Vacant Area	1320.52	3.49
<b>Total Land Area</b>	<b>41735.88</b>	<b>100.00</b>

### 2.4.2 Raw materials

Following raw materials will be required for the manufacturing of MS Ingots & TMT bars.

**Table 2.3: Details of Raw Material**

S. N.	Raw Material	Quantity Required Per Annum (TPA)	Source	Distance from site (Kms)	Mode of Transport
<b>For Rolling Mill Products</b>					
1	MS Billets/ Ingot	203050 (Captive Production 200000 & Outsourced 3050)	--	--	Truck

S. N.	Raw Material	Quantity Required Per Annum (TPA)	Source	Distance from site (Kms)	Mode of Transport
<b>For Billets</b>					
2	Sponge Iron	175000	Durgapur, Jharsuguda and other local sources	~ 500 to 900 Kms	Truck
3	MS Scrap	45000			
4	Ferro alloy	2350			
5	Pig Iron	1250			

### 2.4.3 Power Requirement:

Around 10000 kVA electricity from WBSEDCL will be required for this project. The electricity agreement copy is attached as **Annexure V**.

### Back-up power:

1x320 kVA DG set is proposed to be installed as backup power, which will be used only in the emergency situation during power failure. Another 1x45 kVA DG set is already present in the existing plant.

**Table 2.4: Details of Fuel Requirement**

Fuel	Machinery	Requirement
HSD	DG Set	80 Lit/Hr

### 2.4.4 Water Requirement

The total water requirement will be around 128 KL per day, out of which 14 KL will be used for domestic purpose from where around 11 KL sewage water will be generated which will be treated in MBBR technology based STP of 20 KL capacity. For industrial cooling purpose, around 100 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 47 KLD. The source of water is Ground water. The existing ground water withdrawal permission letter and additional ground water application letter is attached as **Annexure VI**. The water balance of the project is given in **Figure 2.2**.

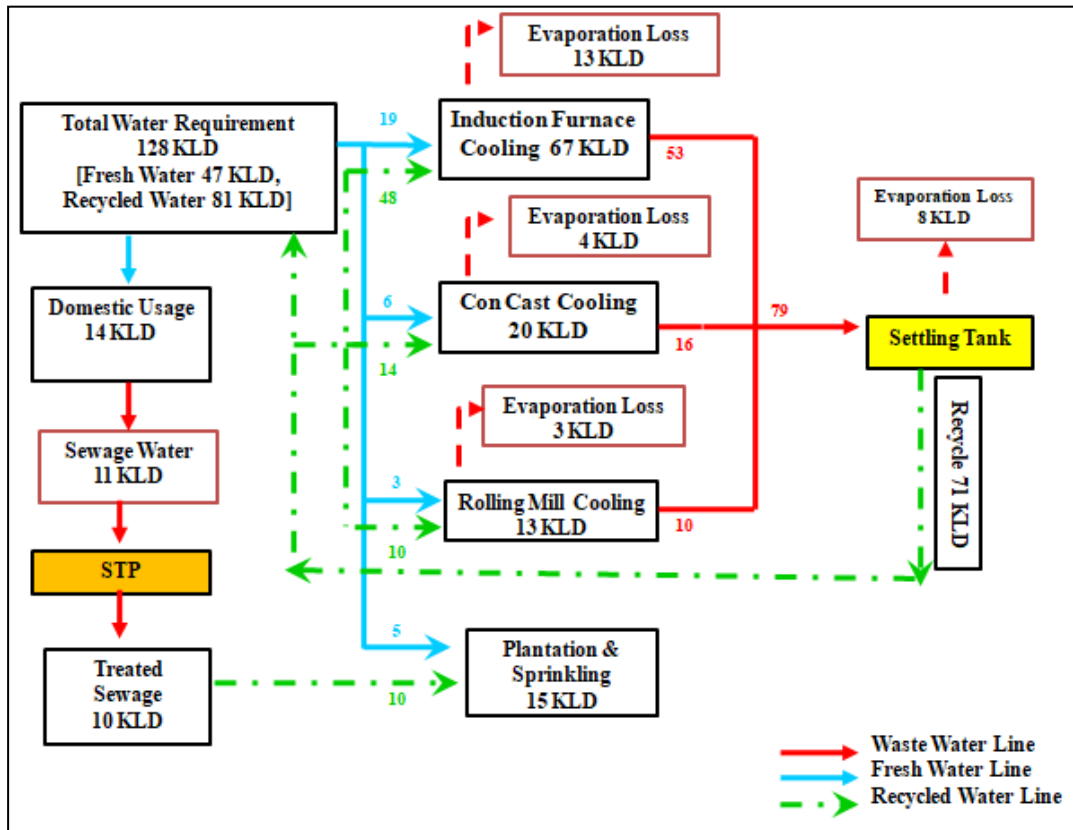


Figure 2.2: Water Balance Diagram

#### 2.4.5 Manpower Requirement

PCPL will generate employment of around 165 full time employees for the proposed project. In the existing plant 135 persons are working now. After this project the total manpower will be 300. The local population will be given preference for employment as per their qualifications; this will improve their living standards and livelihood.

Table 2.6: Details of Manpower

Employee Category	Existing Employees	Proposed Employment	Total No. of Employees
Factory Employee	55	65	120
Contract Labour	80	100	180
<b>Total Worker</b>	<b>135</b>	<b>165</b>	<b>300</b>

#### 2.5 Project Schedule for Approval and Implementation

The activities will be completed in a period of 12 months from the date of receipt of all the approvals from statutory authorities.

#### 2.6 Technology and Process Description

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

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

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

### **(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.

#### **Hot Charging Rolling Mill**

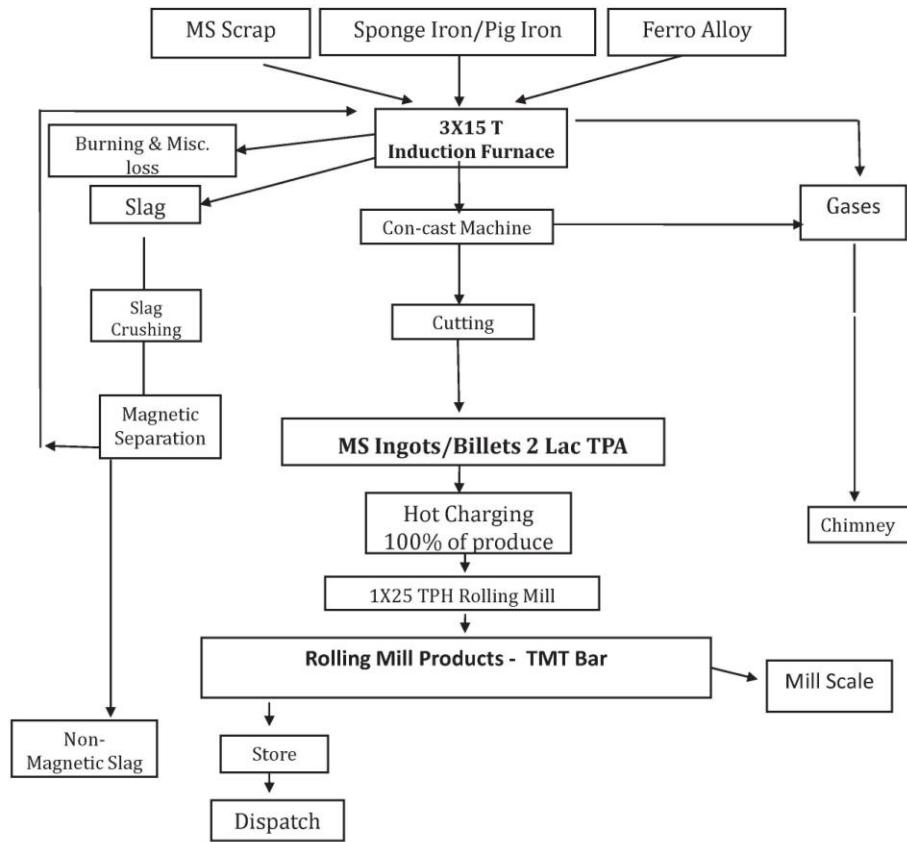
The hot charging is a best way to reduce the energy cost and improve the product quality at the same time. The process involves converting the shape stock viz. Ingots/billets to desired finished section in hot condition by way of passing the material between a pair of grooved rolls and providing suitable 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 ductile-ferrite-pearlite core.

**Table 2.7: Material Balance**

<b>For Billets</b>				
<b>Sl. No.</b>	<b>Raw Material</b>	<b>Input Quantity (TPA)</b>	<b>Product(s)</b>	<b>Product Quantity (TPA)</b>
i)	Sponge Iron	1,75,000	M.S Ingot	2,00,000
ii)	M.S. scrap	45,000	Slag & Burning Loss	23,600
iii)	Ferro alloy	2,350		
v)	Pig Iron	1,250		
<b>Total</b>		<b>2,23,600</b>	<b>Total</b>	<b>2,23,600</b>
<b>For Rolling Mill Products</b>				
<b>Input</b>	<b>TONS</b>	<b>Output</b>	<b>TONS</b>	
M.S. Billets/Ingots	2,03,050	Rolling Mill products (TMT Bar)	2,00,000	
		Mill Scale ~1.5%	3,050	
<b>Total</b>	<b>2,03,050</b>	<b>Total</b>	<b>2,03,050</b>	

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



**Figure 2.3: Process flow chart**





**Figure 2.4: Site Photographs**

## 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 valve 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 valve for Spark Arrestor – 1 No
- (c) Rotary Airlock valve for Bag filter – 4 Nos

**6. Compressor:**

A two stage compressor to deliver 1.5 m<sup>3</sup> /min with drive and motor at 5-7 bars will have to be provided.

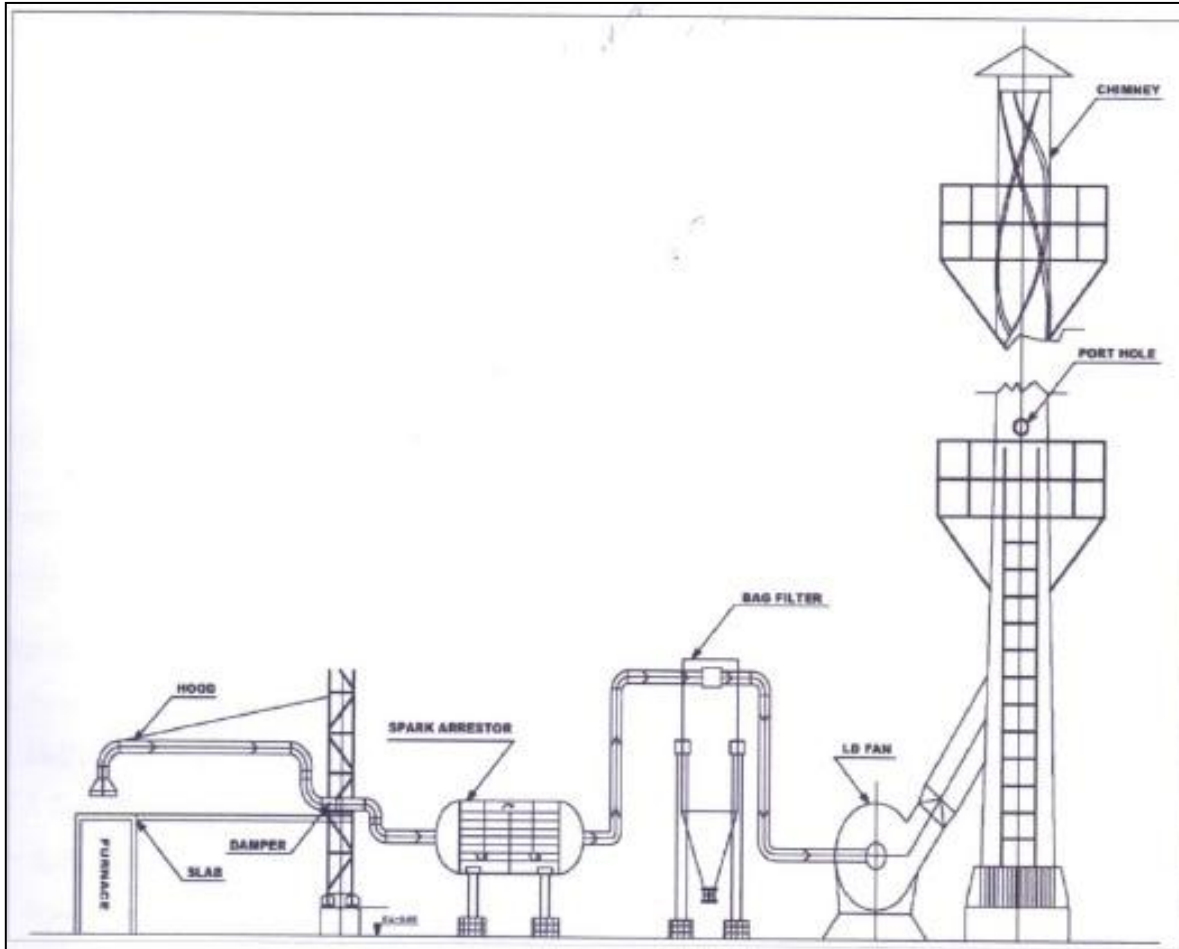
**7. Various Duct Supports, Platform Railings:**

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 2.5**.



**Figure 2.5: Schematic Diagram of Fume Extraction System**

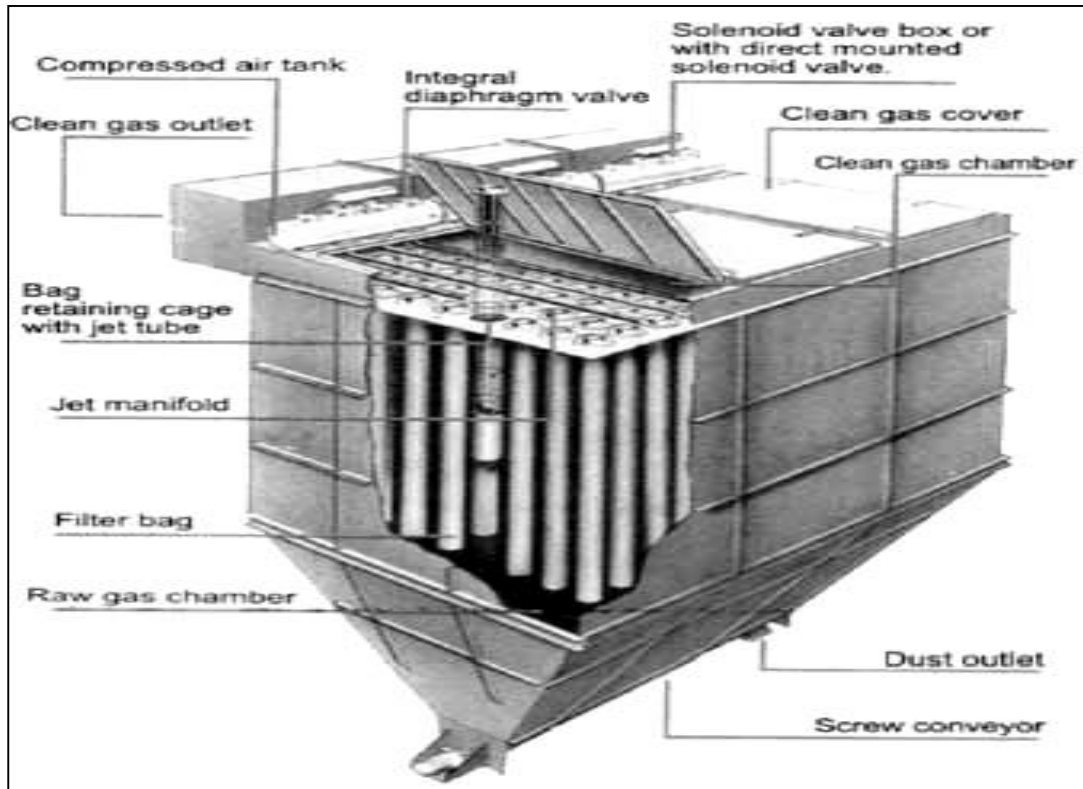
### 10. Bag Filter:

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 place 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 2.6: Section of Bag Filter**

**Table 2.8: Specifications of Spark Arrestor & Bag Filter**

<b>Spark Arrestor</b>	
Total gas volume	40,000 Nm <sup>3</sup> /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
<b>Bag Filter Unit</b>	
Gas volume	40,000 Nm <sup>3</sup> /hr
Air to cloth ratio	1.43 m <sup>3</sup> /min/m <sup>2</sup>
Total filtration area	465.74 m <sup>2</sup>
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 <sup>3</sup> /hr at 6-8 kg/cm <sup>2</sup>
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 <sup>3</sup>

## 2.8 Sources of Pollution

The various types of pollution from the proposed 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 collected through a sewer network, treated in STP and treated water will be reused for plantation.

### STP Details

- For the existing project the domestic waste water is being transferred to septic tank followed by soak pit. After proposed project, 14 KL fresh water will be used for domestic purpose from where around 11 KL sewage water will be generated which will be flowed to proposed STP. 1nos of 20KL MBBR technology based STP is being proposed. The treated waste water will be reused for plantation.

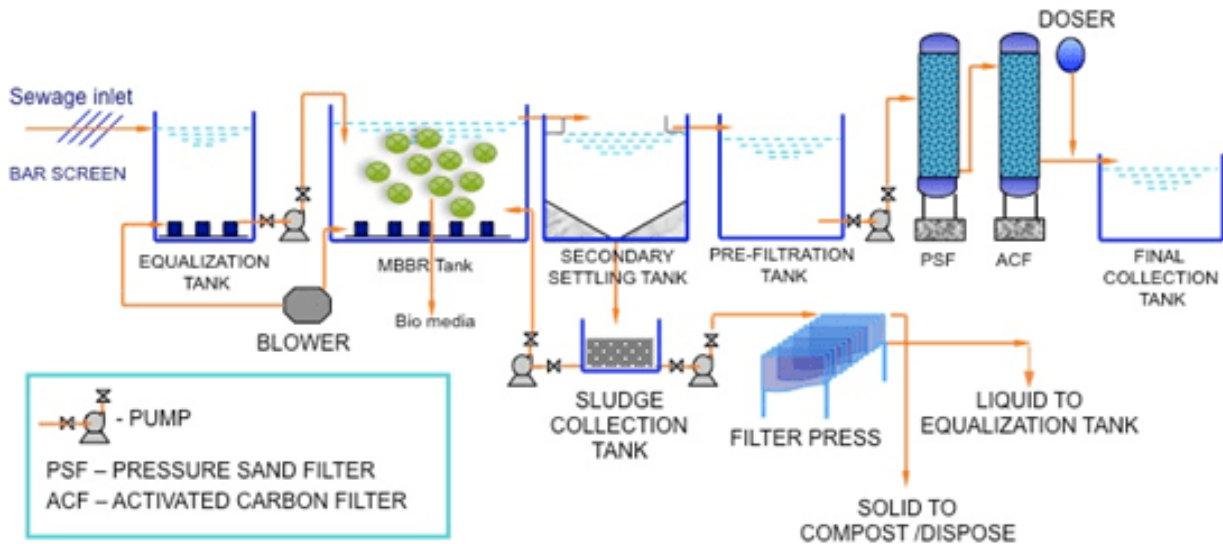


Figure 2.7: Schematic Diagram of Proposed STP

### 2.8.3 Solid Waste Generation and Management

The quantity of Industrial and Municipal solid waste to be generated by the manufacturing process and its management is described in **Table 2.9**.

Table 2.9 Details of Solid Waste Generation & its management

Industrial Waste		
Type of Waste	Quantity	Treatment/Disposal
Slag	1726 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	850TPM	Sold to contractor for sinter plant / Reused in the plant
Ash	15 TPM	Land Filling/Will be given to the cement manufacturers
STP Sludge	0.5 Kg/Day	Will be used as manure for gardening
Sludge from Settling tank	6.81 Kg/Day	WBPCB authorized/approved site
Dust from APC System	194 TPM	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
Sludge from Scrubber	0.25TPM	Sludge from scrubber is being used for land filling at Project Site

<b>Municipal Solid Waste (MSW)</b>		
<b>Type of Waste</b>	<b>Quantity (Kg/Day)</b>	<b>Treatment/ Disposal</b>
Wet Garbage	23	To be disposed off as per MSW Rules
Dry Garbage	53	To be disposed off as per MSW Rules

#### **2.8.4 Noise Pollution**

The major noise generating sources from different plant facilities are Cooling Tower, steel melting section, rolling mill section, Transformer, machine shop, DG sets etc. The noise generation sources and noise attenuation measures are presented in Chapter - 4 of this report.

## 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/Ingots & Rolling Mill Products-TMT Bar production plant. 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 **1<sup>st</sup> January 2021 to 31<sup>st</sup> March 2021** 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			
<b>1</b>	<b>Air Environment</b>						
(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 Anemometer Rain gauge As per IMD specifications	IS 8829 Site 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)	<b>Ambient air quality</b>						
	<b>Pollutants</b> PM <sub>(10)</sub>	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)	<ul style="list-style-type: none"> <li>• Minimum 2 locations in up wind.</li> <li>• 2 Sites in downwind (based on impact receptor). predominant wind direction</li> <li>• Sensitive receptors.</li> <li>• Transportation route receptors.</li> <li>• Land use pattern</li> </ul>	Interpretation based on CPCB NAAQ standards 2009
	PM <sub>(2.5)</sub>		24 hourly twice a week	As per CPCB Guidelines Gravimetric	CARB SOP MLD 055 PM <sub>2.5</sub> gravimetric analysis – revision 9, July 2008 Page 1 of 32 (As per CPCB guidelines)		
	SO <sub>2</sub>		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	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	NO <sub>x</sub>		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 continuous and averaged for 24 hours twice a week	NDIR Method	IS: 5182 (Part 10)-1999 RA-2003 (As per CPCB guidelines)		
<b>2</b>	<b>Noise</b>						
	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)	<ul style="list-style-type: none"> <li>• Minimum 2 locations in up wind</li> <li>• 2 sites in downwind (based on impact receptor)</li> <li>• sensitive receptors.</li> <li>• Transportation route receptors.</li> <li>• Land use pattern</li> </ul>	CPCB /OSHA
	Day Time Noise Levels (Leq <sub>day</sub> ) dB(A)		Once in season		CPCB/ OSHA		
	Night time Noise Levels (Leq <sub>night</sub> ) dB(A)		Once in season		CPCB		
<b>3</b>	<b>Water Environment</b>						
(i)	<b>Parameters for water quality</b> <u>Surface water</u> <ul style="list-style-type: none"> <li>▪ pH;</li> <li>▪ Turbidity;</li> <li>▪ Total Hardness (as CaCO<sub>3</sub>);</li> <li>▪ Total Alkalinity (as CaCO<sub>3</sub>);</li> <li>▪ Chlorides (as Cl);</li> <li>▪ Sulphate (as SO<sub>4</sub>);</li> </ul>	Set of grab samples during study period at 5 * 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 guidelines Test method is given in respective component in, Section-3 of EIA report	<ul style="list-style-type: none"> <li>• Based on water utilization</li> <li>• Upstream and downstream based on outlet (if any)</li> </ul>	* subject to availability of surface water sources

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	Nitrate (as NO <sub>3</sub> ); <ul style="list-style-type: none"> <li>▪ Fluoride (as F);</li> <li>▪ BOD(3Days at 27°C);</li> <li>▪ COD;</li> <li>▪ Phenolic Compounds (as C<sub>6</sub>H<sub>5</sub>OH);</li> <li>▪ Lead (as Pb);</li> <li>▪ Iron (as Fe);</li> <li>▪ Arsenic (as As);</li> <li>▪ Cadmium (as Cd); Total Chromium (as Cr);</li> <li>▪ Mercury (as Hg); Copper (as Cu);</li> <li>▪ Zinc (as Zn);</li> <li>▪ Selenium (as Se);</li> <li>▪ Oil &amp; grease;</li> <li>▪ Colour;</li> <li>▪ Dissolved solids;</li> <li>▪ Residual free chlorine;</li> <li>▪ Boron (as B);</li> <li>▪ Calcium (as Ca);</li> <li>▪ Magnesium (as Mg);</li> <li>▪ DO;</li> </ul>			association.			
(ii)	<b>Ground water</b> <ul style="list-style-type: none"> <li>▪ Color;</li> <li>▪ pH;</li> <li>▪ Turbidity;</li> <li>▪ Dissolved solids;</li> <li>▪ Aluminium as Al;</li> <li>▪ Ammonia (, as total ammonia-N);</li> </ul>	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	<ul style="list-style-type: none"> <li>• Based on water utilization</li> <li>• Ground water flow pattern</li> <li>• Based on impact zone</li> </ul>	

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	<ul style="list-style-type: none"> <li>▪ Anionic Detergents as MBAS;</li> <li>▪ Barium as Ba;</li> <li>▪ Boron as B;</li> <li>▪ Calcium as Ca;</li> <li>▪ Chloramines as Cl<sub>2</sub>; Chloride as Cl; Copper as Cu; Fluoride as F;</li> <li>▪ Free Residual Chlorine;</li> <li>▪ Iron as Fe; Magnesium as Mg; Manganese as Mn;</li> <li>▪ Nitrate as NO<sub>3</sub>; Phenolic Compounds as C<sub>6</sub>H<sub>5</sub>OH;</li> <li>▪ Selenium as Se;</li> <li>▪ Sulphate as SO<sub>4</sub>.</li> <li>▪ Total Alkalinity as CaCO<sub>3</sub>.</li> <li>▪ Total Hardness as CaCO<sub>3</sub>.</li> <li>▪ Zinc as Zn,</li> <li>▪ Cd; Pb; Hg; As; Ni; C</li> </ul>			analysis published by American Public Health association.			
<b>4</b>	<b>Land Environment</b>						

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
i	<b>Soil</b> <ul style="list-style-type: none"> <li>▪ Particle size distribution;</li> <li>▪ Texture;</li> <li>▪ pH.</li> <li>▪ Electrical conductivity;</li> <li>▪ Bulk density;</li> <li>▪ Organic carbon;</li> <li>▪ Sodium (Na); Potassium (K);</li> <li>▪ Moisture content;</li> <li>▪ Total Nitrogen; Available phosphorous;</li> <li>▪ organic matter;</li> <li>▪ Total Soluble Chloride;</li> <li>▪ Total Soluble sulphate;</li> <li>▪ Water holding capacity;</li> <li>▪ Porosity;</li> </ul>	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	<i>Handbook of Agriculture, Indian Council of Agricultural Research</i>
ii	<b>Land use/Landcover</b> <ul style="list-style-type: none"> <li>▪ Location code</li> <li>▪ Total project area</li> <li>▪ Topography</li> <li>▪ Drainage (natural)</li> <li>▪ Cultivated, forest, plantations, water bodies, roads and settlements</li> </ul>	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	<b>Biological Environment Terrestrial</b> <ul style="list-style-type: none"> <li>• Inventarization of floral and faunal species in core and buffer zone</li> </ul>	Project area and 7 locations in buffer area	Five-Seven days in a season	<ul style="list-style-type: none"> <li>• Quadrata sampling/ Enumeration/ Survey methods.</li> <li>• Transect method/ Visual Encounter Survey</li> <li>• Point Count/ Opportunistic Survey</li> </ul>	<ul style="list-style-type: none"> <li>• Land use /Landcover classification</li> <li>• Sensitive area in the vicinity</li> <li>• Land utilization</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary assessment point quarter plot less method for</li> </ul>	

Sr. No	Attributes	Sampling	Measurement Method		Procedure	Selection Criteria	Remarks
		Network	Frequency	Method			
	<ul style="list-style-type: none"> <li>Density in core zone</li> <li>Importance value index (IVI) of trees,</li> <li>Biodiversity index</li> </ul>			Tracks and signs, and visual encounter survey		<ul style="list-style-type: none"> <li>Downwind based on impact zone</li> </ul>	terrestrial vegetation survey
	<ul style="list-style-type: none"> <li>Identification of rare and threatened and endangered species</li> </ul> <p><b>Fauna</b></p> <ul style="list-style-type: none"> <li>Avi fauna</li> <li>Rare and endangered species</li> <li>Sanctuaries / National park / Biosphere reserve</li> <li>Migratory routes</li> </ul>						Secondary data to collect from Government offices/forest department, NGOs, published literature
<b>6</b>	<b>Socio-economic</b>						
	<ul style="list-style-type: none"> <li>Demographic structure;</li> <li>Infrastructure resource base;</li> <li>Economic resource base;</li> <li>Health status; Morbidity pattern;</li> <li>Working pattern;</li> <li>Cropping pattern</li> </ul>	Study area	In two phases of the project	<ul style="list-style-type: none"> <li>Primary data collection through questionnaire</li> <li>proportionate Random sampling method</li> <li>Transect walk</li> </ul>		<ul style="list-style-type: none"> <li>Land utilization pattern</li> <li>Population pattern</li> <li>Gender pattern</li> <li>Working pattern</li> </ul>	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

The Sikkim-Darjeeling Himalaya contains the stretch of tectonically active Eastern Himalaya. It is composed of three main tectonic units:

- I) The Higher Himalaya,
- II) The Lower Himalaya and
- III) The Siwaliks

separated by thrusts, but joined by great fluvial system of the Teesta River. The Higher Himalaya with relief up to 2,000–4,000 m was uplifted by about 2,000 m in the Quaternary rising above the snowline. Its mountain massifs previously had fluvial relief which later had been totally transformed by glacial processes. The Lower Himalaya dissected 1,000–2,000 m locally with remains of mature relief fragments are continuously in the forest belt. The Siwaliks in this part of the Himalayan Range are reduced to a narrow belt, which blend with the Lower Himalaya. Along the Frontal Fault it rises above 1,000 m directly over the alluvial plains of the Sub-Himalayan foredeep, which is still active and split into blocks of various tectonic tendencies (Singh and Keyho, 20014).

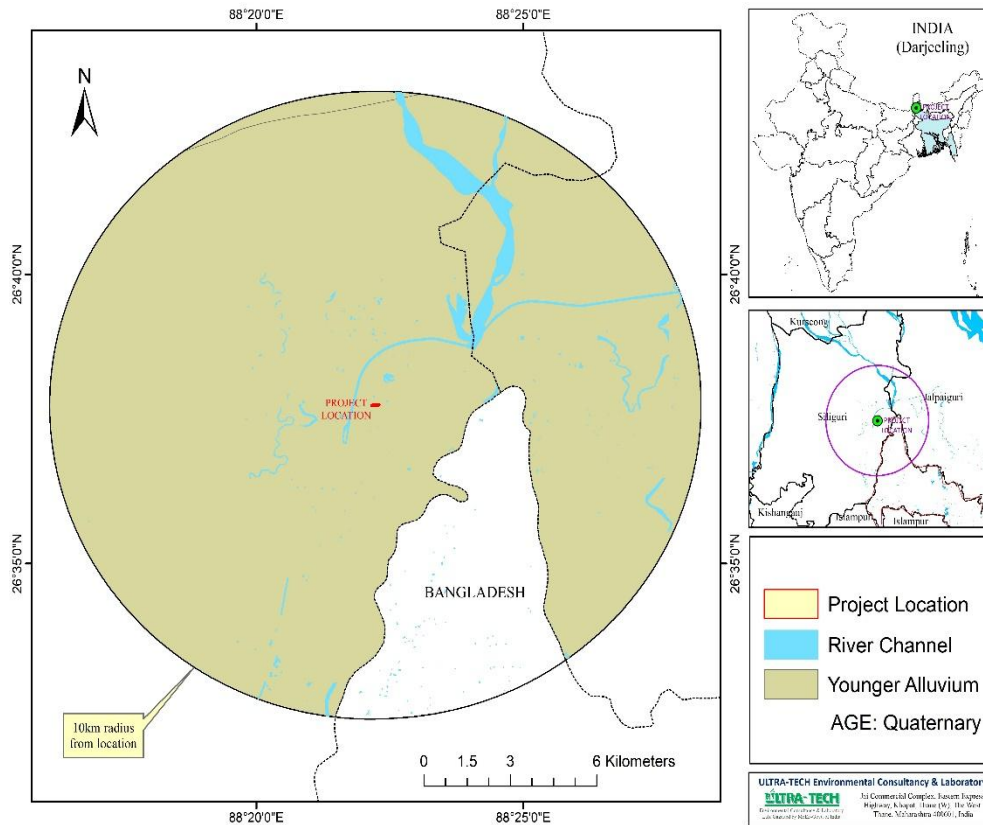
Darjeeling-Sikkim Himalaya is one of the important fault thrust belt in the Himalaya covering the rocks of Central Crystalline Gneissic Complex, Daling Phyllite, Gondwana, Buxa and Siwaliks from north to south. Quaternary rock delimits the Himalaya in the southern part. A number of thrust namely MCT, MBT, MFT and also Daling Thrust are reported in this fault thrust belt (Singh and Keyho, 20014).

Darjeeling Sub Himalaya: The Terai and the foothills were given their present form after the final upheaval of the Himalayan orogeny and consist of almost horizontal layers of unconsolidated sand, silt, pebbles and gravel. The Sub Himalaya is made up of the Siwalik deposits of the Tertiary and good Siwalik exposure is met along the Teesta River

The geological formations of the study area essentially of younger Aluviumrocks. The Sub-Himalaya is made up of Siwalik deposits of the Tertiary age. North of the Siwaliks is the coal-bearing lower Gondwana formations. The Daling series (Pre-Cambrian) follows and is succeeded by the Darjeeling gneiss further north (Cajee L, 2018).

**Table 3.1: Geology of study area**

Age	Series	Lithological Characteristics
Recent to Sub-recent	Alluvium	Younger flood plain deposits of rivers consisting of sands, pebbles, gravels, boulders etc.
Pleistocene to Lower Pleistocene	Siwalik	Micaceous sandstone with siltstone, clay, lignite lenticles etc.



**Figure 3.1: Geological map of Project site**

### 3.2.2 Hydrogeology

The district is covered by three major geological formations viz,

- I) The Precambrian crystallines,
- II) The Vindhyan and
- III) The Gondwanas.

Besides, the tertiary laterite and alluvium also cover part of the district. Ground water occurs mostly under phreatic condition in all the lithological units and locally under semi-confined and confined condition (Source: District census handbook 2011).

The district which includes Kalimpong district. Rock type of the Darjeeling district mainly consist of Banded Gneisses, Schist, Sandstone with shale, valley fill sediments and younger Alluvium of Azoic to Quaternary age. This rock group chiefly comprises the district profile. Northern hilly and doors region is the part of this. Thickness of the aquifer varies between 5 to 50m in consolidated rocks which poses yield of 2-2000 cum/day and the thickness of alluvium in this part varies between 50-700m. Groundwater yield of the alluvium is 200-1500 cum/day.

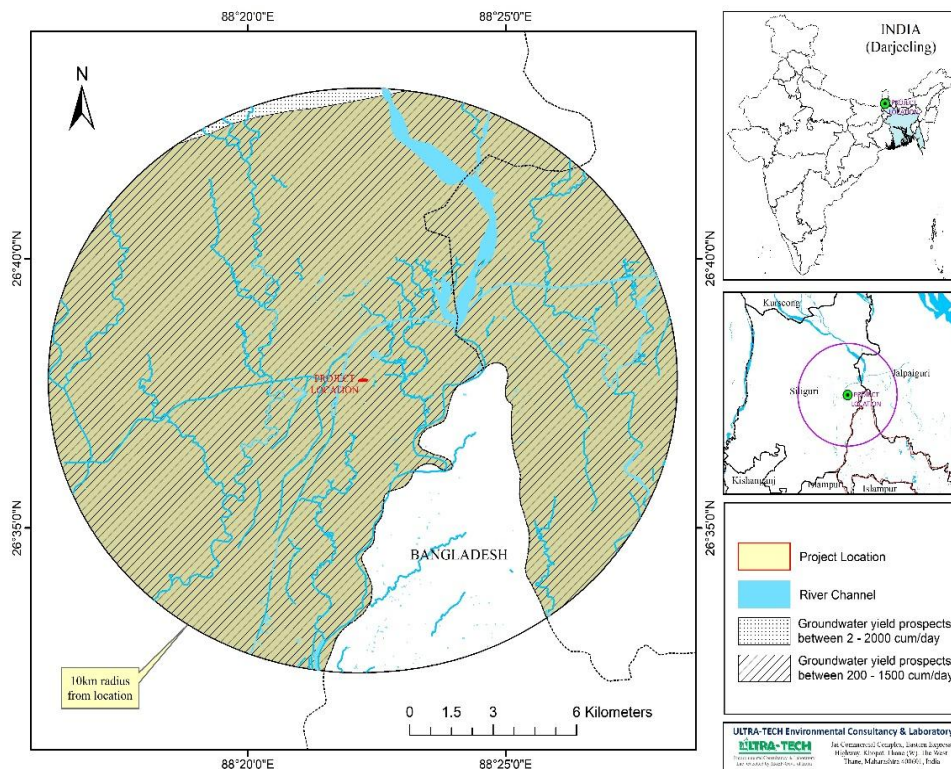
Sothorn flat land of the district comprises mainly of younger Alluvium of Quaternary age. Thickness of the rock type varies between 50 to 700m and having yield value of 200-1500 cum/day

The Hydrogeological studies to understand the local drainage network, aquifer characteristics and yield of water. Accordingly, various components controlling the hydrogeological regime. Hydrogeological map of the study area is shown in **Figure 3.2** and the drainage pattern map of the study area is given in **Figure 3.3**. A detail of Hydrogeology of study area is given in **Table 3.2**.

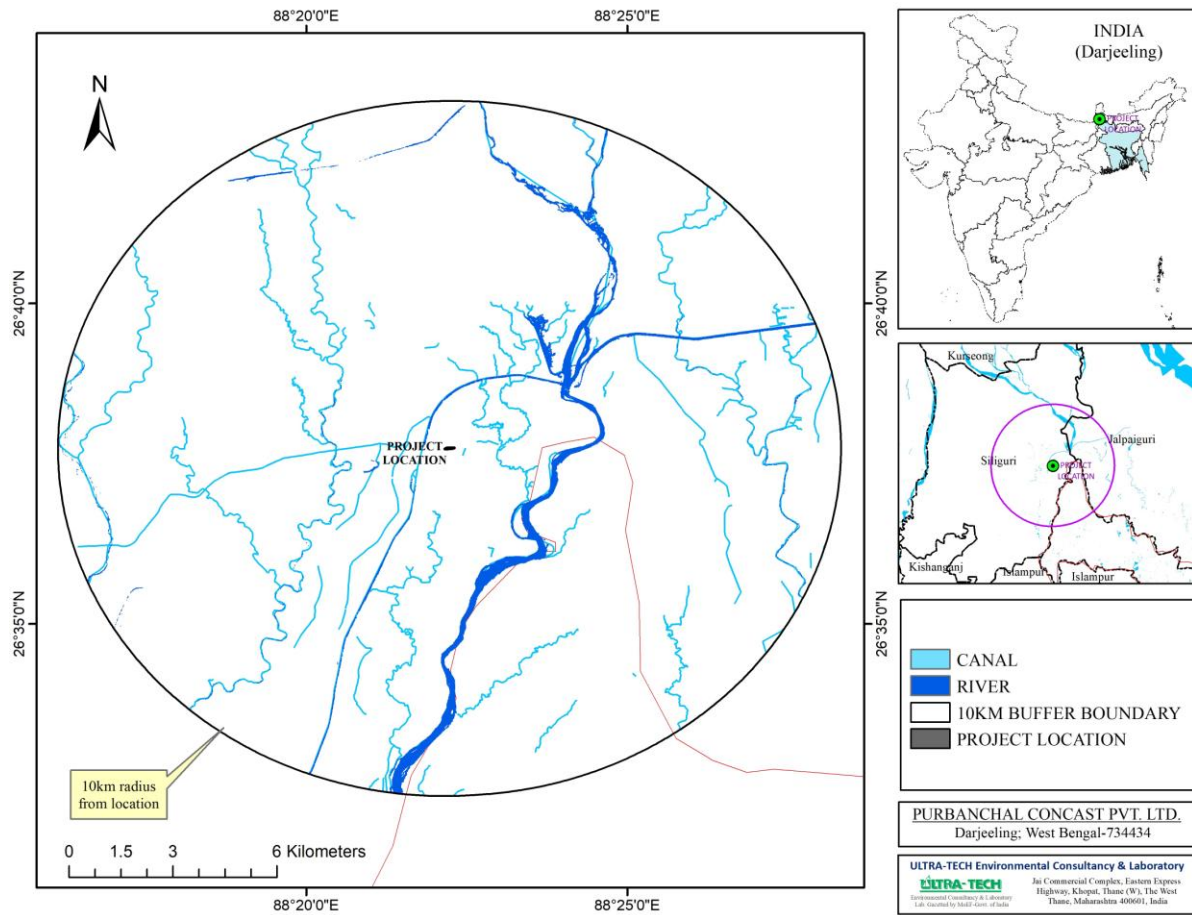
**Table 3.2: Hydrology of study area**

Age	Rock type	Lithology	Aquifer conditions	Hydrology)
Azoic to Quaternary	Younger alluvium	Granular/ fracture zones variably encountered between 20-400m b.g.l	Thickness of aquifer varies between 5-50 m in consolidated rocks and 50-700m in alluvium	Groundwater yield prospects between 2-2000 cum/day in consolidated rock and 200-1500 cum/day in alluvium
Quaternary	Younger alluvium	Granular/ fracture zones encountered between 50-400m b.g.l	Thickness of aquifer varies between 50-700m	Groundwater yield prospects between 200-1500 cum/day

Source: CGWB



**Figure 3.2: Hydrological map of Project site**



**Figure 3.3: Drainage map of the study area**

### 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).

Depth of water in wells measured by CGWB at 32 locations in district varied from 1.46 to 14.24 m bgl during pre-monsoon period with an average of 4.6m and 1.01 to 9.6 m bgl during post-monsoon period with an average of 3.2m in the year 1996 to 2018 (Source: CGWB Website). Figure 4.6 represents water level fluctuation graph for two CGWB monitor wells, one from Bagdogra area and another from Phansidewa area.

Over all stage of ground water development in the area is 6% indicating sufficient scope of development (Source: Dynamic Groundwater Resources Assessment of India – 2017, CGWB).

### Ground Water Resources

The main source of ground water recharge is by the rainfall by direct percolation to the zone of saturation. A significant part of the rainfall is lost as runoff from area while a limited

percentage of rainfall therefore reaches zone of saturation and becomes the part of ground water storage after meeting the evaporation and evapo-transpiration losses. Runoff joining Damodar River is supplemented to ground water recharge. There is also ground water recharge from the return flow of irrigation water from dug wells and tube wells operated by the cultivators and from canals.

The rainy season in the district commence from June and lasts till September. The average annual rainfall is 2973 mm. The maximum rainfall in the area as per IMD data was recorded in the month of July followed by August and September. The following table shows the annual total rainfall recorded for Darjeeling district along with the month(s) while maximum precipitation is recorded over 5 years from 2014-2018

### **3.2.3 Topography**

Physiographically Darjeeling district can be broadly divided into Hills and Plain land. The natural slope of the land is from North to South. Numerous rivers and springs flow Southwards emerging from the hills at the North, the most important being river Teesta. The district further sub divided into region based on topography.

Darjeeling Himalayas region bears the highest elevation and lies at the Northern-most portion of the district. The Singalila range is the highest mountain range of district Darjeeling lies in this region. The two highest peaks of West Bengal lie in the Singalila Range which are Sandakphu with an elevation of 3,636 metres and Phalut with an elevation of 3,600 metres. Tonglu (3,036 metres) and Sabargram (3,543 metres) are two other important peaks (Source: District census handbook 2011).

Western Dooars region is mainly spread over the foot-hills of the Himalayas and primarily is a plain land gently sloping from North to South. General elevation of land is 80 metres to 300 metres. Mahananda Tract, known as Terai region, is the primarily plan land of the district situated to the South of Western Dooars and having elevation of 100 to 150 metres (Source: District census handbook 2011).

The contour map of the study area and project site is given in Figure 3.4 and 3.5 respectively.

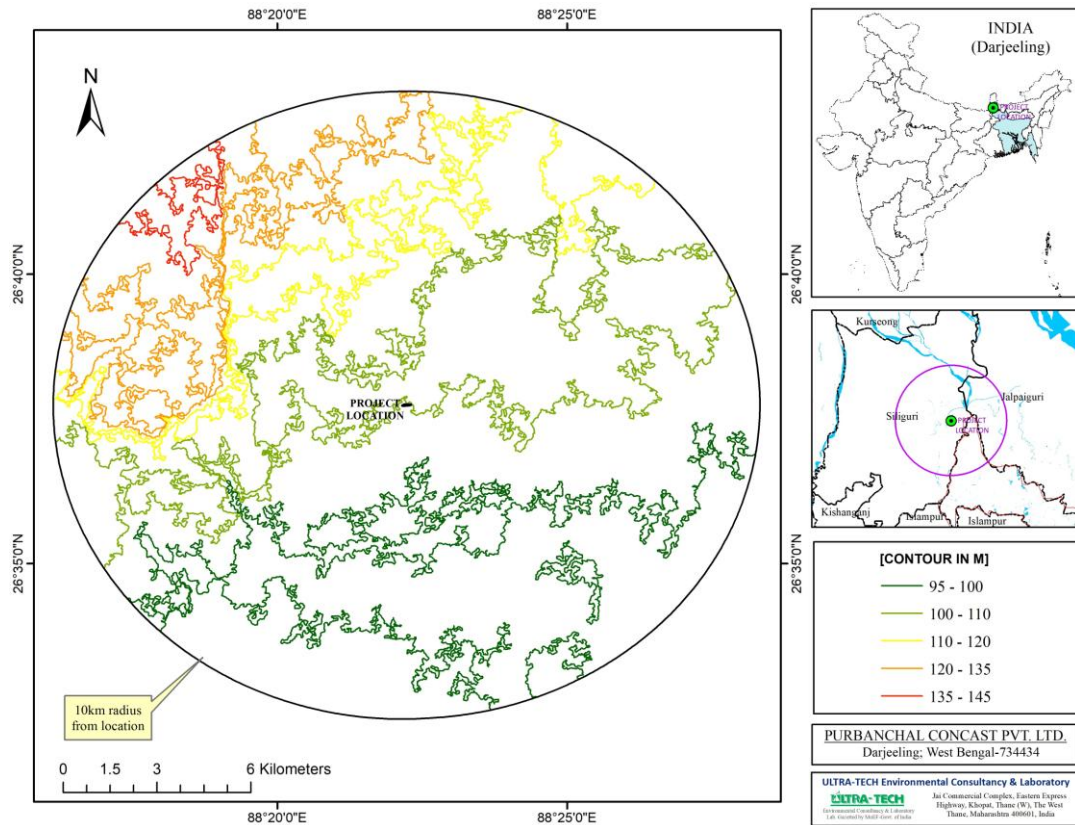


Figure 3.4: Contour Map of the study area

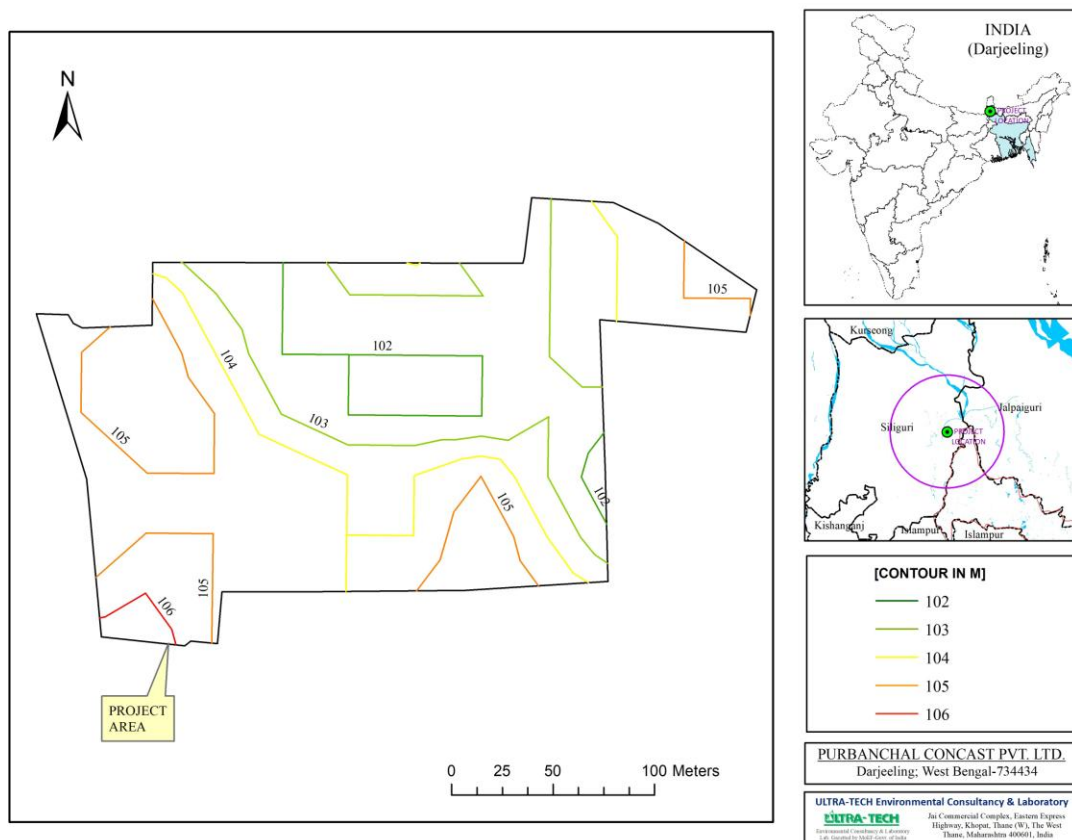
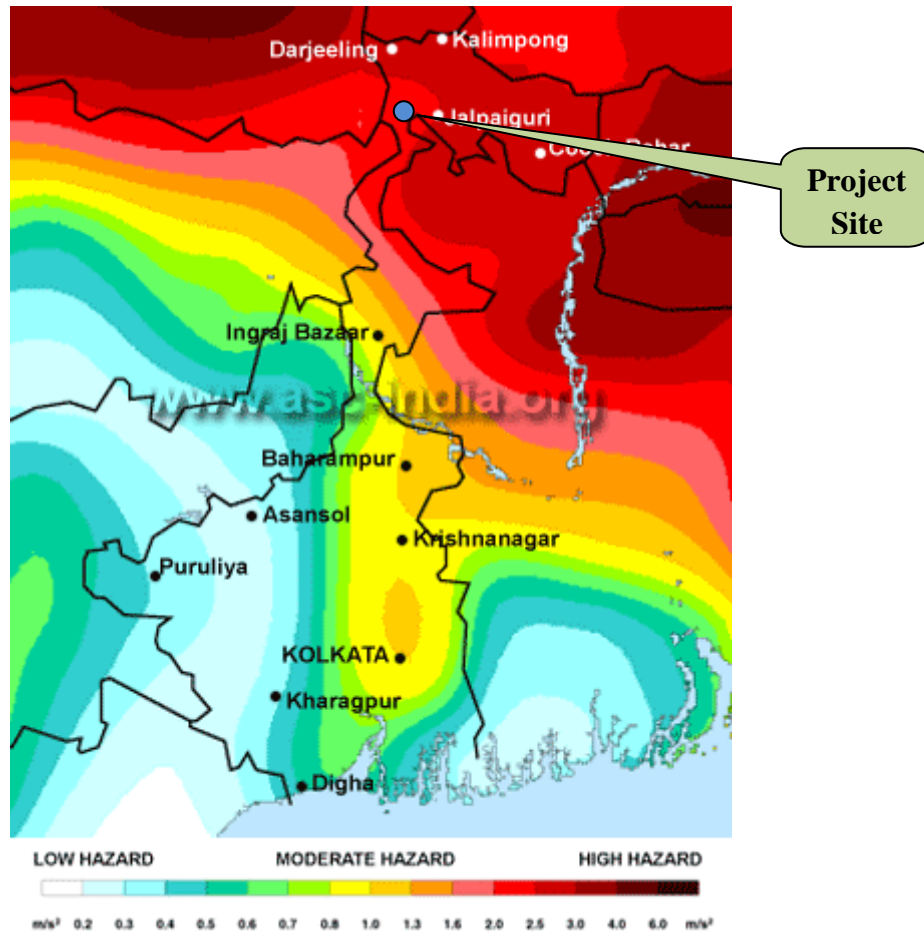


Figure 3.5: Contour map of the Project Site

### 3.2.4 Seismicity

According to IS: 1893-1984, the study area falls under Zone-IV. 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 3.3**.



**Figure 3.3: Seismic Map of West Bengal**

### 3.3 Land Use/Land Cover of the Study Area

#### *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.

#### *Methodology*

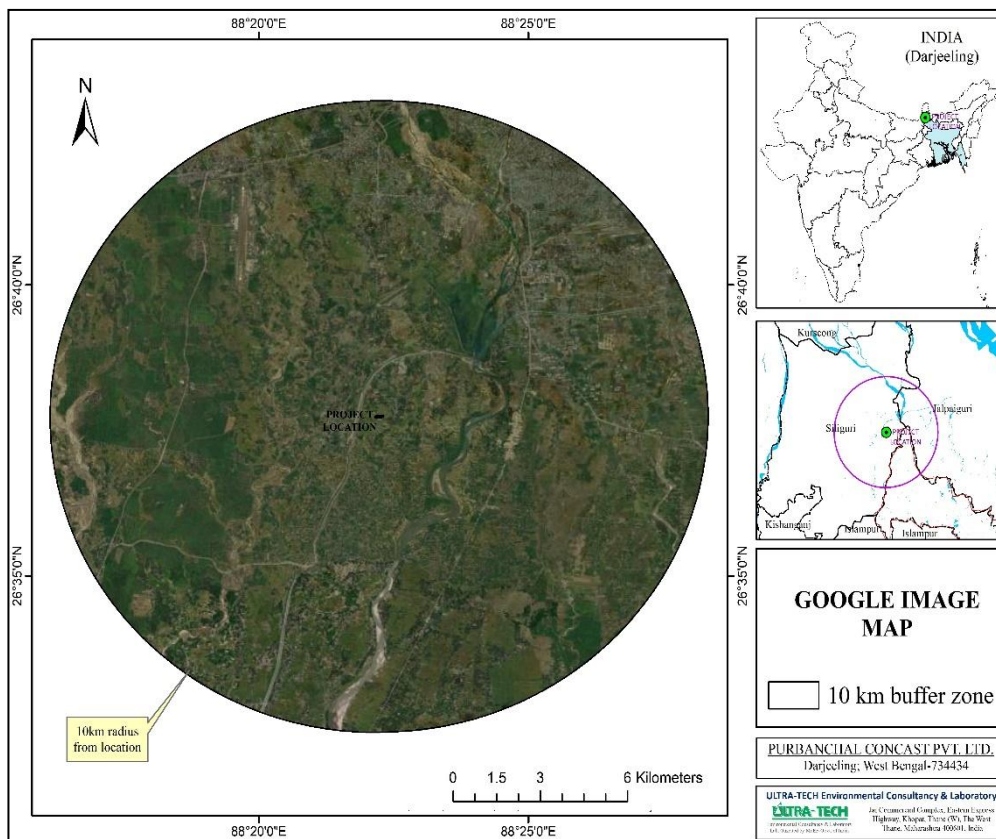
Land use area and land use classification analysis as follows:

1. Development of an input database.
2. Data processing and analysis.
3. End planning of development.

### 3.3.1 Input Data

#### 3.3.1.1 Google Earth Image:

Google Earth images have been analyzed for spatial characteristics, soil sensors, latitude, longitude, and geo-recording of satellite images. Figure 3.4 showing the Google Earth image of the project site.



**Figure 3.4: Project Site on Google image**

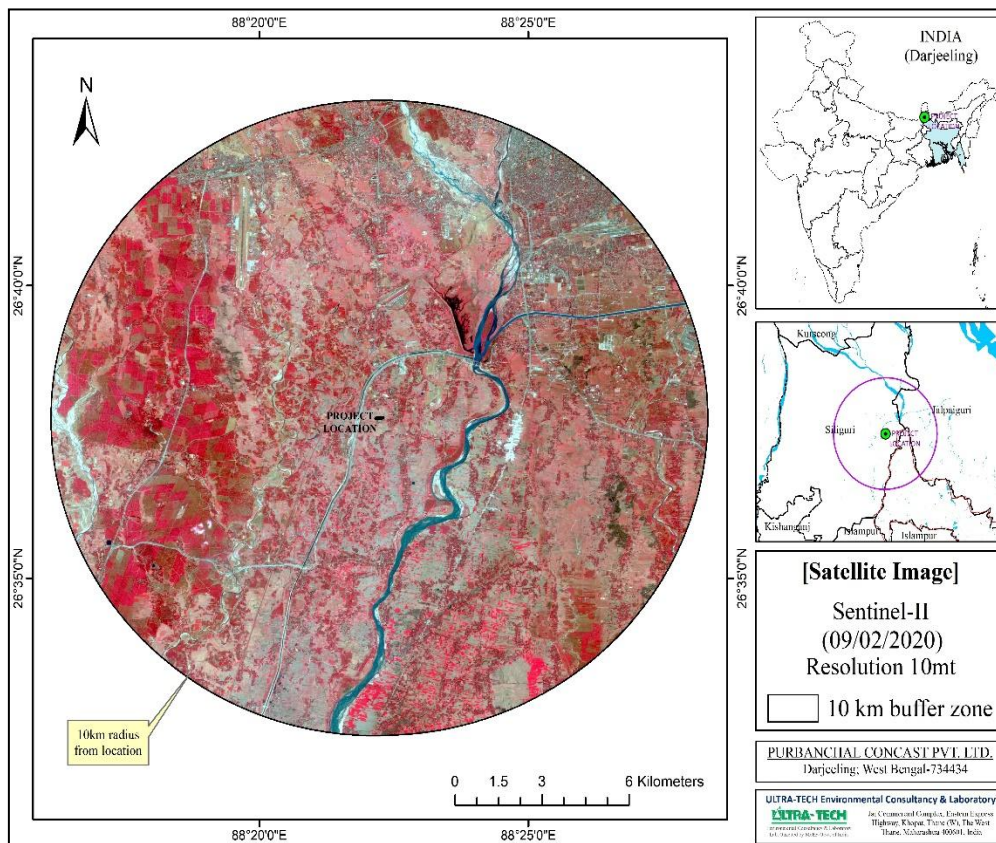
#### 3.3.1.2 Satellite image:

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_T45RXK_A024197_20200209T044913
Acquisition date	29/02/2020
Tile Number	T45RXK
Agency	ESA
Platform	SENTINEL-2A
Orbit Number	33
Orbit Direction	Descending Orbit



**Figure 3.5: Satellite Image Map covering the project location and its surroundings**

### 3.3.2 Processing/Analysis of Data

#### 3.3.2.1 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.

### **3.3.2.2 Radiometric Correction**

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.

### **3.3.2.3 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.

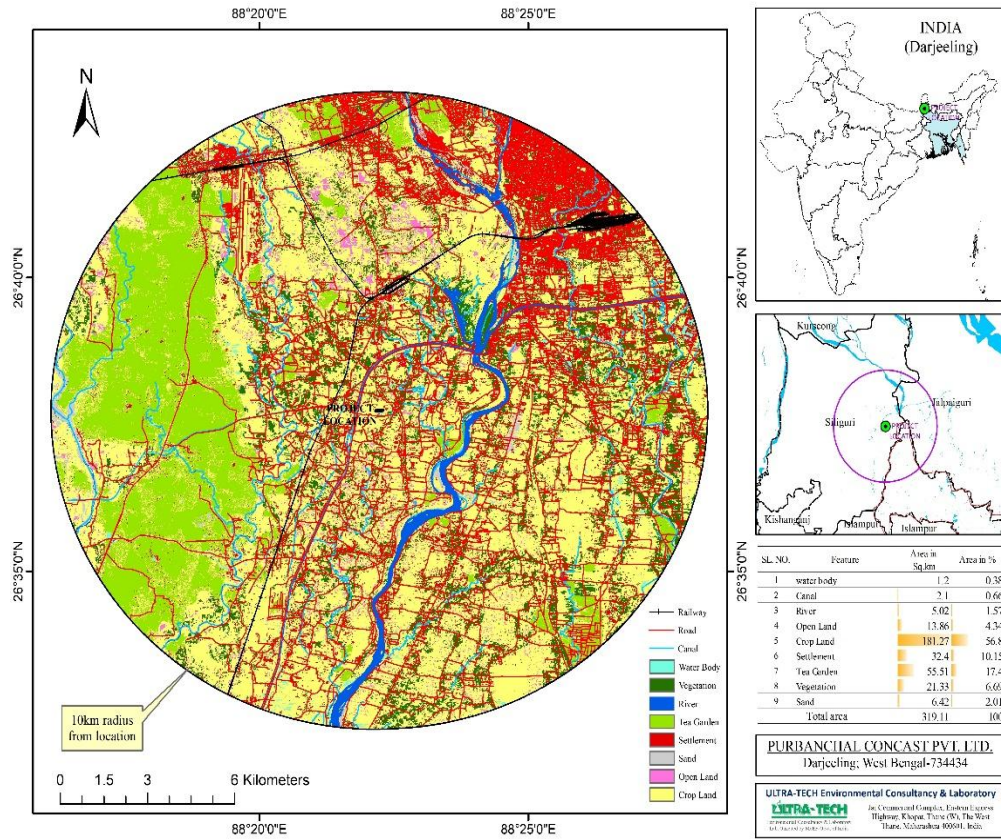
### **3.3.2.4 Ground Truthing:**

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.

## **3.3.3 Final Outputs**

### **3.3.3.1 Classifications of Land Use:**

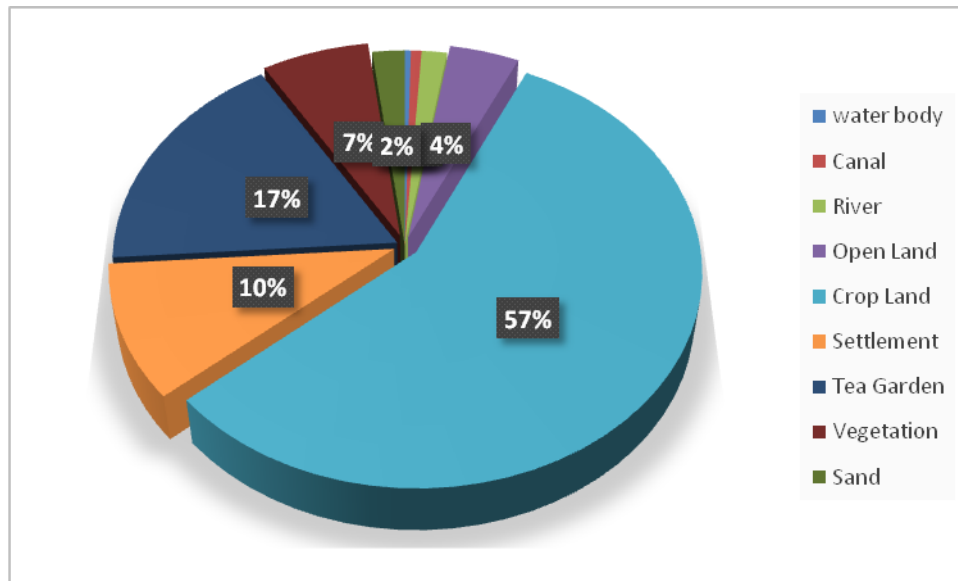
The land use classification of Hybrid Level-2 was carried out using the Supervised Classification System. Bands 3, 4, 5 are the most appropriate ones. At the end of the study, 11 classes were derived and the picture was ranked. The pattern for graded land use is seen in Table 3.2 and seen in Figure 3.6. The False Color Composite for the area as seen in Figure 3.5



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

**Table 3.3: Land-use Classification – Area**

SL. NO.	Feature	Area in Sq.km	Area in %
1	water body	1.2	0.38
2	Canal	2.1	0.66
3	River	5.02	1.57
4	Open Land	13.86	4.34
5	Crop Land	181.27	56.8
6	Settlement	32.4	10.15
7	Tea Garden	55.51	17.4
8	Vegetation	21.33	6.69
9	Sand	6.42	2.01
<b>Total area</b>		<b>319.11</b>	<b>100</b>



**Figure 3.7: LULC Classification**

### 3.3.3.2 Interpretation on Land use classification:

The site of PurbanchalConcast Private Limited (PCPL) was established in 2011 to manufacture mild steel pipes, hollow sections, profiles, guides and structurals to meet the ever increasing requirements of the infrastructure and engineering industries. The objective was to build an integrated facility from Blooms/billets to the finished products. PCPL is strategically located off the Asian Highway near Siliguri having an easy access for to and fro movements. Currently the production facility is spread over nearly 200,000 sqft of covered sheds and adequate space is still available for future expansion. The city of Siliguri began on the banks of the Mahananda River at Saktigarh, a small town which is now in the southern part of the city. When the British East India Company introduced railways to Northeast India, it enhanced the importance of the region. The population of the town continuously increased leading to its expansion because of many immigrants from Bangladesh, and adjacent Indian states.

Figure 4 shows the land use map and the land cover map of the study area covering a distance of 10 km. The LULC map in Figure 4 shows that the analysis consists of 9 areal classes Open land, Tea Garden, Urban Area, Crop land, Waterbody, Sand, Vegetation, River, Canal. Table 1 shows that cropland is the main patches that cover a large part of the study area.

#### **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 row or close-grown crops. Non-cultivated cropland includes permanent hay land and horticultural cropland. The majority of the landcover surrounding the projecting in under the coverage of roplandsthis land use/land cover class in the project area covered 181.27 sq.km. The majority of vegetation of the 10 km radius region is covered under Kashiram Jote near Siliguri.

### **Vegetation:**

The selection of the vegetation class depends on the fertility of the soil and the pattern of land use over time. It is an area within the forest frontier with a prevalent affiliation with trees and other species of vegetation capable of growing timber and other forest products. This land use/land cover class in the project area covered 21.33 sq. km of woodland vegetation class, which is 6.69 % of the overall study area.

### **Tea Garden:**

Figure 4 shows the distribution of the tea garden patches located in Kashirmajote, covering an area of 55.51 sq.km, constituting 17.4% of the area near the project location. The North Bengal Tea Industry production areas are in the North Bengal region of West Bengal state, in Eastern India. It includes tea estates and facilities in the districts of Darjeeling, Jalpaiguri, Cooch Behar, Kishanganj and North Dinajpur in West Bengal. North Bengal has about 450 tea gardens spread out in the Darjeeling Hills, Terai, and Dooars regions that are registered as sellers in the Siliguri Tea Auction Centre. Siliguri Tea Auction Centre was established in the year 1976 for the better marketing facility of the local tea products. This tea auction centre has immensely reduced the travel time of tea growers of North Bengal to market the end product at this centre either wise this tea grower had to market them at Guwahati Tea Auction centre which is about 500 km from Siliguri.

### **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 1.2sq. km, which is 0.3% of the overall 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. They cover a minimum area of 5.02sq. km, i.e. 1.57 % of the project area. They are listed as linear land use and land cover categories (Figure 4) for the study region. They demonstrate the presence and density of the drainage system in the sample region. The river bed of the Mahananda River, which flows from south-west to north-east as per fig 4. The Mahananda originates from the Paglajhora falls near Kurseong in West Bengal's Darjeeling district. The water — clean and pristine during origin — turns filthy and polluted as it enters Siliguri in Champasari.

### **Urban Area:**

Built-up Land: is defined as a human ecosystem created as a result of non-agricultural use. Built-up land within a distance of 10 km from the project site, including cities, income settlements, including buildings and industry, factories, roads, communications, water, and vegetation facilities. Out of the total area covered by the settlement and commercial sectors, the area of 32.4 sq.km is part of the built-up land community, which is 10.15% of the total sample area. The area around the site of the sand mining project comes under this class. Potential and process of urban growth and development in Siliguri received recognition in 1931 when it became a non-municipal town, which was followed by its declaration as a Municipal Town in 1950. As Siliguri lies on the traditional trade route to Sikkim, Nepal,

Bhutan and Tibet, even in its initial period of growth, it attracted people from its vast hinterlands stretching as far as Bihar, eastern fringes of Uttar Pradesh and Assam. As a result, Siliguri has acquired a cosmopolitan character. Partition of India accentuated its importance as it placed it in a narrow corridor linking North-East to the rest of the country.

### **Open Land:**

Barren vegetation defines a region of soil where plant growth can be sparse, stunted, and/or contain little biodiversity. Environmental conditions such as toxic or infertile soils, high winds, coastal salt sprays, and climatic conditions are also key factors in poor plant growth and development. Barren terrain has been classified according to the climate, geology, and geographical location of the particular region, covering 13.86 sq.km of the project area, constituting 4.34% of the project area.

### **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.

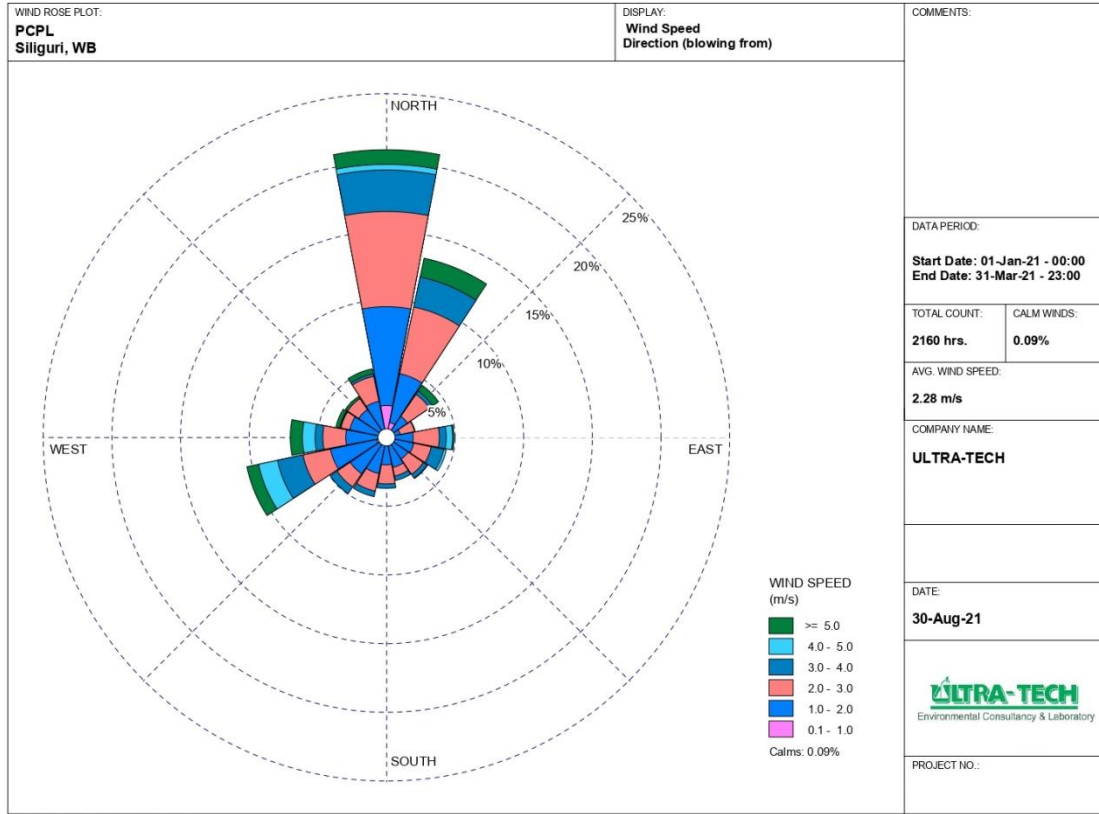
**Table 3.4: Meteorological Monitoring at site**

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 IST
6	Rainfall	Rain Gauge	Daily

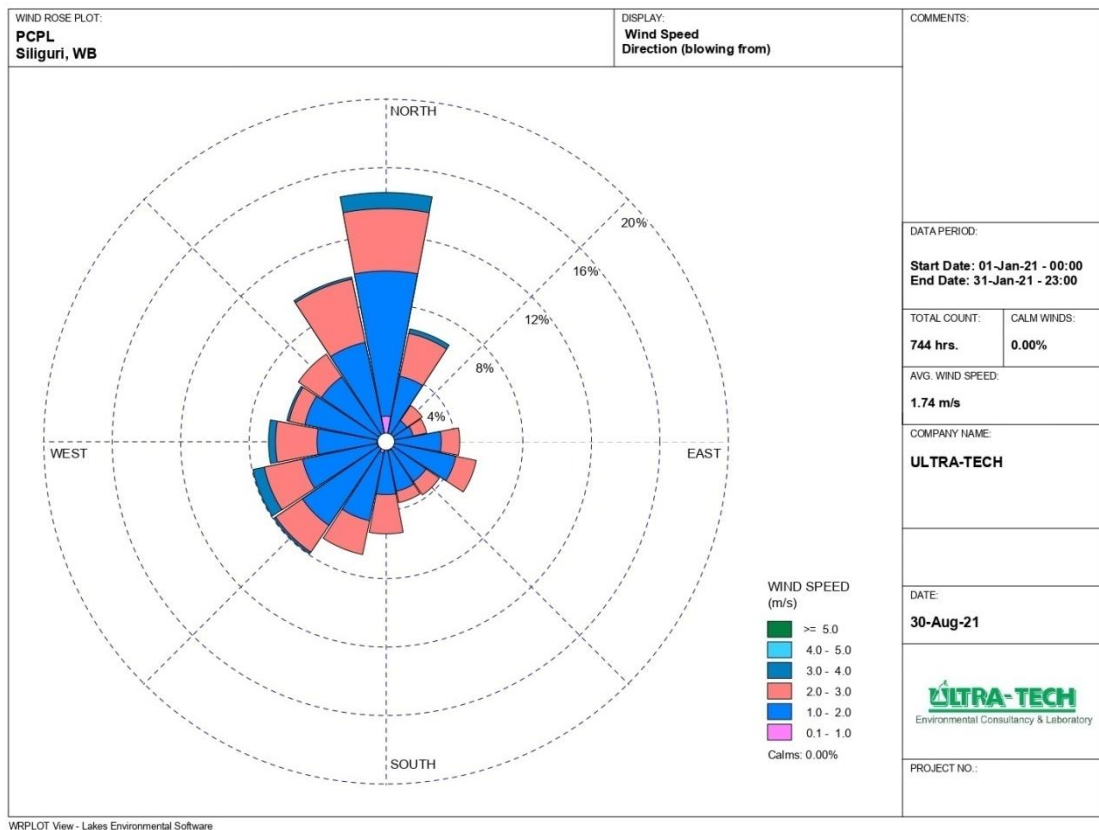
The aforesaid meteorological parameters were being observed in the field during monitoring period. The analysis of the field observations is given in **Table 3.5**. The wind rose during the study period is presented in **Figure 3.8(A), 3.8(B), 3.8(C) & 3.8(D)**.

**Table 3.5: Meteorological Data Recorded at study area**

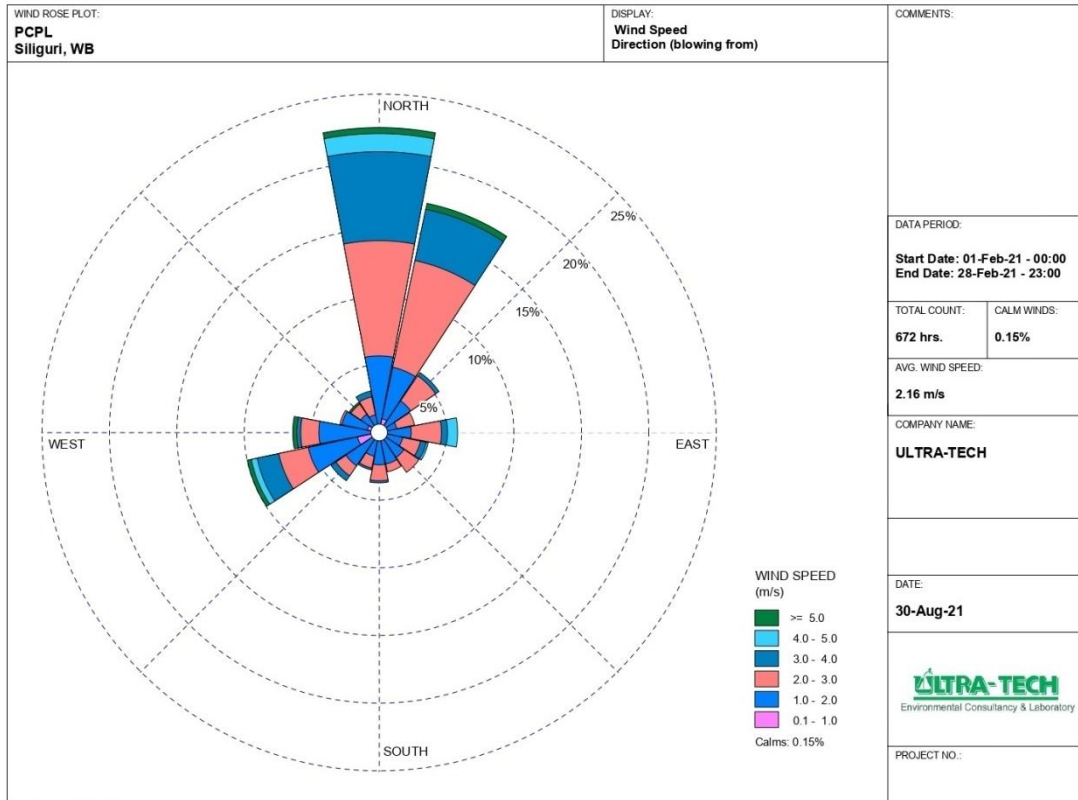
Period	Wind Speed (m/s)		Temp (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Max	Min	
<b>January 2021</b>	3.7	0.2	27	10	64	37	0
<b>February 2021</b>	6.7	0.0	34.3	10	53	14	0
<b>March 2021</b>	7.8	0.0	40.9	15.3	68	4	0



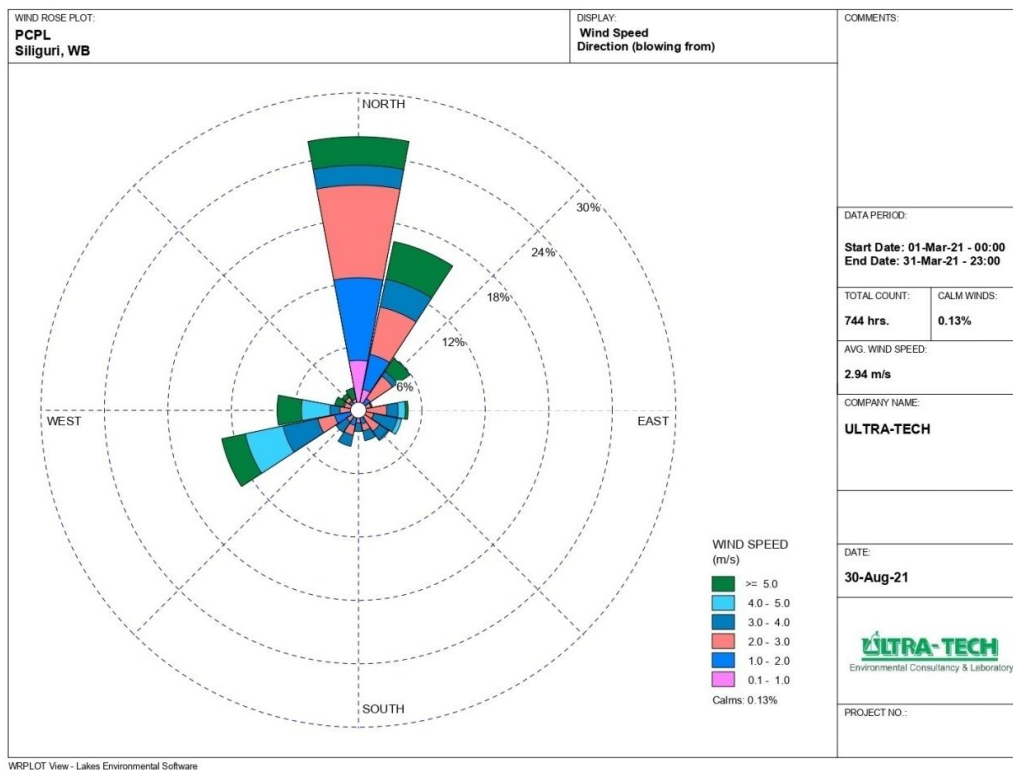
**Figure 3.8(A): Wind rose for period of 1<sup>st</sup> January 2021 to 31<sup>st</sup> March 2021**



**Figure 3.8(B): Wind rose for period of January 2021**



**Figure 3.8(C): Wind rose for the month of February 2021**



**Figure 3.8(D): Wind rose for the month of March 2021**

### 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<sub>10</sub>, PM<sub>2.5</sub>, Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>) and Carbon Monoxide (CO). Their quality monitoring was conducted as per revised NAAQ standards 2009.

#### 3.5.1 Methodology Adopted for the Study

PM<sub>10</sub>, PM<sub>2.5</sub>, Sulphur dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>) and Carbon 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<sub>10</sub>, PM<sub>2.5</sub>, Sulphur dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>) and Carbon 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<sub>2</sub>, NO<sub>2</sub>, CO. Fine Particulate Air sampler PEM-ADS 2.5/10 of Poltech instruments were used for monitoring fine particles i.e PM<sub>2.5</sub> in the ambient air. **Table 3.6** shows the techniques for sampling and analysis for these parameters.

**Table 3.6: Techniques Used for Ambient Air Quality Monitoring**

Parameters	Technique	Technical Protocol	Detectable Limit, ( $\mu\text{g}/\text{m}^3$ )
PM <sub>10</sub>	Respirable Dust Sampler (Gravimetric method)	Gravimetric	10.0
PM <sub>2.5</sub>	FRM method/ Low volume sampling (Gravimetric)	Gravimetric	5.0
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	5.0

Parameters	Technique	Technical Protocol	Detectable Limit, ( $\mu\text{g}/\text{m}^3$ )
Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	5.0
Carbone Monoxide	Non- Dispersive Infrared Absorbtion Method	IS-5182 (Part 10)	1.14 $\text{mg}/\text{m}^3$

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<sub>10</sub> 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<sub>2</sub> and NO<sub>2</sub>. Samples of gases are drawn at a flow rate of 0.2 liters per minute.

PM<sub>10</sub> has been estimated by gravimetric method. Modified West and Gaeke method (IS-5182 part-II, 1969) has been adopted for estimation of SO<sub>2</sub> and Jacobs-Hochheiser method (IS-5182 part-VI, 1975) has been adopted for the estimation of NO<sub>2</sub>. Calibration charts have been prepared for all gaseous pollutants.

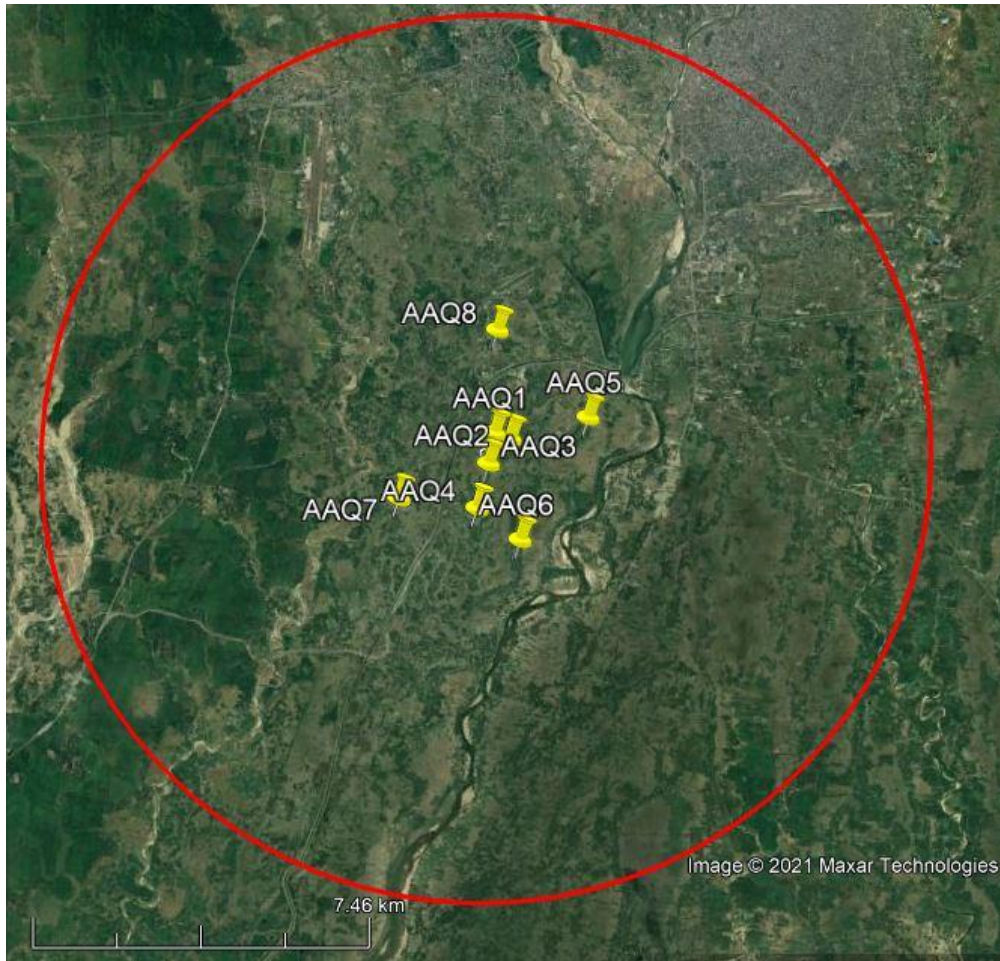
#### ***Duration of Sampling***

The duration of sampling of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>x</sub> 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) (16<sup>th</sup> 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 3.7: Details of Ambient Air Quality Monitoring Locations**

Station Code	Location	Coordinates	Distance & Direction
AAQ-1	Project Site	26°37'42.49"N, 88°22'16.17"E	--
AAQ-2	Kashiram	26°37'38.87"N, 88°22'29.14"E	0.3 Kms E
AAQ-3	Liusipukuri	26°37'19.86"N, 88°22'12.73"E	0.6 Kms S
AAQ-4	Sahananda	26°36'47.15"N, 88°22'5.55"E	1.60 Kms SSW
AAQ-5	Hatiram	26°37'56.79"N, 88°23'31.66"E	2.08 Kms NE
AAQ-6	Rupandighi	26°36'25.61"N, 88°22'41.95"E	2.37 Kms SSE
AAQ-7	Kadmi	26°36'51.68"N, 88°21'1.56"E	2.40 Kms SW
AAQ-8	Narayan	26°38'57.78"N, 88°22'13.84"E	2.28 Kms N



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

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

**Table 3.8: Summary of Ambient Air Quality Monitoring Results**

Location Code	Name of the Location	Range	Values ( $\mu\text{g}/\text{m}^3$ )					
			PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>	NH <sub>3</sub>
AAQ1	Project Site	Min	78.20	26.40	5.70	27.60	20.10	19.20
		Max	102.40	41.30	7.70	37.80	34.20	26.20
		Avg	87.56	34.09	6.53	31.60	28.69	21.76
		<b>98%tile</b>	<b>97.04</b>	<b>40.05</b>	<b>7.44</b>	<b>37.38</b>	<b>33.78</b>	<b>25.78</b>
AAQ2	Kashiram	Min	76.30	20.20	5.20	19.80	20.60	19.20
		Max	90.70	30.40	6.90	30.10	30.20	21.40
		Avg	82.60	24.82	6.10	24.77	24.57	20.10
		<b>98%tile</b>	<b>89.45</b>	<b>30.30</b>	<b>6.90</b>	<b>29.53</b>	<b>30.10</b>	<b>21.35</b>
AAQ3	Liusipukuri	Min	87.30	31.30	5.80	25.40	26.40	19.10
		Max	96.40	43.10	7.30	34.20	31.70	27.50
		Avg	92.83	37.95	6.58	30.38	29.42	21.33
		<b>98%tile</b>	<b>96.40</b>	<b>42.90</b>	<b>7.30</b>	<b>33.95</b>	<b>31.55</b>	<b>25.90</b>
AAQ4	Sahananda	Min	75.40	29.60	5.40	23.70	23.70	19.60

Location Code	Name of the Location	Range	Values ( $\mu\text{g}/\text{m}^3$ )					
			PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>3</sub>	NH <sub>3</sub>
		Max	88.30	39.20	7.30	31.20	32.00	26.40
		Avg	83.12	33.18	6.33	28.01	28.31	21.50
		<b>98%tile</b>	<b>88.30</b>	<b>38.40</b>	<b>7.25</b>	<b>30.95</b>	<b>31.65</b>	<b>25.45</b>
AAQ5	Hatiram	Min	86.50	27.00	5.20	26.40	26.70	19.30
		Max	98.30	35.60	6.60	34.10	33.30	22.40
		Avg	92.10	32.19	5.70	30.43	30.05	20.65
		<b>98%tile</b>	<b>97.80</b>	<b>35.35</b>	<b>6.35</b>	<b>33.65</b>	<b>32.55</b>	<b>22.30</b>
AAQ6	Rupandighi	Min	80.60	29.40	5.20	23.40	26.40	19.40
		Max	98.70	37.90	6.30	30.50	31.20	25.70
		Avg	88.98	31.67	5.70	27.31	28.74	21.68
		<b>98%tile</b>	<b>98.00</b>	<b>37.45</b>	<b>6.30</b>	<b>30.45</b>	<b>30.90</b>	<b>25.65</b>
AAQ7	Kadmi	Min	87.60	30.10	5.30	25.70	23.40	19.50
		Max	98.80	39.50	6.40	32.40	32.40	27.40
		Avg	93.39	34.35	5.72	29.38	27.67	22.11
		<b>98%tile</b>	<b>98.49</b>	<b>39.45</b>	<b>6.35</b>	<b>32.04</b>	<b>31.78</b>	<b>26.88</b>
AAQ8	Narayan	Min	90.40	27.60	5.30	27.80	25.40	19.30
		Max	99.50	41.40	6.90	35.40	32.38	26.40
		Avg	95.99	35.03	6.02	31.61	29.59	22.58
		<b>98%tile</b>	<b>99.50</b>	<b>41.00</b>	<b>6.80</b>	<b>34.75</b>	<b>32.19</b>	<b>26.00</b>
<b>NAAQ Standards</b>			<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>2</b>	

### 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<sub>10</sub>:** The maximum value for PM<sub>10</sub> is observed at AAQ1, as **102.4  $\mu\text{g}/\text{m}^3$** , while the minimum value observed at AAQ4, as **75.40  $\mu\text{g}/\text{m}^3$**  during the study period.

**PM<sub>2.5</sub>:** The maximum value for PM<sub>2.5</sub> is observed at AAQ3, as **43.10  $\mu\text{g}/\text{m}^3$**  with the minimum value observed at AAQ2, as **20.20  $\mu\text{g}/\text{m}^3$**  during the study period.

**SO<sub>2</sub>:** The maximum value for SO<sub>2</sub> is observed at AAQ1, as **7.70  $\mu\text{g}/\text{m}^3$**  with the minimum value observed at AAQ2, AAQ5 & AAQ6, as **5.20  $\mu\text{g}/\text{m}^3$**  during the study period.

**NO<sub>2</sub>:** The maximum value for NO<sub>2</sub> is observed at AAQ1, as **37.80  $\mu\text{g}/\text{m}^3$**  with the minimum value observed at AAQ2, as **19.80  $\mu\text{g}/\text{m}^3$**  during the study period.

**O<sub>3</sub>:** The maximum value for O<sub>3</sub> is observed at AAQ1, as **34.20  $\mu\text{g}/\text{m}^3$**  with the minimum value observed at AAQ1, as **20.10  $\mu\text{g}/\text{m}^3$**  during the study period.

**NH<sub>3</sub>:** The maximum value for NH<sub>3</sub> is observed at AAQ3, as **27.50  $\mu\text{g}/\text{m}^3$**  with the minimum value observed at AAQ3, as **19.10  $\mu\text{g}/\text{m}^3$**  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  $L_{eq}$  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 3.9: 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	73.8	62.4
ANQ 2	Kashiram	65	55	63.4	48.2
ANQ 3	Liusipakuri	65	55	63.7	46.4
ANQ 4	Sahananda	65	55	62.6	45.5
ANQ 5	Hatiram	65	55	64.1	41.2
ANQ 6	Rupandighi	65	55	60.8	40.6
ANQ 7	Kadmi	65	55	62.3	44.2
ANQ 8	Narayan	65	55	62.3	39.7

- **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 3.10** describes ambient noise standards.

#### In Respect of Noise\*

**Table 3.10: Ambient Noise Standards**

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

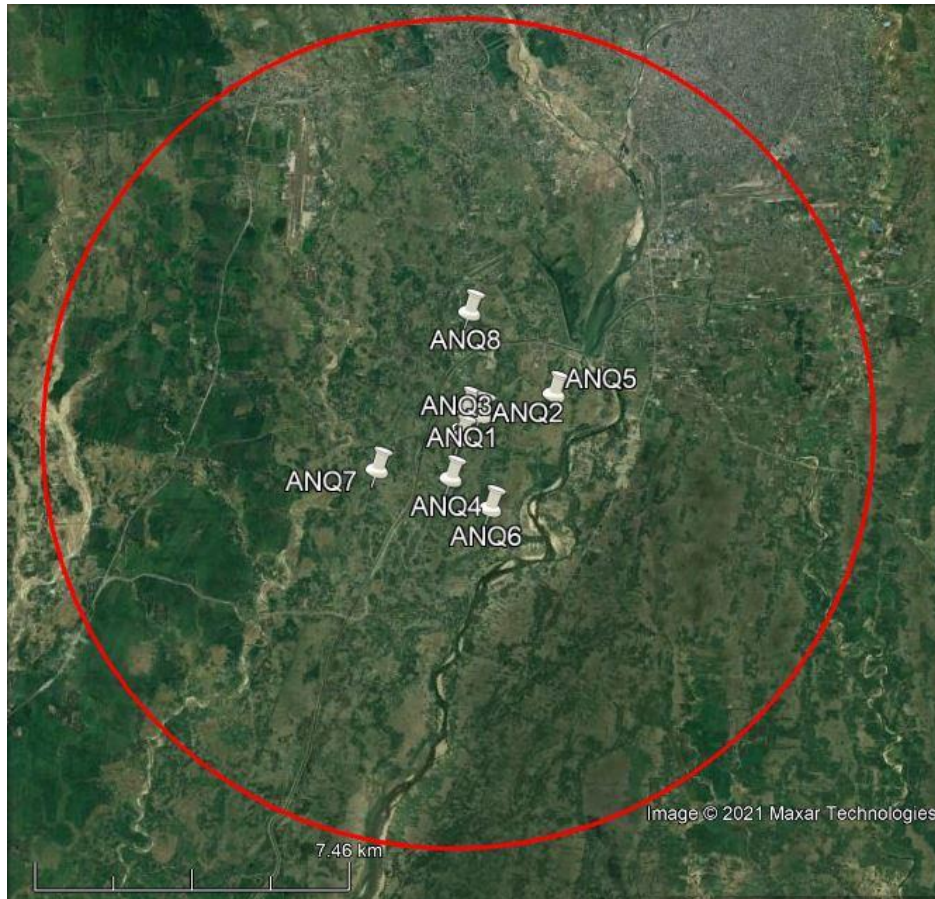
\* As per Environment protection act.

\*\* 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 3.9**. Noise level of the study area varied from 60.8 to 73.8 dB (A) in day time and from 39.7 to 62.4 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<sub>3</sub>. 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

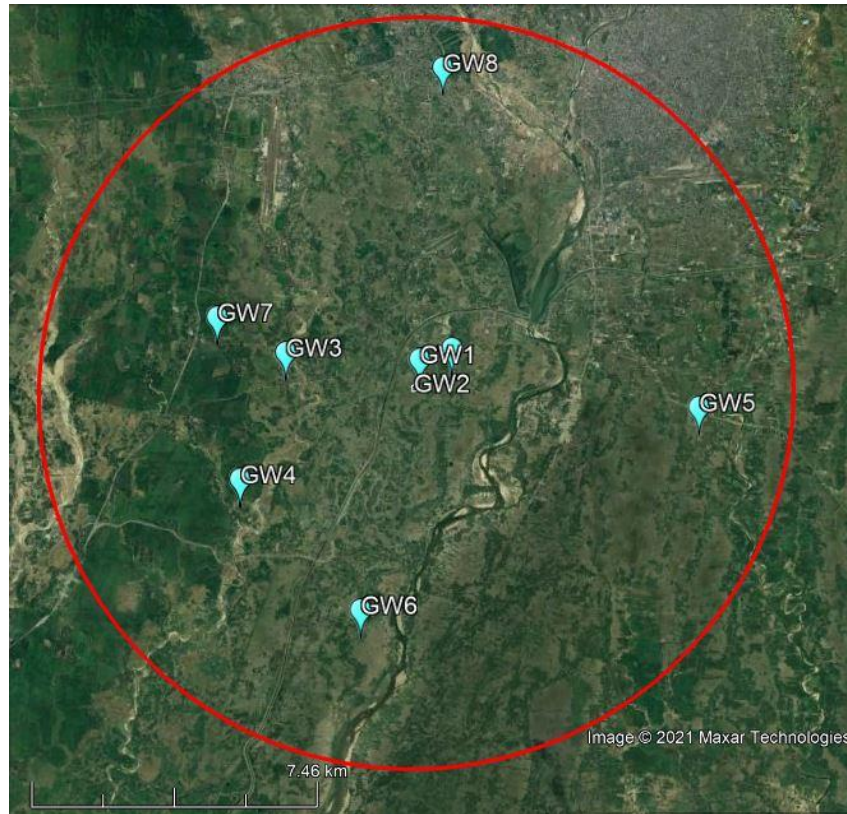
Eight (8) ground water samples and Eight (8) surface water samples were collected. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards for drinking water as per IS: 10500:2012. The Ground & Surface water sampling locations are listed below in **Table 3.11(A) & 3.11(B)** and **Figure 3.9(C) & 3.9(D)**.

**Table 3.11(A): Ground Water Sampling Locations**

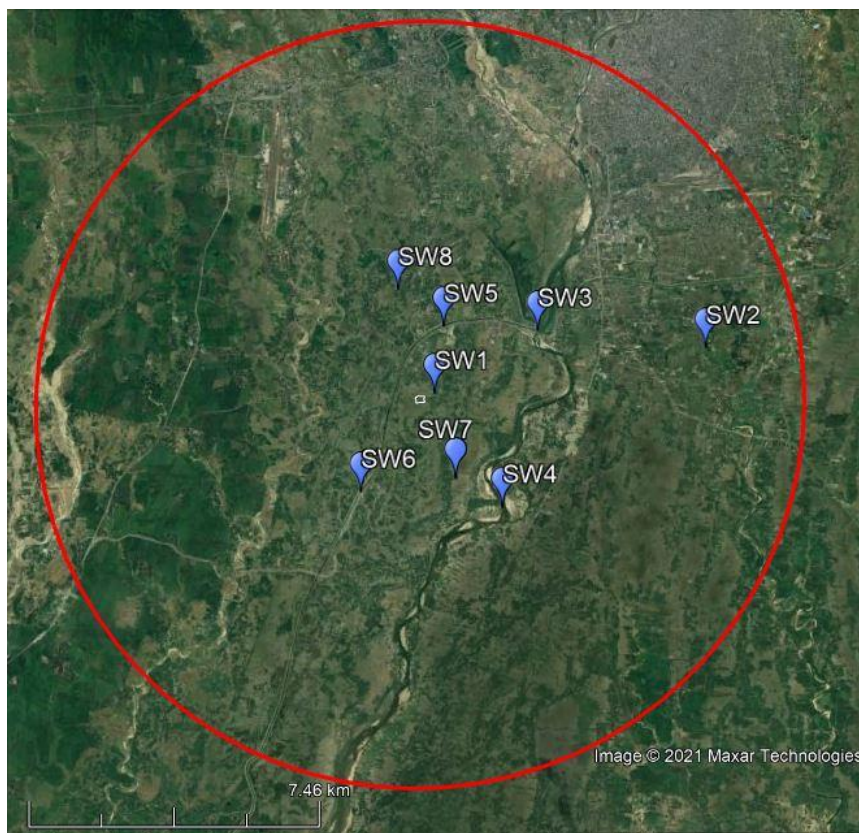
Code	Location	Coordinates	Distance & Direction
GW-1	Project Site	26°37'42.49"N, 88°22'16.17"E	--
GW-2	Kashiram	26°37'53.44"N, 88°22'47.53"E	0.86 Kms NE
GW-3	Antigachh	26°37'43.48"N, 88°20'8.45"E	3.37 Kms W
GW-4	Nembutari	26°35'52.91"N, 88°19'32.55"E	5.42 Kms SW
GW-5	Radhabari	26°37'12.39"N, 88°26'47.34"E	7.51 Kms E
GW-6	Purbba Bansaon Kismat	26°34'6.70"N, 88°21'35.02"E	6.60 Kms S
GW-7	Hansqua Sarcargachher Chhat	26°38'11.26"N, 88°19'0.62"E	5.29 Kms WNW
GW-8	Bara Mohansingh	26°41'57.99"N, 88°22'23.48"E	7.84 Kms N

**Table 3.11(B): Surface Water Sampling Locations**

Code	Location	Coordinates	Distance & Direction
SW-1	Pond Near Leusipakuri Market Complex	26°37'47.80"N, 88°22'27.12"E	0.26 Kms NE
SW-2	Pond in Binnaguri	26°38'36.53"N, 88°26'40.69"E	7.43 NE
SW-3	Mahananda River US	26°38'44.82"N, 88°24'1.33"E	3.49 Kms NE
SW-4	Mahananda River DS	26°36'14.64"N, 88°23'36.97"E	3.40 Kms SE
SW-5	Teesta Sub Canal US	26°38'44.84"N, 88°22'32.12"E	1.95 Kms NE
SW-6	Teesta Sub Canal DS	26°36'21.96"N, 88°21'23.32"E	2.72 Kms SW
SW-7	Pond in Rupandighi	26°36'37.53"N, 88°22'51.51"E	2.09 Kms SE
SW-8	Pond in Nirmmal Area	26°39'14.44"N, 88°21'46.96"E	2.85 Kms NW



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



**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 3.12** 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 3.12: Ground Water Characteristics**

Sl. No.	Parameters	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	Requirement/limit As per IS 10500:2012	
										Desirable	Permissible
1	pH (at 25 <sup>0</sup> C)	7.14	6.38	6.29	6.37	5.06	6.56	6.67	6.21	6.5 -8.5	No Relaxation
2	Conductivity (µmho/cm )	153.7	93.7	124.8	89.4	131	126.1	150.6	118.2	--	--
3	Colour (Hazen)	<5	<5	<5	<5	<5	<5	<5	<5	5	15
4	Turbidity, NTU, Max	<1	<1	<1	<1	<1	<1	<1	<1	1	5
5	Total Dissolved Solid , mg/l	123	76.4	93.6	73.2	104.8	97.4	106.2	94.6	500	2000
6	Alkalinity (as CaCO <sub>3</sub> ), mg/l	67.3	48.2	41.4	47.9	62.1	52.7	59.4	57.8	200	600
7	Total Hardness (asCaCO <sub>3</sub> )mg/l	59.3	36.2	48.1	33.4	50.6	48.4	58.2	45.6	200	600
8	Calcium (as Ca) ,mg/l	12.5	7.6	10.1	6.9	10.6	12.4	12.8	9.7	75	200
9	Magnesium (as Mg) , mg/l	6.8	4.1	5.5	3.7	5.7	5.6	6.7	5.1	30	100
10	Chloride (as Cl) ,mg/l	19.2	12.8	15.9	11.6	18.9	16.8	16.2	15.2	250	1000
11	Iron (as Fe), mg/l	0.84	1.46	6.57	6.52	1.28	6.78	4.81	5.31	0.3	No Relaxation
12	Fluoride, (as F), mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	1.5
13	Sulphate (as SO <sub>4</sub> ) ,mg/l	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	200	400
14	Arsenic (as As) mg/l,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.05
15	Sodium(as Na) mg/l,	13.8	8.6	11.8	8.1	12.9	11.4	12.1	10.4	--	--
16	Potassium(as K) mg./l,	5.7	3.1	4.9	3.9	5.1	4.6	5	4.4	--	--
17	**Total Coliform Count, MPN/100ml	Absent.	Absent.	Absent.	Absent.	Absent.	Absent.	Absent.	Absent.	Shall not be detectable in any 100 ml sample	

**Table 3.13(A): Surface Water Characteristics**

S. N.	Parameters	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
1	pH (at 25°C)	6.7	6.67	7.5	6.46	5.72	7.4	5.6	5.89
2	Conductivity (µmho/cm)	123	106	111.8	112	94.6	103	41.3	39.8
3	Turbidity, NTU, Max	<1	<1	<1	<1	<1.0	<1.0	<1	<1.0
4	Total Dissolved Solid, mg/l	64.2	59.2	68.4	69.2	56.8	55.2	34.4	37.2
5	Alkalinity (as CaCO <sub>3</sub> ), mg/l	35.2	36.1	40.7	38.1	37.8	41.7	25.8	22.8
6	Total Hardness (as CaCO <sub>3</sub> ), mg/l	28.4	23.5	30.2	31.4	27.2	28.3	18.8	17.8
7	Calcium (as Ca), mg/l	7.1	5.9	7.3	7.7	8.2	8	5.5	5.3
8	Magnesium (as Mg), mg/l	4.7	<2.0	4.2	4.6	3.9	3.2	<2.0	<2.0
9	Chloride (as Cl), mg/l	14.3	13.8	15.6	16.2	12.1	12.9	11.2	11.5
10	Iron (as Fe), mg/l	0.17	0.15	0.19	0.16	0.18	0.21	0.14	0.13
11	Fluoride, (as F), mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
12	Sulphate (as SO <sub>4</sub> ), mg/l	7.2	6.8	6.1	6.9	6.4	7.1	<5.0	<5.0
13	Nitrate (as NO <sub>3</sub> ), mg/l	4.4	3.8	4.1	4.9	4.5	4.8	2.8	3.2
14	Arsenic (as As) mg/l,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
15	Chromium as Cr +6 mg/l,	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Copper as Cu (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Phenolic Compounds mg/l,	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
18	Alluminium as Al (mg/l)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
19	Boron as B (mg/l)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
20	Sodium (as Na) mg/l,	13.4	11.2	12.8	12.4	10.2	11.9	6.8	5.6
21	Potassium (as K) mg./l,	8.9	7	7.9	7.2	6.9	7.8	4.7	3.8
22	Dissolved Oxygen	4.2	5.2	5.6	6.2	5.5	5.1	3.2	3.2
23	Total Suspended Solids (mg/l)	14.4	13.4	12.4	12.6	14.4	16.2	18.4	20.2
24	Oil & Grease (mg/l)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
25	Chemical Oxygen Demand (mg/l)	10	12.2	10	10	10	10	11.2	45.8
26	Biological Oxygen Demand 3 days at 27°C (mg/l)	3.2	3.4	2.8	2.8	3.8	3.8	4.4	14
27	Phosphate as PO <sub>4</sub> <sup>-3</sup>	1.92	1.84	1.72	1.89	1.81	1.78	1.68	1.59

S. N.	Parameters	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
28	**Total Coliform Count, MPN/100ml	580	480	490	410	460	490	410	460
29	**Faecal Coliform Count, MPN/100ml	380	260	270	220	250	320	230	210

**Table 3.13(B): Surface Water Quality Standards**

Class of water	Criteria
A	<ul style="list-style-type: none"> <li>Total Coliforms Organism MPN/100ml shall be 50 or less</li> <li>pH between 6.5 and 8.5</li> <li>Dissolved Oxygen 6mg/l or more</li> <li>Biochemical Oxygen Demand 5 days 20C 2mg/l or less</li> </ul>
B	<ul style="list-style-type: none"> <li>Total Coliforms Organism MPN/100ml shall be 500 or less</li> <li>pH between 6.5 and 8.5</li> <li>Dissolved Oxygen 5mg/l or more</li> <li>Biochemical Oxygen Demand 5 days 20C 3mg/l or less</li> </ul>
C	<ul style="list-style-type: none"> <li>Total Coliforms Organism MPN/100ml shall be 5000 or less</li> <li>pH between 6 to 9</li> <li>Dissolved Oxygen 4mg/l or more</li> <li>Biochemical Oxygen Demand 5 days 20°C 3mg/l or less</li> </ul>
D	<ul style="list-style-type: none"> <li>pH between 6.5 to 8.5</li> <li>Dissolved Oxygen 4mg/l or more</li> <li>Free Ammonia (as N) 1.2 mg/l or less</li> </ul>
E	<ul style="list-style-type: none"> <li>pH between 6.0 to 8.5</li> <li>Electrical Conductivity at 25C micro mhos/cm Max.2250</li> <li>Sodium absorption Ratio Max. 26</li> <li>Boron Max. 2mg/l</li> </ul>

### 3.7.4 Observations

#### Ground Water Quality

- The analysis results indicate that the pH ranges in between 5.06 to 7.14, which is well within the specified standard of 6.5 to 8.5. The minimum pH of 5.06 was observed at GW5; the maximum pH of 7.14 was observed at GW1.
- Total hardness was observed to be ranging from 33.4 to 59.3 mg/l. The minimum hardness (33.4 mg/l) was recorded at GW4 and the maximum (59.3 mg/l) was recorded at GW1.
- Chlorides were found to be in the range of 11.6 to 19.2 mg/l, the minimum concentration of chlorides (11.6 mg/l) was observed at GW4, whereas the maximum value of 19.2 mg/l was observed at GW1.
- Sulphates were found to be less than 5.0 mg/l in all the locations.
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 73.2 to 123 mg/l, the minimum TDS observed at GW4 (73.2 mg/l) and maximum concentration of TDS observed at GW1 (123 mg/l).

#### Surface Water Quality

- The analysis results indicate that the pH values in the range of 5.6 to 7.5, the minimum value was observed at SW7 and maximum value was observed at SW3.
- DO was observed to be in the range of 3.2 to 6.2 mg/l. The minimum DO value was observed at SW7 & SW8 and maximum DO was observed at SW4.
- The TDS was observed in the range of 34.4 to 69.2 mg/l, the minimum TDS value was observed at SW7, and where as maximum value was observed at SW4.
- The chlorides and Sulphates were found to be in the range of 11.2 to 16.2 mg/l and <5.0 to 7.2 mg/l, respectively.
- Total hardness expressed as CaCO<sub>3</sub> ranges between 17.8 to 31.4 mg/l.
- The calcium & magnesium were found to be in the range of 5.3 to 8.2 mg/l and <2.0 to 4.7 mg/l, respectively.
- As per CPCB Classification Surface Water quality of SW3 & SW4 falls in Class C, SW1, SW2, SW5 & SW6 falls in Class D and SW7 & SW8 falls in Class E.

### 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:

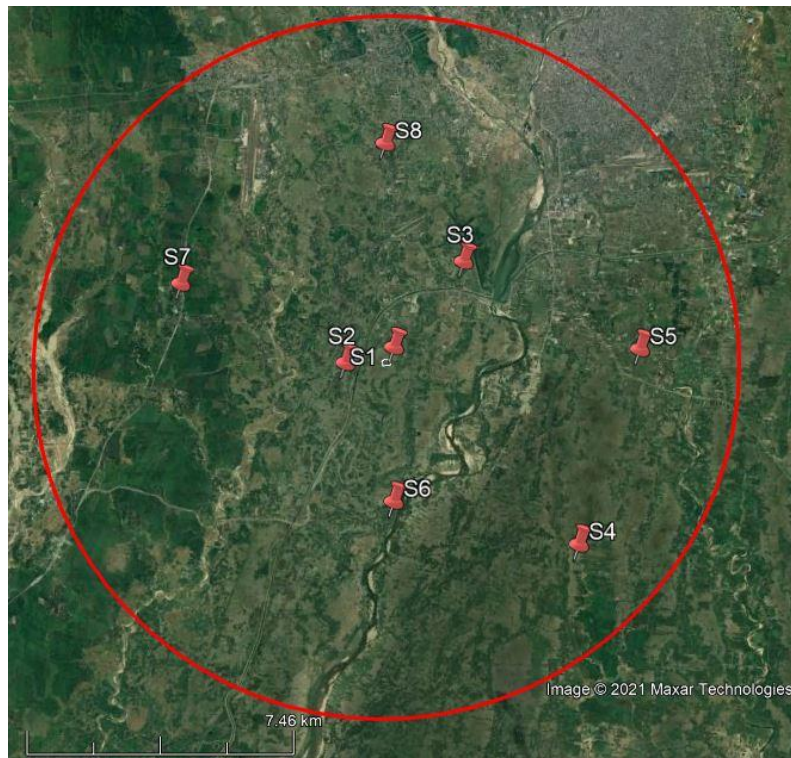
*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

- 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 3.14** 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 3.15(B)**.

**Table 3.14: Soil Sampling Stations in the Study Area**

Code	Location	Coordinates	Distance & Direction
S-1	Project Site	26°37'42.49"N, 88°22'16.17"E	--
S-2	Liusipukuri	26°37'24.96"N, 88°21'27.97"E	1.27 Kms SW
S-3	Dwarabaksa	26°39'3.57"N, 88°23'23.57"E	3.02 Kms NE
S-4	Sannyasikata	26°34'48.97"N, 88°25'36.53"E	7.60 Kms SE
S-5	Binnaguri	26°37'49.91"N, 88°26'29.25"E	6.97 Kms ENE
S-6	Phansidewa	26°35'20.24"N, 88°22'25.75"E	4.28 Kms SSE
S-7	Hansqua Dalur Chhat	26°38'31.27"N, 88°18'33.96"E	6.14 Kms WNW
S-8	Ranga Pani	26°40'50.49"N, 88°21'55.73"E	5.73 Kms NNW



**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 3.15(A)**.

**Table 3.15(A): Soil Quality Monitoring Results**

S.N	Parameters	S1	S2	S3	S4	S5	S6	S7	S8
1	Colour	Hue 2.5YR-5/0 gray	Hue 5YR-4/1 dark gray	Hue 2.5YR-5/0 gray	Hue 7.5YR-4/0 dark gray	Hue 5YR-7/0 light gray	Hue 5YR-5/1 gray	Hue 10 YR-4/1 dark gray	Hue 5YR-4/1 dark gray
2	Texture	Sand=21.8%	Sand=20.4%	Sand=22.7%	Sand=19.7%	Sand=21.8%	Sand=22.2%	Sand=19.8%	Sand=28.5%
		Silt=53.4%	Silt=50.5%	Silt=50.4%	Silt=48.1%	Silt=52.0%	Silt=57.4%	Silt=50.5%	Silt=59.4%
		Clay=24.8%	Clay=29.1%	Clay=12.9%	Clay=26.9%	Clay=26.5%	Clay=20.4%	Clay=41.5%	Clay=12.1%
		Texture: Silty clay	Texture: Silty clay	Texture: Sandy silt	Texture: Silty clay	Texture: Silty clay	Texture: Silty clay	Texture: Silty clay	Texture: Silty sand
3	pH (1:2.5 ratio)	8.07	7.69	8.11	7.97	7.48	6.96	8.13	6.68
4	Conductivity ( $\mu$ mhos/cm)	940	1210	950	980	1040	990	1160	880
5	Sodium (as Na) mg/kg	0.01	0.027	0.011	0.016	0.018	0.015	0.02	0.009
6	Potassium (as K) mg/kg	0.018	0.042	0.018	0.024	0.028	0.02	0.036	0.011
7	Calcium (as Ca) mg/kg	0.3	0.44	0.34	0.35	0.36	0.4	0.38	0.21
8	Magnesium (as Mg) mg/kg	0.16	0.33	0.18	0.26	0.3	0.2	0.28	0.14
9	Nitrogen mg/kg	0.069	0.082	0.072	0.083	0.076	0.065	0.088	0.064
10	Phosphates (as P <sub>2</sub> O <sub>5</sub> ) mg/kg	0.03	0.051	0.033	0.037	0.034	0.037	0.044	0.028
11	Total Organic Carbon %	3.24	3.12	3.51	3.02	3.22	2.98	3.35	1.68

**Table 3.15(B): 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 6.68 to 8.13. The minimum pH value of 6.68 was observed at S8 where as the maximum value of 8.13 was observed at S7.
- The electrical conductivity was observed to range from 880 to 1210  $\mu$  mhos/cm, with the maximum observed at S2 with the minimum observed in S8.
- The nitrogen value found between the range of 0.064 to 0.088 mg/kg and Total Organic Carbon found between 1.68% to 3.51%.

## 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 show 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

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

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 Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal 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).

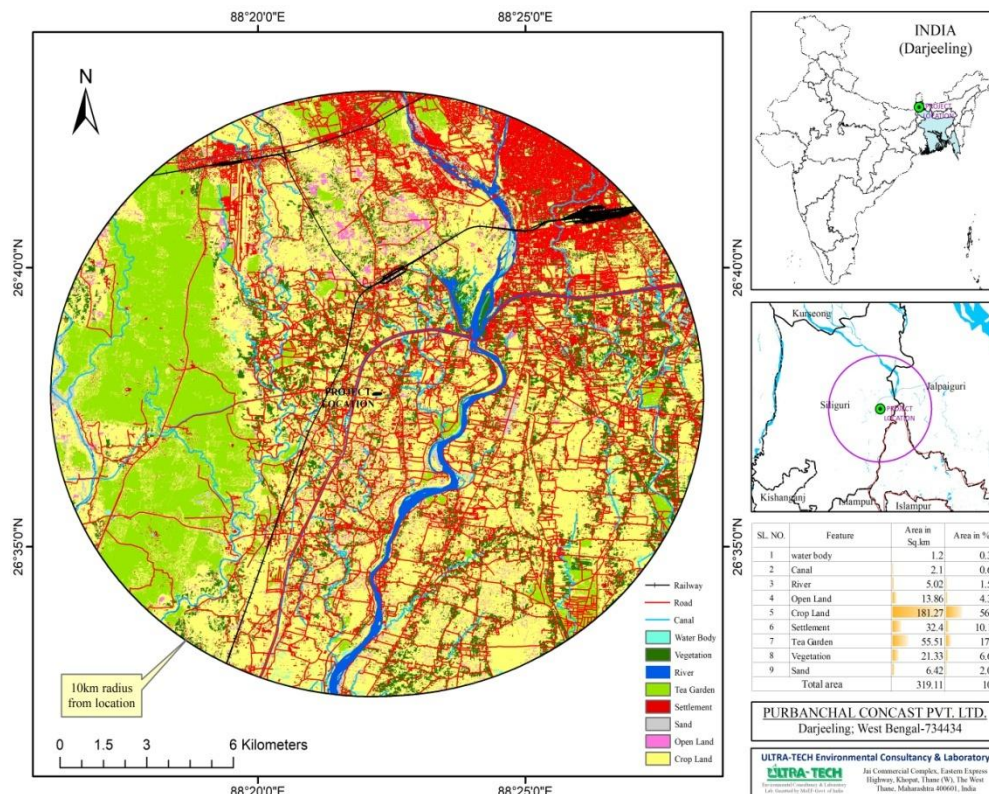


Figure 3.10: Study Area for Biological Environment

### 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) Flora:

The floristic survey reveals that the project site possesses different varieties of flora such as: The floristic survey reveals that the project site possesses different varieties of flora (**Table 3.16**) such as:

- **Trees:** There are no naturally grown trees in the project site. However, Trees like *Ficus religiosa*, *Mangifera indica*, *Polyalthia longifolia*, *Ailanthus excels*, *Dypsis lutescens* etc. are planted in green belt.
- **Shrubs:** *Citrus limon*., *Cycas revolute*, *Thuja Occidentalis* & *Embelia ribes*
- **Herbs:** *Achyranthes aspera*, *Parthenium hysterophorus*, *Euphorbia hirta* etc.
- **Palms :** *Caryota urens*

### b) Fauna:

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

- **Mammals:** *Canis lupus familiaris* and *Funambulus palmarum*
- **Reptiles:** *Calotes versicolor*
- **Avifauna:** *Acridotheres tristis*, *Merops orientalis*, *Saxicoloides fulvicata*, *Nectarinia asiatica* , *Corvus splendens*, *Pycnonotus cafer* etc.
- **Butterflies:** *Danaus chrysippus*, *Phalanta phalantha*, *Junonia orithya* etc.

### c) Aquatic Ecology:

There is no water body within the Project site.

## 3.9.5.2 Area between Project site & 10 km of the project site

### A. Terrestrial Ecology

#### a) Flora:

Based on field survey primary data were generated by preparing a general checklist of the plants encountered in this area. The study showed overall 107 species from 94 genera and 59 families (**Table 3.1**). The floristic survey reveals that the study area is having dominance of trees viz Dominant tree species in Study area are *Ailanthus excels*, *Azadirachta indica*, *Acacia auriculiformis*, *Michelia champaea*, *Bombax ceiba*, *Cassia fistula* , *Ficus elastica*, and *Terminalia tomentosa* etc. (**Table 3.16**) Dominant families of plants recorded in the study area are Caesalpiniaceae, Fabaceae, Mimosaceae, Euphorbiaceae, Cucurbitaceae, Papilionaceae. There is an agriculture land, tea gardens, and scattered vegetation in a study area. In view of this IVI was not studied

**Table 3.16: Presence of vegetation up to 10 km surroundings of the project site**

SN	Botanical name	Common name	Family
<b>Trees</b>			
1.	<i>Azadirachta indica</i>	Neem tree	Meliaceae
2.	<i>Albizia lebbek</i>	Sirish	Fabaceae
3.	<i>Aegle marmelous</i>	Bael	Rutaceae
4.	<i>Acacia catechu</i>	Khair	Fabaceae
5.	<i>Acacia nilotica</i>	Babul	Fabaceae
6.	<i>Acacia auriculiformis</i>	Arteliyn Babul	Mimosaceae
7.	<i>Artocarpus heterophyllus</i>	Rukh	Moraceae
8.	<i>Artocarpus integrifolia</i>	jackfruit	Moraceae
9.	* <i>Ailanthus excelsa</i>	Gokul	Simaroubaceae
10.	<i>Adina cordifolia</i>	Haldu	Rubiaceae
11.	<i>Bombax ceiba</i>	Samal	Malvaceae
12.	<i>Butea monosperma</i>	Palas	Leguminosae
13.	<i>Boswellia serrata</i>	Indian franki	Burseraceae
14.	<i>Bauhinia variegata</i>	Kachanar	Fabaceae
15.	<i>Bauhinia purpurea</i>	Tanki	Fabaceae
16.	* <i>Citrus limon</i>	Nimbu	Rutaceae
17.	<i>Cassia fistula</i>	Amaltash	Fabaceae
18.	<i>Castanopsis hystrix</i>	Katus	Fagaceae
19.	<i>Careya arborea</i>	Kumbh	Lecythidaceae
20.	<i>Carica papaya</i>	Papaya	Caricaceae
21.	<i>Cassia siamea</i>	Kashid	Fabaceae
22.	<i>Casuarina equisetifolia</i>	Australian pine tree	Casuarinaceae
23.	<i>Caesalpinia pulcherrima</i>	Krishnachaura	Fabaceae
24.	* <i>Ceiba pentandra</i>	Kapok tree	Bombacaceae
25.	<i>Dalbergia sisso</i>	Sisam	Fabaceae
26.	<i>Daphniphyllum himalayense</i>	Raktachandan	Daphniphyllaceae
27.	<i>Dillenia pentagyna</i>	Tatri	Dilleniaceae
28.	<i>Delonix regia</i>	Gulmohar	Caesalpiniaceae
29.	<i>Eucalyptus globolus</i>	Safeda	Myrtaceae
30.	<i>Elaeocarpus lanceifolius</i>	Bhadrasae	Elaeocarpaceae
31.	<i>Elaeocarpus sikkimensis</i>	Bhadrasae	Elaeocarpaceae
32.	<i>Elaeocarpus rugosus</i>	Nandiki	Elaeocarpaceae
33.	<i>Ficus benghalensis</i>	Wad	Moraceae
34.	<i>Ficus racemosa</i>	Umber	Moraceae
35.	<i>Ficus benjamina</i>	Weeping fig	Moraceae
36.	<i>Erythrina variegata</i>	Sunshine Tree	Fabaceae
37.	<i>Ficus elastica</i>	Rubber	Moraceae
38.	* <i>Ficus religiosa</i>	Pimpal	Moraceae
39.	<i>Gmelina arborea</i>	Candahar tree	Verbenaceae,
40.	<i>Grewia serrulata</i>	-	Malvaceae
41.	<i>Haldina cordifolia</i>	Karam	Rubiaceae
42.	<i>Leucaena leucocephala</i>	Subabul	Fabaceae
43.	<i>Lagerstroemia reginae</i>	Jarul	Lythraceae
44.	<i>Mitragyna parvifolia</i>	Karam	Rubiaceae
45.	<i>Mimusops elengi</i>	Bakul	Sapotaceae

SN	Botanical name	Common name	Family
46.	<i>*Mangifera indica</i>	Aam	Anacardiaceae
47.	<i>* Michelia champaea</i>	Chapha	Magnoliaceae
48.	<i>Neolamarckia cadamba</i>	Kadam	Rubiaceae
49.	<i>Nyctanthes arbortristis</i>	jasmine	Oleaceae
50.	<i>Nephelium litchi</i>	Litchi	Sapindaceae
51.	<i>Pithecellobium dulce</i>	Jungle jalebi	Fabaceae
52.	<i>Pongamia pinnata</i>	Karanj	Fabaceae
53.	<i>*Polyalthia longifolia</i>	Ashoka	Annonaceae
54.	<i>Prosopis juliflora</i>	Bilayati Babool	Fabaceae
55.	<i>Peltophorum pterocarpum</i>	Copperpod	Leguminosae
56.	<i>Syzygium cumini</i>	Jamun	Myrtaceae
57.	<i>Toona ciliata</i>	red cedar	Meliaceae
58.	<i>Tamarindus indica</i>	Iml	Fabaceae
59.	<i>Tectona grandis</i>	Sag	Verbenaceae
60.	<i>Terminalia tomentosa</i>	Indian laurel	Combretaceae
61.	<i>Trema orientalis</i>	Terma	Cannabaceae
62.	<i>Zizphus glaberrima</i>	Ber	Rhamnaceae
<b>Shrubs</b>			
1.	<i>Annona squamosa</i>	Sarifa	Annonaceae
2.	<i>Cassia tora</i>	Tarota	Fabaceae
3.	<i>Catharanthus roseus</i>	Nayantara	Apocynaceae
4.	<i>Calotropis gigantea</i>	Aank	Asclepiadaceae
5.	<i>Dobinea vulgaris</i>	Sangli phul	Anacardiaceae
6.	<i>Dendrophthoe falcata</i>	Banda	Loranthaceae
7.	<i>Dichroa febrifuga</i>	Basak	Hydrangeaceae
8.	<i>*Embelia ribes</i>	black pepper	Primulaceae
9.	<i>Hibiscus rosa-chinensis</i>	Hibiscus	Malvaceae
10.	<i>Lantana camara</i>	Raimuniya	Verbenaceae
11.	<i>Nerium oleander</i>	Kaner (Red)	Apocynaceae
12.	<i>Ocimum sanctum</i>	Tulsi	Labiatae,
13.	<i>Ocimum basilicum</i>	Basil	Labiatae
14.	<i>Psidium guajava</i>	Amrud	Myrtaceae
15.	<i>Ricinus communis</i>	Arandi	Euphorbiaceae
16.	<i>*Thuja occidentalis</i>	Thuja	Cupressaceae
17.	<i>*Cycas revoluta</i>	Sago plant	Cycadaceae
<b>Herbs</b>			
1	<i>Achyranthes aspera</i>	Pigweed	Amaranthaceae
2	<i>Argemone mexicana</i>	Pivladhotra	Papaveraceae
3	<i>Agave angustifolia</i>	Agave	Agavaceae,
4	<i>Aloe vera</i>	Aloe vera	Asphodelaceae
5	<i>Parthenium hysterophorus</i>	Gajar Grass/Congress grass	Asteraceae
6	<i>Euphorbia hirta</i>	Pusidudh	Euphorbiaceae
7	<i>Mimosa pudica</i>	Lajwanti	Mimosaceae
8	<i>Cymbidium aloifolium</i>	kopou	Orchidaceae
<b>Grasses</b>			
1	<i>Dendrocalamus strictus</i>	Bass	Poaceae
2	<i>Bambusa arundinacea</i>	Kat bass	Poaceae

SN	Botanical name	Common name	Family
3	<i>Saccharum spontaneum</i>	Kans	Poaceae
4	<i>Cynodon dactylon</i>	Dube	Poaceae
5	<i>Dichanthium annulatum</i>	-	Poaceae
6	<i>Eragrostis nigra</i>	-	Poaceae
7	<i>Eragrostis tenella</i>	-	Poaceae
<b>Climbers</b>			
1	<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae
2	<i>Bougainvillea glabra</i>	Bougainvillea	Nyctaginaceae
3	<i>Jasminum pubescens</i>	Jasminum	Oleaceae
4	<i>Cucurbita pepo.</i>	Pumpkin	Cucurbitaceae
<b>Palms</b>			
1	<i>Borassus flabellifer</i>	Sugar palm	Arecaceae
2	<i>Phoenix sylvestris</i>	Khajoor	Arecaceae
3	* <i>Caryota urens</i>	Rangbhang	Arecaceae
4	<i>Areca catechu</i>	Supari	Arecaceae
<b>Aquatic Vegetation</b>			
1	<i>Typha elephantina</i>	Era	Typhaceae
2	<i>Hydrilla verticillata</i>	Hydrilla	Hydrocharitaceae
3	<i>Nymphaea lotus</i>	White lotus	Nymphaeaceae
4	<i>Nelumbo nucifera</i>	Indian lotus	Nelumbonaceae
5	<i>Cyperus rotundus</i>	Nutgrass, Coco	Cyperaceae

Source: Primary data generation by Ultratech team

\* Also observed on site Project site

## b) Fauna

### Methodology

Field observations were carried out during March 2021. The diversity of fauna basically depends upon density and diversity of flora. The existing fauna i.e. mammals, amphibians, reptiles, butterflies, dragonflies and damselflies in and around project site were enumerated. Further, information towards faunal diversity from secondary sources was collected on interaction with the local people and Forest Dept. officials.

#### b.1) Vertebrates

##### Mammals

The domestic animals in the study area mostly comprise of dog, cat and cow. The survey revealed that 14 species of mammals were recorded in and around the study area. During the site survey Rhesus macaque, Porcupine, Wild Boar, Squirrel etc, was observed in the study area.

While no wild mammal was observed in this during survey **Table 3.17**. None of these animals are endangered (Schedule I) as per Wildlife (Protection) Act 1972.

## *Amphibians & Reptiles*

Two species of amphibians & eight species of reptiles were recorded. Availability of fauna in the vicinity of the sites is presented in **Table 3.17**.

## *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, 42 species of birds were noticed. The dominant birds were little green bee eater, Barn owl, Small blue Kingfisher, Red vented bulbul, Indian myna, Indian cuckoo, House crow, etc.(**Table 3.18**) It has been observed that the majority of birds were insectivorous in habit preferring insects, worms and arachnids. .

## **b.2) Invertebrates**

### *Butterflies*

Study area comprises of 9 species of butterflies, dominated by *Euploea core*, *Danaus chrysippus*, *Junonia orithya* and *Phalanta phalantha*. (**Plate3.2**) Butterflies 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.



*Phalanta phalantha*



*Junonia orithya*



*Neptis hylas*



*Danaus chrysippus*

**Figure 3.12: Butterflies observed in 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
<b>Mammals</b>			
1	<i>Bos tarus</i>	Cow	Not enlisted
2	<i>Bubalus bubalis</i>	Domestic buffalo	Not enlisted
3	<i>Capra hircus aegagrus</i>	Goat	Not enlisted
4	<i>Canis lupus familiaris</i>	Common dog	Not enlisted
5	<i>Sus scrofa</i>	Indian wild boar	Sch. III
6	<i>Herpestes edwardsii</i>	Common Mongoose	Sch. II
7	<i>Presbytis entellus</i>	Common Langur	Sch. II
8	<i>Macaca mulatta</i>	Rhesus monkey	Sch. II
9	<i>Rattus rattus</i>	House Rat	Sch. V
10	<i>Funambulus palmarum</i>	Four Striped Palm Squirrel	Sch. IV
11	<i>Pteropus giganteus</i>	Indian fly fox	Sch. V
12	<i>Hystrix indica</i>	Indian porcupine	Sch. III
13	<i>Microtus sikkimensis</i>	Sikkim Vole	Sch. V
14	<i>Lepus nigricollis</i>	Indian hare	Sch. IV
<b>Amphibians and Reptiles</b>			
1	<i>Rana hexadactyla</i>	Indian Pond Frog	Sch. IV
2	<i>Rana tigerinus</i>	Indian Bull Frog	Sch. IV
3	<i>Calotes versicolor</i>	Common Garden lizard	-
4	<i>Naja naja</i>	Cobra	Sch. II
5	<i>Ptyas mucosa</i>	Dhaman/Ret Snake	Sch. II
6	<i>Varanus bengalensis</i>	Monitor Lizard	Sch. II
7	<i>Bungarus caeruleus</i>	Common Krait	Sch. IV
8	<i>Xenochrophis piscator</i>	Keelblack	Sch. II
9	<i>Vipera russellis</i>	Russell's Viper	Sch. II
10	<i>Hemidactylus flaviviridis</i>	House Gecko/Chhipkali	-
<b>Butterflies</b>			
1	<i>Papilio polytes</i>	Common Mormon	Not enlisted
2	<i>Phalanta phalantha</i>	Common Leopard	-
3	<i>Junonia orithya</i>	Blue Pansy	Not enlisted
4	<i>Junonia lemonias</i>	Lemon Pansy	Not enlisted

SN	Scientific Name	Common Name	Status according to IWPA 1972
6	<i>Junonia almana</i>	Peacock Pansy	-
7	<i>Tirumala limniace</i>	Blue Tiger	Not enlisted
8	<i>Euploea core</i>	Common Indian Crow	Least concern
9	<i>Neptis hylas</i>	Common sailor	Not enlisted
10	<i>Danaus chrysippus</i>	Plain Tiger	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	<i>Cuculus canorus</i>	Common Cuckoo	Sch. IV
2	<i>Corvus macrorhynchos</i>	Jungle crow	Sch. IV
3	<i>Dinopium benghalensis</i>	Lesser Golden Backed Woodpecker	Sch. IV
4	<i>Streptopelia chinensis</i>	Spotted dove	Sch. IV
5	<i>Streptopelia decaocto</i>	Indian ring dove	Sch. IV
6	<i>Sterna aurantia</i>	River Tern	Sch. IV
7	* <i>Nectarinia asiatica</i>	Purple Sunbird	Sch. IV
8	<i>Turoides striatus</i>	Jungle Babbler	Sch. IV
9	<i>Ardea cinerea</i>	Grey Heron	Sch. IV
11	<i>Ardeola grayii</i>	Indian Pond Heron	Sch. IV
12	<i>Anas platyrhynchos</i>	Mallard	Sch. IV
13	<i>Francolinus pondicerianus</i>	Grey francolin	Sch. IV
14	<i>Psittacula krameri</i>	Rose-ringed parakeet	Sch. IV
15	<i>Centropus bengalensis</i>	Lesser coucal	Sch. IV
16	<i>Merops orientalis</i>	Green bee-eater	Sch – IV
17	<i>Apus affinis</i>	House swift	Sch – IV
18	<i>Anhinga melanogaster</i>	Indian Darter	Sch – IV
19	<i>Anas penelope</i>	Eurasian wigeon	Sch – IV
20	* <i>Anas crecca</i>	Common Teal	Sch – IV
21	<i>Columba livia</i>	Rock pigeon	Sch – IV
22	<i>Halcyon smyrnensis</i>	White-throated kingfisher	Sch. IV
23	* <i>Alcedo atthis</i>	Common kingfisher	Sch. IV
24	<i>Psittacula krameri</i>	Rose-ringed parakeet	Sch. IV
25	<i>Egretta garzetta</i>	Little egret	Sch. IV
26	<i>Bubulcus ibis</i>	Cattle egret	Sch. IV
27	<i>Corvus splendens</i>	House crow	Sch. V
28	<i>Dicrurus macrocercus</i>	Black drongo	Sch. IV
29	* <i>Acridotheres tristis</i>	Common myna	Sch. IV
30	<i>Acridotheres ginginianus</i>	Bank myna	Sch. IV
31	* <i>Saxicoloides fulicata</i>	Indian robin	Sch. IV
32	<i>Nycticorax nycticorax</i>	Night Heron	Sch. IV
33	<i>Tyto alba</i>	Barn owl	Sch – IV
34	<i>Upupa epops</i>	Indian Hoopoe	Sch – IV
35	<i>Clamator jacobinus</i>	Pied crested cuckoo	Sch – IV
36	<i>Sturnus pagodarum</i>	Brahminy starling	Sch. IV
37	<i>Pycnonotus cafer</i>	Red-vented bulbul	Sch. IV

S.N	Scientific Name	Common Name	Status according to IWPA-1972
38	<i>Nectarinia asiatica</i>	Purple sunbird	Sch. IV
39	<i>Passer domesticus</i>	House sparrow	Sch. IV
40	<i>Microcarbo niger</i>	Little cormorant	Sch. IV
41	<i>Accipiter bediua</i>	Shikra	Sch.IV
42	<i>Vanellus indicus</i>	Red wattled lapping	Sch.IV

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 major crops in Darjeeling District and study area are maize, ginger, paddy, tamarind, mustard, elachi, etc. in Kharif season (summer season), primarily maize and ginger which accounts nearly 80 – 90% of total crops of the season. However, paddy accounts for 10 – 20% of the total crop, which is cultivated during Rabi season. In few pockets, mustard, elachi, tamarind, vegetables etc.

Study area is also famous for variety of fruits and vegetables grown at different elevations. Pineapples are the highest growing fruit variety in the district. Banana, Papaya, Jackfruit, Guava, Lychee, Mango and Jackfruit are the other major varieties of fruits cultivated in Darjeeling depending upon the quality of land and topography.

Horticulture is also one of the economy sources in the study area consists of fruits, vegetables, spices and herbal products.

The climate and soil of Darjeeling District is aptly suitable for horticultural development and in all the three seasons i.e. winter, summer and monsoon, horticultural production can be done. In rainy season, main seasonal horticultural products are Lady finger, Raddish, Brinjal, Tomato, Pumpkin group, Cucumber group, French bean, Potato, Kanda, Cauliflower, etc. The main horticulture produce in Winter Season are Brinjal, Tomato, Potato, Cabbage, Cauliflower, Onion, Carrot, Raddish etc. Medicinal/Aromatic and Plantation crops includes tea & Cardamum Agricultural & Horticulture crops found in the study area (Table 3.19)

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

SN	Botanical Names	Common Names
<b>Grain Crops</b>		
1	<i>Triticum</i> sp.	Wheat
2	<i>Oryza sativa</i>	Rice
<b>Cereals</b>		
1	<i>Zea</i> sp.	Maize
<b>Oilseed</b>		
1	<i>Brassica</i>	Mustard
2	<i>Linum usitatissimum</i>	Linseed
<b>Vegetable Crops</b>		
1	<i>Solanum melongena</i>	Brinjal

2	<i>Allium cepa</i>	Onion
3	<i>Allium sativum</i>	Lasun
4	<i>Zingiber officinale</i>	Ginger
5	<i>Solanum tuberosum</i>	Potato
6	<i>Brassica</i>	Cauliflower
7	<i>Brassica oleracea</i>	Cabbage
8	<i>Capsicum sp.</i>	Mirchi
<b>Horticulture crops - Fruits</b>		
1	<i>Ananas comosus</i>	Pineapple
2	<i>Litchi chinensis</i>	Litchi
3	<i>Musa paradisiaca</i>	Kela
4	<i>Citrus limon</i>	Limbu
<b>Medicinal and Aromatic crops</b>		
<b>Plantation crops</b>		
1	<i>Camellia sinensis</i>	Tea
2	<i>Elettaria cardamomum</i>	Cardamum

Source: [https://agricoop.nic.in/sites/default/files/WestBengal%206-Darjeeling-31.12.2011\\_0.pdf](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 75 $\mu$  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 counts, recorded in Mahananda river varied between 760 and 840 No/ml (**Table 3.20**). Altogether 12 genera of Phytoplankton were recorded (**Table 3.21**). Amongst 4

groups chlorophyceae was dominant followed by Bacillariophyceae Cyanophyceae & Pheophyceae members are found in Mahananda river .The Shannon Wiener index for phytoplankton varied from 1.8 to 2.2 indicating medium productive water.

**Table 3.20: Enumeration of Phytoplankton in Mahananda River**

Name	Location	Density (No/ml)	Percent Composition of Algal groups				SWI
			Chloro-phyceae	Cyno-phyceae	Bacillario-phyceae	Pheo-phyceae	
<b>Mahananda River</b>	Near Fulbari bridge	840	32	24	26	18	2.2
	Near Rupandighi Village	760	30	22	28	20	1.8

**Ranges of Shannon Wiener Diversity Index**

- <1: Indicate poor productive water
- 1-3 Indicate medium productive water
- >3 Indicate good productive water

**Table 3.21: Phytoplankton genera observed in Mahananda river**

SN	Chlorophyceae	Bacillariophyceae	Cyanophyceae	Pheophyceae
1	<i>Chlorella sp</i>	<i>Cyclotella sp</i>	<i>Microcystis sp</i>	<i>Ceratium sp.</i>
2	<i>Cosmarium sp.</i>	<i>Cymbella sp.</i>	<i>Oscillatoria sp.</i>	<i>Scytosiphon sp.</i>
3	<i>Closterium sp.</i>	<i>Pinullaria sp,</i>	<i>Phormidium sp.</i>	-
4	<i>Scenedesmus sp.</i>	-	-	-

**b. Zooplankton**

Zooplankton counts, recorded in Mahananda River are presented in **Table 3.22**. Density of zooplankton varied between 670 and 710 N/m<sup>3</sup>. Only 7 genera of zooplankton from three different groups were recorded Rotifera was dominant followed by copapoda & cladocera in Mahananda river (**Table 3.23**) However, The Shannon Wiener index for zooplankton varied from 1.4 to 2 indicating medium productive water.

**Table 3.22: Enumeration of Zooplankton in Mahananda River**

Name	Location	Count (No/m <sup>3</sup> )	Per cent Composition of Zooplankton groups			SWI
			Rotifera	Copapoda	Cladocera	
<b>Mahananda River</b>	Near Fulbari bridge	710	56	34	10	2
	Near Fulbari bridge	670	70	20	10	1.4

### Ranges of Shannon Wiener Diversity Index

- <1: Indicate poor productive water
- 1-3 Indicate medium productive water
- >3 Indicate good productive water

**Table 3.23: Zooplankton Genera Recorded in Mahananda River**

No.	Rotifera	Copepoda	Cladocera
1	<i>Asplanchna</i> sp.	<i>Diaptomus</i> sp	<i>Alonella</i> sp.
2	<i>Brachionus</i> sp.	<i>Cyclops</i> sp.	<i>Bosmina</i> sp.
3	<i>Keratella</i>	-	<i>Daphnia</i> sp
4	<i>Lecane</i> spp	-	-

### 3.8: Detail of Fishes

The Mahananda River is a major tributary of the Ganges in Bangladesh. Fish are at the tertiary level of the food chain of aquatic ecology. 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-3.24**

**Table 3.24: Checklist of Fish Species**

SN	Scientific	Common
1	<i>Glossogobius giuris</i>	-
2	<i>Labeo rohita</i>	Rohu
3	<i>Labeo bata</i>	Bata
4	<i>Puntius ticto</i>	Punthi
5	<i>Mystus cavasius</i>	-
6	<i>Mystus tengara</i>	tengara
7	<i>Clarias batrachus</i>	Magur
8	<i>Mystus vittatus</i>	.-
9	<i>Labeo calbasu</i>	Kurchi
10	<i>Wallago attu</i>	Boal
11	<i>Chanda nama</i>	-

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

### 3.10 Socio-Economic Environment

#### 3.10.1 Introduction

Socio-economic has been recognized as, a component of environment. It focuses primarily on the social and economic effects that are likely to occur as a result of the construction, operation of the project. It includes various factors, viz. demographic structure, availability of basic amenities such as housing, education, health and medical services, occupation, water supply, sanitation, communication and power supply, prevailing diseases in the region as well as features such as places of tourist attraction and monuments of archaeological importance.

The study of these parameters helps in identifying predicting and evaluating the likely impacts due to project activity in the surrounding region. Any developmental activity exerts direct, indirect, positive and negative impacts on the socio-economic environment of the region. The objective of the study mostly based on the TOR (terms of reference).

### **Objective**

General objectives of Socio Economic study as follows:-

- To identify and assess potential social impacts of the project.
- To identify all potential significant adverse social impacts of the Project and recommend measures for mitigation.
- To verify compliance with the environmental regulations and industry's standards.
- To recommend cost effective measures to be implemented to mitigate the expected impact.
- Prepare socio economic report to contribute in EIA reports.
- To provide guidelines to stakeholders participating in the mitigation of adverse social impacts of the project.
- Management and detailing findings and suggest recommendations.
- Community consultation at planning and execution stage.

The study area for socio economic assessment defined as an area within 10 Km radius for primary and for secondary data around the project site as per the statutory requirement of the Ministry of Environment & Forest. Designation of impact zone is based on the EIA guidance manual. Primary data and secondary data is use for socio economic study.

### **3.10.2 Data Collection**

Data collection is a term used to describe a process of preparing and collecting data. Systematic gathering of data for a particular project from various sources, that has been systematically observed, recorded, organized. Data are the basic inputs to any decision making process in project.

#### **Primary Data Collection**

The data collected from the field under the control and supervision of an investigator. This type of data is generally afresh and collected for the first time. It is useful for current studies as well as for future studies. While collecting primary data collection in study area following methods are uses.

1. Observation Method.
2. Focus group discussion (FGD).
3. Surveys and questionnaires.

## Secondary Data Collection

Secondary data is 'Data gathered and recorded by someone else prior to and for a purpose other than the current project.' Secondary data are collected from different offices like Census offices (India Census 2011), Statistical department, Health offices, Land and Revenue department, Zilla Parishad and Non-Governmental organizations.

### 3.10.3 Concept & Definitions

- **Study Area:** The study area, also known as impact area has been defined as the sum total of core area and buffer area with a distance of 10 Kilometers from the periphery of the core area. The study area includes all the land marks both natural and manmade, falling therein.
- **QoL:** The Quality of Life (QoL) refers to degree to which a person enjoys the important possibilities of his/her life. The 'Possibilities' result from the opportunities and limitations, each person has in his/her life and reflect the interaction of personal and environmental factors. Enjoyment has two components: the experience of satisfaction and the possession or achievement of some characteristic.
- **Household:** A group of persons who normally live together and take their meals from a common kitchen are called a household. Persons living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated persons live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each such person is treated as a separate household. There may be one-member households, two member households or multi-member households.
- **Sex Ratio:** Sex ratio is the ratio of females to males in a given population. It is expressed as 'number of females per 1000 males'.
- **Literates:** All persons aged 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.
- **Literacy Rate:** Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.
- **Labour Force:** The labour force is the number of people employed and unemployed in a geographical entity. The size of the labour force is the sum total of persons employed and unemployed. An unemployed person is defined as a person not employed but actively seeking work. Normally, the labour force of a country consists of everyone of working age (around 14 to 16 years) and below retirement (around 65 years) that are participating

workers, that is people actively employed or seeking employment. People not counted under labour force are students, retired persons, and stay-at home people, people in prisons, permanently disabled persons and discouraged workers.

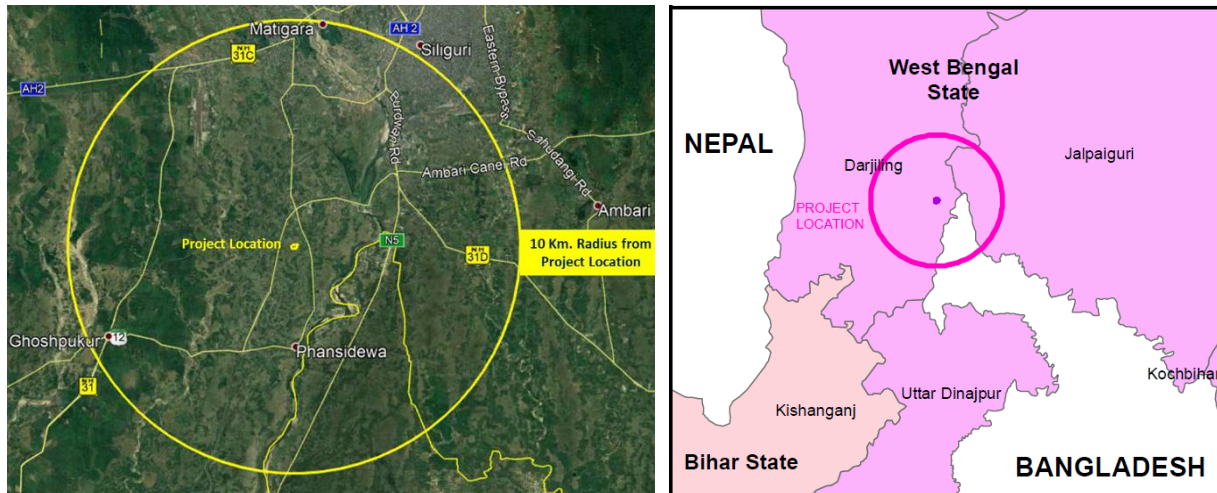
- **Work:** Work is defined as participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. The work may be part time, full time, or unpaid work in a farm, family enterprise or in any other economic activity.
- **Worker:** All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation or milk production even solely for domestic consumption are also treated as workers.
- **Main Workers:** Those workers who had worked for the major part of the reference period (i.e. 6 months or more in the case of a year) are termed as Main Workers.
- **Marginal Workers:** Those workers who did not work for the major part of the reference period (i.e. less than 6 months) are termed as Marginal Workers
- **Work participation rate:** The work participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

#### **3.10.4 Project Site Details**

**PurbanchalConcast Private Limited (PCPL)** was established in 2011 to manufacture mild steel pipes, hollow sections, profiles, guides and structures to meet the ever-increasing requirements of the infrastructure and engineering industries. The objective was to build an integrated facility from Blooms/billets to the finished products.

PCPL is strategically located off the Asian Highway near Siliguri at KashiramJote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434 having an easy access for to and fro movements. Currently the production facility is spread over nearly 200,000 Sq. Ft. of covered sheds and adequate space is still available for future expansion.

Considering the future growth potential of steel market and domestic and international level, M/s PurbanchalConcastPvt. Ltd. has proposed to install 3X15T Induction Furnaces with CCM and 1x25 TPH Rolling Mill with Hot Charging Facility for production of 200000 TPA MS Billets / Ingots and 200000 TPA rolling mill products in their existing premises.

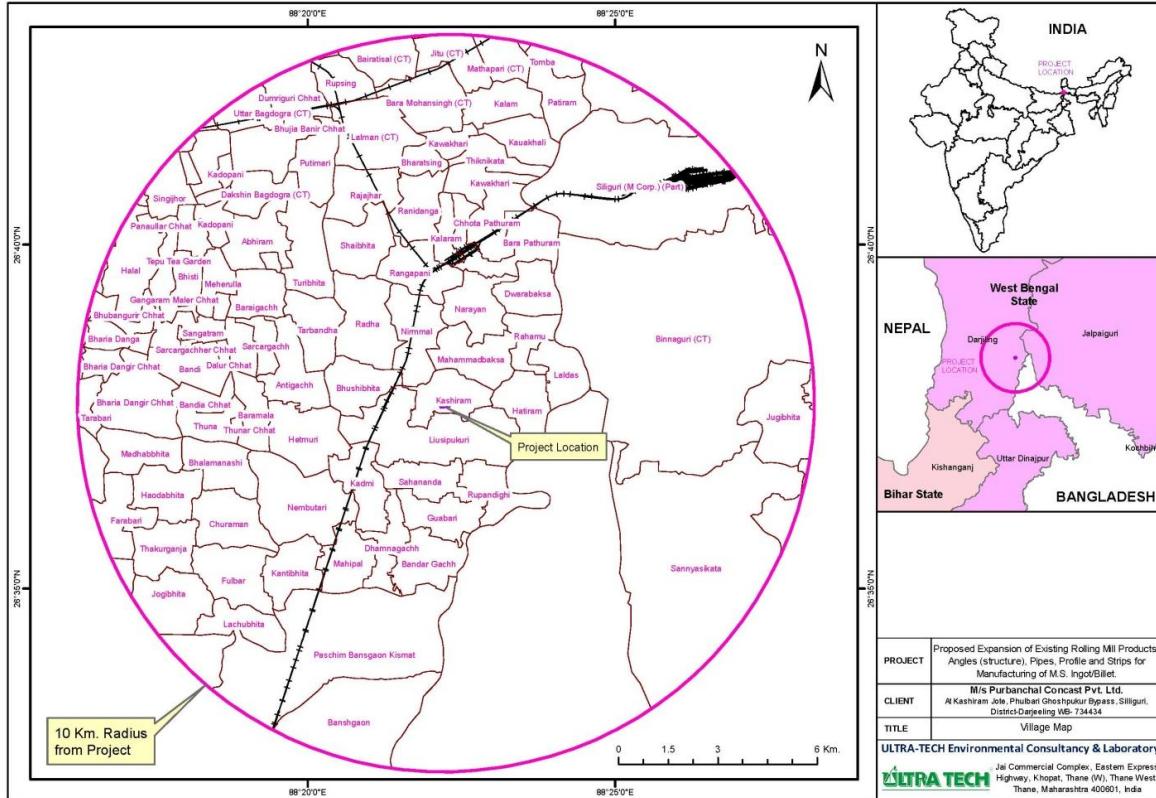


**Figure 3.13: Project Site and Study area**

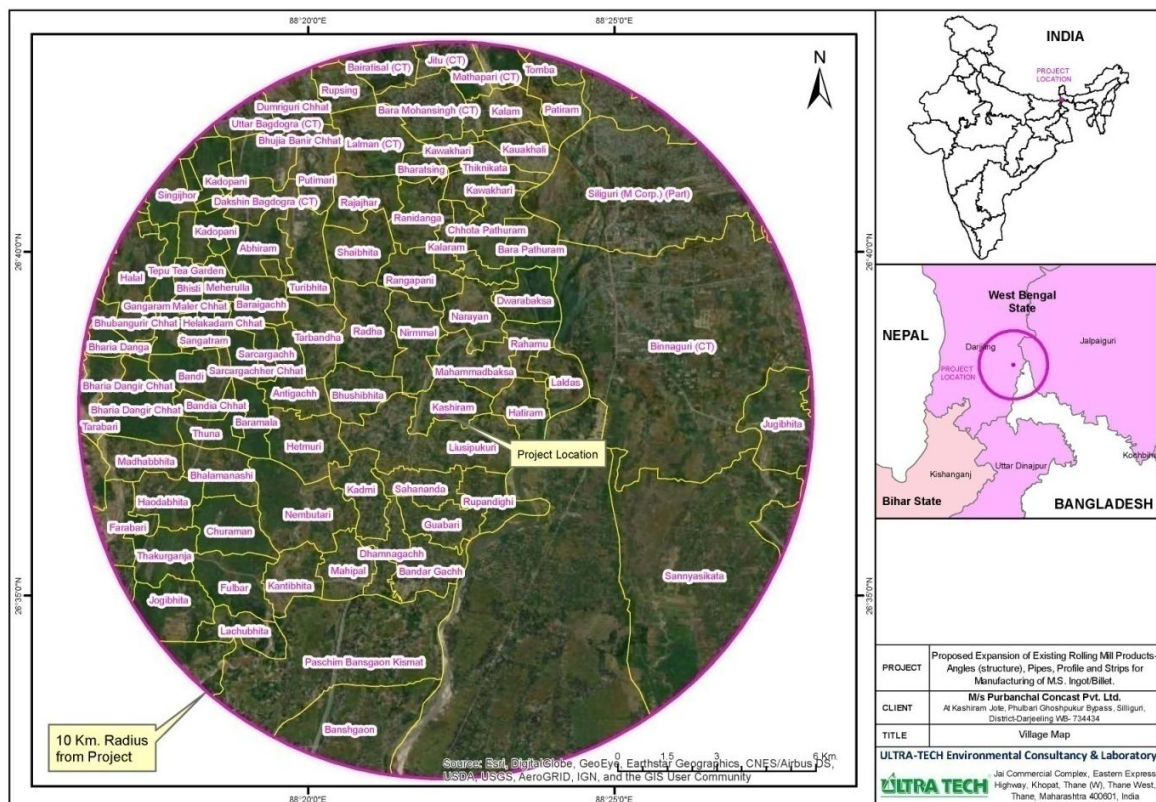
The study area means villages in 10 km radius of the project site. Topographical map, Village Map Bhuvan portal and Google earth maps were used to identify the villages & wards in 10 km radius. A total of 90 rural and urban inhabitations falls within the study area.

Project site is near to Siliguri city area. Siliguri is a major city in West Bengal that forms "Twin Cities" with the neighboring district capital of Jalpaiguri. The city spans areas of the Darjeeling and Jalpaiguri districts in the Indian state of West Bengal. Known as the "Gateway of Northeast India", Siliguri is popular for three tea, timber and tourism. It is located on the banks of the Mahananda River and the Teesta River at the foothills of the Himalayas. Siliguri is the second largest urban agglomeration in West Bengal, after Kolkata.

Siliguri has great strategic importance in West Bengal. It is located conveniently, connecting four international borders i.e. China, Nepal, Bangladesh and Bhutan. It also connects the North-East with mainland India. Located at the foothills of Eastern Himalayas, Siliguri is a significant trading and transportation hub.



**Figure 3.14: Villages within 10 Km. Radius Area from Project Site**



**Figure 3.15: Villages within 10 Km. Radius Area on Google Earth Map**

**Table 3.25: Demography of Study area**

SN	Name	House holds	Total Pop.		0-6 age Pop.	SC Pop.		ST Pop.		Literate Pop		Illiterate Pop.		Working Pop		Non-Working Pop	
			Male	Females		Male	Females	Male	Females	Male	Females	Male	Females	Main	Marginal	Male	Females
<b>Darjiling Dist.</b>																	
1	DumriguriChhat	207	487	463	135	419	378	59	75	290	194	197	269	288	90	213	359
2	Kawakhari	825	2000	1676	366	810	752	63	71	1699	1270	301	406	1326	73	814	1463
3	Thiknikata	751	1660	1634	337	971	910	5	9	1378	1196	282	438	1088	67	729	1410
4	Kauakhali	1526	3342	3273	873	1971	1981	9	10	2344	1926	998	1347	2345	50	1519	2701
5	Kalam	1237	3280	2384	610	479	432	224	208	2681	1605	599	779	2179	149	1303	2033
6	Patiram	1762	4310	4005	1177	2726	2610	39	39	2712	2012	1598	1993	3135	150	1827	3203
7	Tomba	1935	5038	4594	1375	841	794	115	112	3461	2637	1577	1957	2920	480	2342	3890
8	Bairatisal (CT)	1220	2452	2464	420	561	553	26	29	2144	2038	308	426	1653	106	1107	2050
9	Jitu (CT)	1419	2886	3006	661	462	487	141	149	2270	2168	616	838	2021	75	1331	2465
10	Mathapari (CT)	2659	5903	5626	1367	1786	1667	162	176	4353	3504	1550	2122	4358	422	2485	4264
11	Bara Mohansingh (CT)	3720	7798	7818	1341	2597	2515	490	554	6664	6159	1134	1659	4683	651	3642	6640
12	Rupsing	779	1846	1653	397	1078	952	58	61	1416	1076	430	577	1048	141	889	1421
13	BhujiaBanirChhat	473	1165	1083	271	402	403	15	15	831	639	334	444	582	140	567	959
14	Putimari	244	610	607	155	145	151	252	251	442	340	168	267	351	114	265	487
15	Rajajhar	548	1346	1244	346	1184	1105	73	66	900	638	446	606	653	142	678	1117
16	Bharatsing	155	342	358	72	278	295	3	1	262	218	80	140	162	60	151	327
17	Ranidanga	1024	2383	2272	465	1241	1181	31	17	1885	1609	498	663	1403	220	1024	2008
18	Shaibhita	391	954	897	238	861	794	64	70	689	469	265	428	509	152	421	769
19	Rangapani	772	1904	1715	451	1210	1085	49	48	1366	1020	538	695	999	285	847	1488
20	Uttar Bagdogra (CT)	5634	13781	11263	2597	1329	1254	617	636	11700	8527	2081	2736	8657	677	5736	9974
21	Lalman (CT)	1583	3590	3304	771	2095	1940	25	21	2759	2143	831	1161	2233	205	1619	2837
22	DakshinBagdogra (CT)	590	1301	1346	317	28	39	305	315	978	845	323	501	755	122	650	1120
23	Singijhor	219	523	543	125	8	7	427	450	323	268	200	275	289	172	280	325
24	Kadopani	235	592	614	201	6	5	528	561	361	271	231	343	428	61	347	370
25	Bhisti	83	227	232	60	16	14	163	152	86	77	141	155	214	0	107	138
26	Tepu Tea Garden	484	1194	1244	348	176	190	803	848	714	528	480	716	601	486	609	742
27	PanaullarChhat	61	156	153	31	41	51	37	42	108	72	48	81	101	1	65	142
28	Halal	290	757	754	197	77	80	56	58	515	389	242	365	411	51	377	672
29	BhubangurirChhat	185	434	436	113	193	194	190	184	205	138	229	298	246	145	191	288
30	BhariaDanga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	BhariaDangirChhat	43	97	93	31	27	21	58	62	28	24	69	69	46	46	51	47

SN	Name	House holds	Total Pop.		0-6 age Pop.	SC Pop.		ST Pop.		Literate Pop		Illiterate Pop.		Working Pop		Non-Working Pop	
			Male	Females		Male	Females	Male	Females	Male	Females	Male	Females	Male	Females	Main	Marginal
32	Tarabari	63	138	151	36	10	8	84	97	55	47	83	104	87	57	69	76
33	Madhabbhita	219	552	538	116	112	108	298	299	351	271	201	267	416	65	277	332
34	Farabari	300	719	686	191	338	323	232	236	497	370	222	316	410	145	348	502
35	Haodabhita	145	371	365	83	104	98	210	224	291	242	80	123	209	21	203	303
36	Thakurganja	499	1289	1282	289	72	73	1000	1005	924	730	365	552	658	450	703	760
37	Jogibhita	452	1109	1112	237	85	73	905	922	762	542	347	570	592	373	600	656
38	Lachubhita	262	650	610	168	335	292	234	247	443	280	207	330	159	303	344	454
39	Fulbar	276	617	662	158	2	1	593	634	399	339	218	323	286	333	298	362
40	Churaman	170	417	425	103	48	39	249	268	289	222	128	203	237	144	221	240
41	Bhalamanashi	577	1507	1444	341	39	40	852	888	1080	854	427	590	897	169	884	1001
42	Thuna	224	523	547	117	9	9	497	516	317	248	206	299	263	232	280	295
43	ThunarChhat	66	141	178	24	0	0	134	172	114	113	27	65	112	35	74	98
44	Baramala	407	898	901	223	9	8	718	734	495	346	403	555	581	291	443	484
45	BandiaChhat	219	451	510	114	6	4	359	409	296	244	155	266	316	101	245	299
46	Bandi	107	236	257	59	97	108	102	111	172	142	64	115	179	17	120	177
47	DalurChhat	163	392	394	85	11	15	184	221	284	240	108	154	182	125	195	284
48	MuktarChhat	4	7	11	0	0	0	7	11	3	4	4	7	0	14	1	3
49	Sangatram	17	40	45	11	40	44	0	0	34	33	6	12	13	14	20	38
50	GangaramMalerChhat	24	58	51	15	8	7	22	15	31	17	27	34	34	21	20	34
51	Meherulla	319	717	784	222	112	119	549	608	304	250	413	534	605	160	348	388
52	HelakadamChhat	63	156	133	32	131	108	15	17	95	52	61	81	109	10	61	109
53	SarcargachherChhat	118	313	351	95	3	0	303	345	161	135	152	216	135	133	158	238
54	Sarcargachh	158	402	406	117	71	71	306	303	248	171	154	235	204	111	204	289
55	Baraigachh	79	206	221	62	6	6	193	212	97	81	109	140	175	21	101	130
56	Abhiram	369	912	861	247	438	408	112	117	581	412	331	449	374	167	490	742
57	Turibhita	12	27	42	12	0	0	27	42	14	21	13	21	14	19	11	25
58	Tarbandha	335	730	685	152	650	621	69	52	419	304	311	381	313	313	319	470
59	Antigachh	420	1033	994	231	326	293	281	331	707	532	326	462	487	283	491	766
60	Bhushibhita	209	539	472	107	330	279	78	69	414	288	125	184	328	115	228	340
61	Radha	395	996	936	233	505	457	29	32	711	529	285	407	523	123	494	792
62	Nirmmal	525	1357	1200	364	850	726	57	58	866	613	491	587	742	35	670	1110
63	Mahammadbaksa	591	1537	1376	392	820	748	110	107	1069	747	468	629	921	84	706	1202
64	Narayan	133	350	345	103	321	315	2	2	223	175	127	170	166	58	162	309

SN	Name	House holds	Total Pop.		0-6 age Pop.	SC Pop.		ST Pop.		Literate Pop		Illiterate Pop.		Working Pop		Non-Working Pop	
			Male	Females		Male	Females	Male	Females	Male	Females	Male	Females	Male	Females	Main	Marginal
65	Kalaram	542	1299	1164	273	484	423	2	1	888	676	411	488	744	112	553	1054
66	Bara Pathuram	591	1435	1293	337	1038	940	96	100	986	658	449	635	875	56	643	1154
67	ChhotaPathuram	404	992	926	274	915	835	11	16	730	526	262	400	459	207	501	751
68	Dwarabaksa	228	597	564	154	585	546	0	0	432	312	165	252	319	43	261	538
69	Rahamu	150	360	342	88	222	210	34	34	239	162	121	180	209	28	167	298
70	Laldas	162	388	350	88	382	346	0	0	269	183	119	167	270	5	138	325
71	Hatiram	315	750	671	166	488	435	57	43	491	344	259	327	620	52	333	416
72	Kashiram	507	1222	1150	284	362	327	4	7	843	677	379	473	725	40	583	1024
73	Liusipukuri	1063	2714	2471	649	783	716	160	149	1782	1253	932	1218	1640	418	1277	1850
74	Hetmuri	464	1055	1069	224	100	109	685	669	682	505	373	564	429	657	493	545
75	Nembutari	183	400	376	76	164	145	111	116	284	210	116	166	241	64	196	275
76	Kantibhita	141	347	298	80	243	220	50	35	269	181	78	117	176	46	176	247
77	Mahipal	417	952	935	254	512	489	12	12	672	495	280	440	525	98	460	804
78	Dhamnagachh	515	1218	1138	226	746	708	114	97	883	701	335	437	661	87	572	1036
79	Kadmi	285	633	623	140	456	428	44	68	472	366	161	257	328	78	334	516
80	Sahananda	398	994	922	253	612	565	66	52	713	506	281	416	561	94	490	771
81	Rupandighi	166	366	358	87	199	174	8	11	239	171	127	187	242	40	153	289
82	Guabari	465	1119	1084	290	734	723	113	109	752	571	367	513	583	345	549	726
83	Bandar Gachh	900	2020	1871	380	825	761	16	16	1570	1255	450	616	1195	293	879	1524
84	PaschimBansgaonKismat	349	828	816	233	699	687	79	87	558	433	270	383	456	194	369	625
85	Banshgaon	1155	3059	2899	1117	443	423	105	98	1713	1328	1346	1571	1387	335	1549	2687
86	Siliguri (M Corp.) (Part)Darjiling	66062	1,51,535	1,43,011	29,939	13,335	12,707	1,863	1,840	1,22,163	1,06,525	29,372	36,486	96,180	12,229	64,082	1,22,055
<b>Jalpaiguri Dist.</b>																	
87	Jugibhita	767	1864	1785	455	502	445	33	44	1358	1065	506	720	850	382	835	1582
88	Sannasikata	5773	13936	13108	3749	5800	5439	341	335	9709	7627	4227	5481	7749	1534	6523	11238
89	Binnaguri (CT)	12868	30258	28582	8172	16898	15923	494	456	19403	14726	10855	13856	16929	3756	13801	24354
90	Siliguri (M Corp.) (Part)Jalpaiguri	49895	1,12,167	1,06,551	22,601	19,478	18,239	1,210	1,227	89,519	77,595	22,648	28,956	69,702	9,821	47,203	91,992

\*Above information as per Censuses 2011 data.

Source: [https://data.gov.in/catalog/villagetown-wise-primary-census-abstract-2011-west-bengal?filters%5Bfield\\_catalog\\_reference%5D=166343&format=json&offset=6&limit=6&sort%5Bcreated%5D=desc](https://data.gov.in/catalog/villagetown-wise-primary-census-abstract-2011-west-bengal?filters%5Bfield_catalog_reference%5D=166343&format=json&offset=6&limit=6&sort%5Bcreated%5D=desc)

Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.

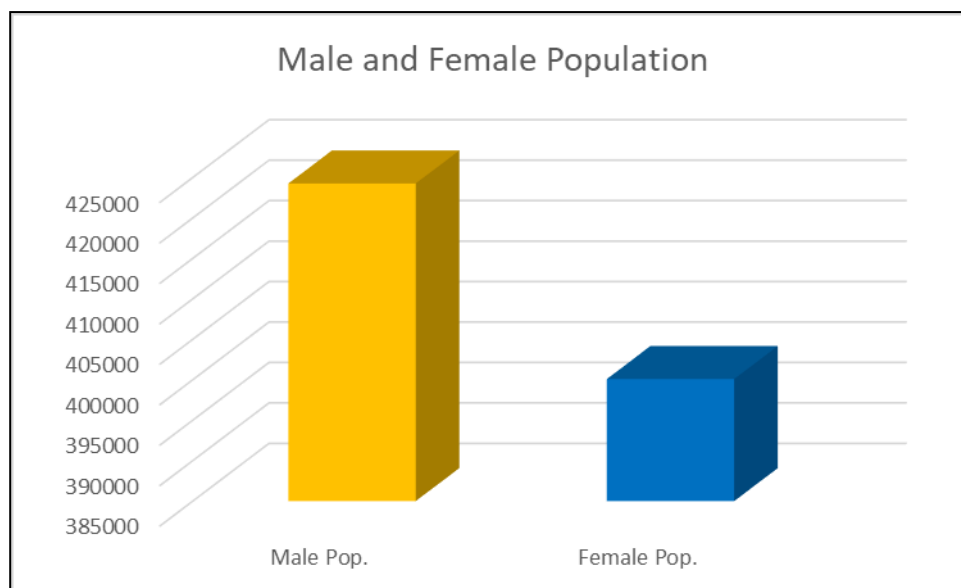
### 3.10.5 Male and female population

The study area is witnessing a rapid growth in its population beginning from last decade due to rapid urbanization and industrialization.

While dealing study area (10 Km radius from project site) as per secondary data (Population Census 2011) the total population is 824342 in 183739 households. Male population is 424256 and female population is 400086.

There are 183739 households in the study area and the average size of household is 4 members per household in the study area. The dependent population below 6 years is 91176 (11.1% of the total population) in the study area. The sex ratio of the study area is 943 females per 1000 males. The sex ratio of the study area is poor, as compared to district sex ratio of Darjiling (970) (source: <https://www.census2011.co.in/census/district/1-darjiling.html>).

- Male - Female Ratio is: 1000 Male: 943 Female
- Population Density in study area is: 2625 per Sq. Km. (Population Density = Number of People/Land Area)



**Figure 3.16: Male-Female Population Distribution Chart**

### 3.10.6 Religion

The most commonly followed religion in study area is Hinduism, with Islam being the largest minority religion, followed by small percentage of adherents of Christianity and Buddhism.

Project site, Study area located at nearby Siliguri city is situated in the state of West Bengal, known to be a land of many festivals. Some of the major festivals celebrated in study area include Durga Puja, Ganesh Puja, Chhath Puja, Laxmi Puja, Diwali, Saraswati Puja. Besides the oldest fair in Siliguri is the Baishakhi Mela observed with the Bengali New Year. Other significantly large crowd pullers are fairs like the Hosto Shilpomela or handicrafts fair, Book Fair and Lexpo Fair. Most of these fairs are held in the Kanchenjunga Stadium.

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

Siliguri also organizes the fashion week during the winter season for popular entertainment. Around the same time, i.e. between the festive seasons commencing from mid-October to mid-December a number of local clubs in Siliguri organize concerts for the local population.

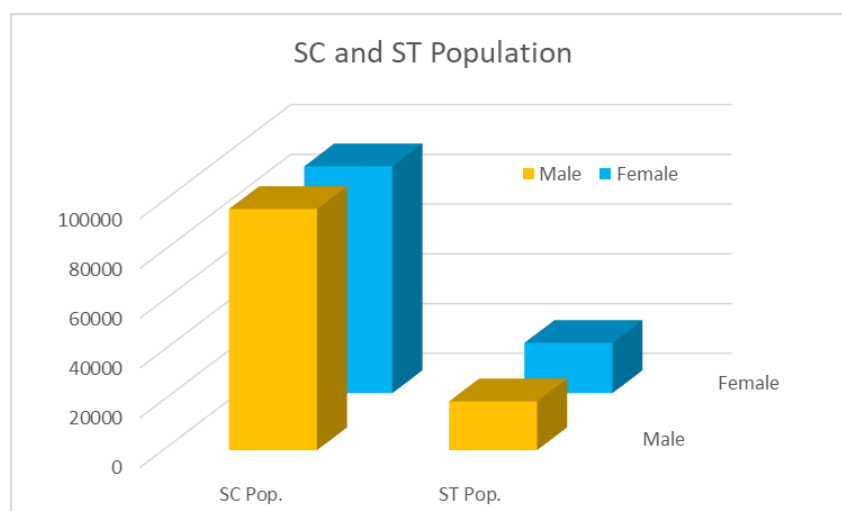
Surrounding area of project site following religious places are noted; Shiva Temple, Hari Mandir, Ananda Smriti Kali Temple, Sanidev Temple, Hanuman Temple, Shiv Mandir, Soni Temple, Smashan Kali Temple, Mahadev temple, Kali Temple, Guabari radhakrishnaMandir, Maa Mansha Mandir, Shani Temple, Maa Kali Mandir Rangapani. Leusipakuri Masjid, Hatiramjote Masjid, Sailani Jote Jamma Masjid, Kalangini Jama Masjid, Asharfiya Jumma Masjid, Nipania Jama Masjid, Dhadagoch Nakhoda Jaame Masjid, Fulbari Jamme Masjid, Beersheba Church of God, St.Paul's Catholic Church Hansqua, St. Alphonsa Church Nambutari, St. Peter Canisius Church, VishwaVani Church, Gayaganga, Iskcon Temple, Bikash Fastfood. Etc.

Religion		
Religion		Percent
Hinduism		91.98%
Islam		5.37%
Christianity		0.94%
Buddhist		0.65%
Others		1.05%

Study area and surrounding area land which has embraced such a diverse population, there are many local languages in study area. The official languages here are Bengali, English and Hindi also widely spoken. Some of the other regional languages which are spoken here are Nepali, Bihari, Marwari, Assamese, Bhojpuri, Punjabi and Tibetan.

### 3.10.7 SC and ST Population:

The proportion of Scheduled Caste (SC) population within the study area is 22.8%. The proportion of Scheduled tribe (ST) within the study area is 4.8%. Whereas this proportion in the districts, Schedule Caste (SC) constitutes 18.86% while Schedule Tribe (ST) were 20.21% of total population in Dragging district of WB. This can be observed in **figure 3.17**.



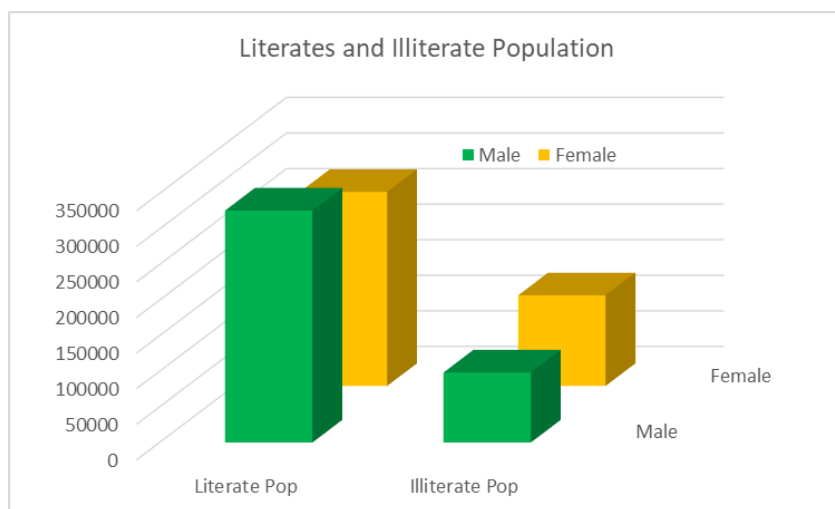
**Figure 3.17: SC and ST Population Distribution**

### 3.10.8 Educational Status:

Education is considered as basis for development of society. Education has become a necessity of today's changing world. The level of education has tremendously gone high mostly in urban areas whereas rural areas are still facing the problem of uneducation. Education in study area and surrounding area has a strong foundation since ages.

The study area has a high literacy rate of study area is 72.6% (2001 census), but still it has been seen that the rural education is quite low. In rural villages where literacy rates are low and most residents have not progressed beyond primary school, there is widespread recognition that education represents the only means for their children to access this brighter future.

Access to education is legally guaranteed and government primary schools are present in all the remotest regions of study area and surrounding area. However, the public education sector is struggling to provide an adequate level of service to its students.



**Figure 3.18: Graph showing Literates and Illiterate Population**

The proportion of Male literates and female literates within the study area is 54% and 46% respectively out of total literate population.

While dealing with 10 km radius from project site some nearby schools are; Kinajote Primary School, Nazrul Satabarshiki Vidyalaya High School, GyanBikash Academy, Kina Jote Primary School, Nazrul Satabarshiki Vidyalaya High School, Rangapani Primary School, JhamakIalPramari School, KebalJote Primary School, Shourya Public School, DhamanPrymari School, Barbhita Primary School, VelkuJote Pry. School.

For higher education siliguri city is nearby the study area. Several education facilities are available at siliguri city, Degree collages, Medical Collages, Engineering colleges, Bengali Medium Schools, English Medium Schools, and Army Schools are in city area.

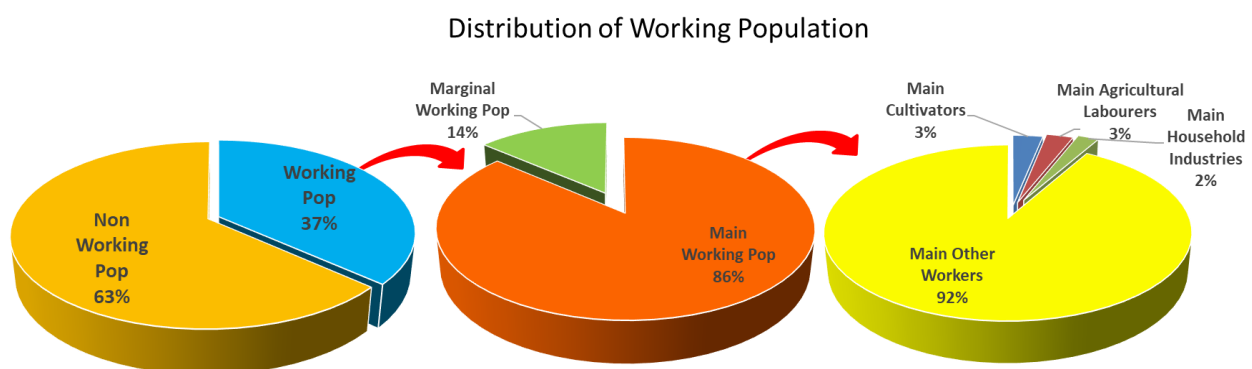
### 3.10.9 Economy

The two most significant contributors to Darjeeling's economy are tourism and the tea industry. Darjeeling tea, due to the unique agro-climatic conditions of Darjeeling, has a distinctive natural flavour, is internationally reputed and recognized as a geographical indicator. Darjeeling produces 7% of India's tea output, approximately 9,000,000 kilograms (20,000,000 lb) every year. The tea industry has faced competition in recent years from tea produced in other parts of India as well as other countries like Nepal. Widespread concerns about labour disputes, worker layoffs and closing of estates have affected investment and production. Several tea estates are being run on a workers' cooperative model, while others are being planned for conversion into tourist resorts. More than 60% of workers in the tea gardens are women. Besides tea, the most widely cultivated crops include maize, millets, paddy, cardamom, potato and ginger.

Darjeeling had become an important tourist destination as early as 1860. It is reported to be the only location in eastern India that witnesses large numbers of foreign tourists. It is also a popular filming destination for Bollywood and Bengali cinema.

While dealing study area 10 km radius from project site as per Census of India 2011 within study area total working population is 36.6 % and non-working population is 63.4 % out of working population almost 86.4 % peoples are in main working population category. And 13.6 % Population is in marginal population category.

Non-working population in study area is 522787 which are 63.4 % out of total population. This category includes below 15 years age population and not willing to any work is considered. Also after Retirement age population also include in this category.



**Figure 3.19: Distribution of Working Population**

### 3.10.10 Infrastructure, Healthcare, Transport and Communication

This section analyses the infrastructure facilities like water supply, roads, markets, banks, post offices, hospitals, schools and electrification in the study area. PCPL is strategically located off the Asian Highway near Siliguri at KashiramJote, PhulbariGhoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434 having an easy access for to and fro movements.

**Road:** NH 27 crosses through the heart of the city which is now a part of AH2 project. Siliguri originates the century-old Hill Cart Road that is NH 110 which connects Siliguri and Darjeeling (77 km) made in British period. Siliguri also originates NH 10 which connects Gangtok, NH 12 which connects Pankhabari-Mirik. The highways NH 327, that connects Siliguri — Panitanki and NH 327B connecting Panitanki - MechiBridg, are also part of AH2.

### **Bus service**

Tenzing Norgay Bus Terminus is the main bus terminus serves as bus depot for both Government and private bus service which operated by NBSTC. It connects to all other districts and cities in West Bengal like Darjeeling, Kalimpong, Jalpaiguri, Cooch Behar, Malda, Balurghat, Raiganj, Berhampore, Kolkata, Asansol, Suri etc.

Sikkim Nationalised Transport Bus Terminus (Siliguri) is located at hillcart road in siliguri. This bus terminus is operated by Sikkim govt. Mainly Sikkim based buses are operated from here. This bus terminus is one of the busy and important bus terminus in siliguri area. Sikkim Nationalised Transport Bus Terminus (Siliguri), which connects Sikkim area.

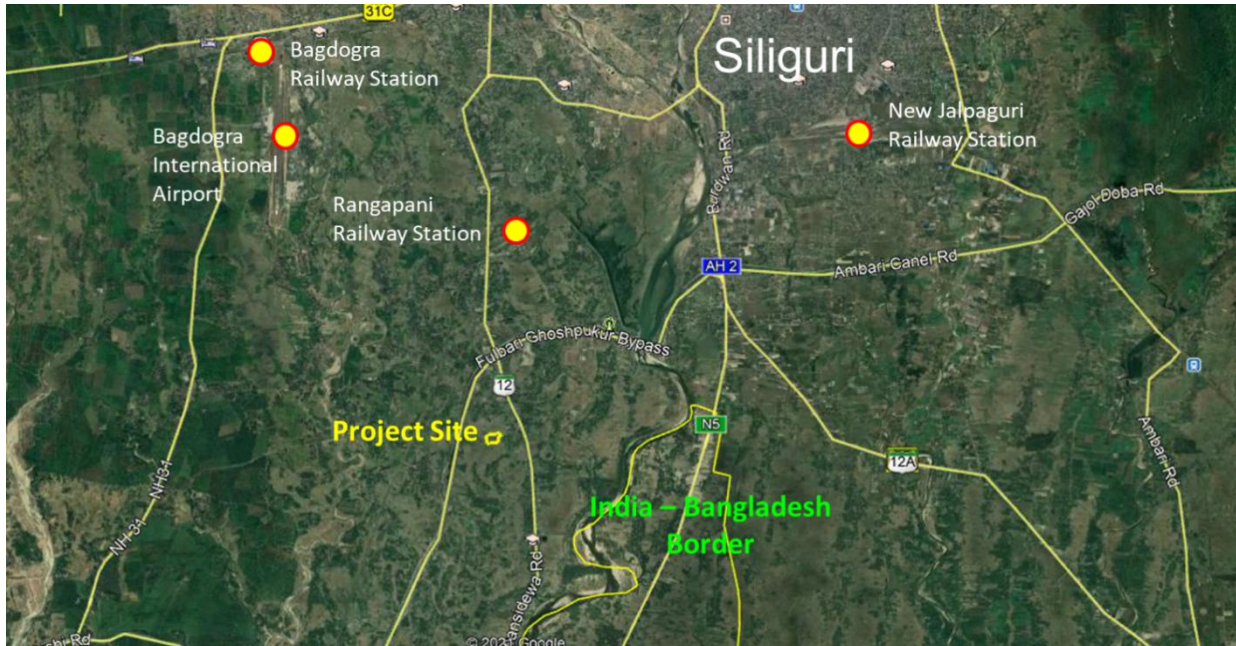
### **Rail:**

Being a transportation hub, Siliguri is well connected through railway with almost all parts of the country. There are seven stations that serve the city.

- New Jalpaiguri Junction railway station
- Siliguri Junction
- Siliguri Town railway station
- Bagdogra railway station
- Matigara Railway Station
- Rangapani railway station
- Gulma railway station

### **Air:**

Bagdogra International Airport is an international airport located towards the west of Siliguri city, and 7 km North West from project site, operated as a civil enclave at AFS Bagdogra of the Indian Air Force. This airport is a major transport hub in the region with flights connecting Kolkata, New Delhi, Mumbai, Chennai, Bangalore, Hyderabad, Ahmedabad, Guwahati, Dibrugarh and has international connectivity with Paro and Bangkok. The airport also has regular helicopter services to Gangtok. Due to its location near Darjeeling hills and Sikkim, Bagdogra international airport sees thousands of tourists annually.



**Figure 3.20: Transportation Accessibility**

### **Socio Economic Survey:**

Socio economic survey was undertaken in the project site and study area. The main objective of the survey was to visit the project site and collect the socio-economic data from the study area and observe the basic infrastructure available. A keen observation of the quality of life of the study area was also carried out.

The project site visit, observations, and questionnaire survey has been used ‘data collection methods’ for collecting data about people and processes as part of qualitative research. Special care was taken to observe prevailing socio-economic condition in the sample area and also assess awareness opinion and reaction of the inhabitants about the project.

### **Objective of the study:**

The objective of conducting socio economic study is to obtain the

- Existing conditions of the project surrounding area.
- Prevailing socio-economic condition of the project surrounding area.
- Awareness, opinion and aspirations of the peoples, about proposed project.

### ***Methodology***

The present study was carried out with the help of both primary and secondary sources. The primary sources included socio economic data collected from a sample of population residing in the study area through a well-structured and pre-tested questionnaire. The secondary sources included the existing literature comprising of reports and studies on the existing area. In the socio-economic survey, besides age, sex and education, issues related to livelihood, basic amenities and post project scenario etc. were discussed with the peoples where focus of

the discussion was on the existing facilities and their aspirations regarding the development of project.

The interviews conducted through structured questionnaires have derived quantitative data, but has also extended discussion with sample respondents in order to supplement the structured findings of the questionnaires with qualitative information as well. Hence, the data collection exercise has been quantitative as well as qualitative in nature. The structured questionnaire covered 5 key areas:

- a. Socio-demographic characteristics
- b. Basic amenities status
- c. Livelihood status
- d. Issues regarding basic living environment
- e. Perception & opinion on the peoples.

The target respondents were either head of the household or a member of the household residing in the study area.

The recorded data is analysed using statistical methods to draw the out the findings and conclusion.

### Socio Economic Survey Questionnaire:

**Socio Economic Survey Questionnaire**

**PROJECT DETAIL**  
 Name of the Project : *Proposed Expansion of Rolling Mill & Installation of IF*  
 Name of the Proponent : *Purbanchal Concast Pvt. Ltd.*  
 Type of Project : *Expansion*

**1. IDENTIFICATION**

1.1	Name of the Respondent (परिवार प्रमुख का नाम)	<i>Loknath Ray</i>
1.2	Address (घर)	<i>Bhushibhita</i>
1.3	Sex (Male / Female) (लिंग/पुरुष/स्त्री)	<i>Male</i>
1.4	How long have you lived here? (तुम कितनी देर तक यहाँ रह चुके होगे)	<i>10</i> -Year
1.5	Family size (परिवार का आकार)	<i>4</i>
1.6	Education (परिवार प्रमुख का शिक्षण)	Illiterate <i>शिक्षर</i>
		Primary (Class1-5) <i>प्राथमिक (बर्ग 1-5)</i>
		SSC/HSC <i>एकदसवीं / दसदसवीं</i>
		Graduate /Post Graduate <i>ग्रेजुएट / पोस्ट ग्रेजुएट</i>
		Technical (Diploma/ITI) <i>तकनीकी/डिप्लोमा/आर्टीआईटी</i>
1.7	Occupation (व्यवसाय)	Others (Specify) <i>अन्य (निर्दिष्ट करें)</i>
		Daily Wage labour <i>दैनिक मजदूरी</i>
		Self employed <i>स्वयं-सहायता/स्वयं-सहायक</i> <i>Business</i>
		Service - Government <i>सरकार - सेवा</i>
		Service Private <i>निजी - सेवा</i>
1.8	Are other family members also working? (क्या परिवार के अन्य सदस्य भी काम कर रहे हैं?)	Yes (Provide details) <i>हां (विवरण प्रदान करें)</i> <i>Wife IEDC worker</i>
		No <i>(नहीं)</i>

**2. BASIC AMENITIES**

2.1	Source of Drinking Water (पेयजल का स्रोत)	<input checked="" type="checkbox"/> Tap in the house <i>(घर का मस)</i>
		<input checked="" type="checkbox"/> Common Tap <i>(सार्वजनिक मस)</i>
		Other: <i>अन्य (निर्दिष्ट करें)</i>
2.2	Type of cooking fuel (क्या सजने के ईंधन का प्रकार)	<input checked="" type="checkbox"/> LPG/Gas <i>(एलपीजी/गैस)</i>
		Kerosene <i>(मिट्टी तेल)</i>
		Firewood <i>(सकड़ी)</i>
		Other <i>अन्य (निर्दिष्ट करें)</i>
		<input checked="" type="checkbox"/> Private (in your own house) <i>निजी (अपने घर में)</i>
2.3	Type of toilet (सौभाग्य का प्रकार)	<input checked="" type="checkbox"/> Common (shared by others) <i>सार्वजनिक (दूसरों द्वारा साझा)</i>
		Public <i>सार्वजनिक</i>

**ULTRA-TECH** Environmental Consultancy & Laboratory

2.4	Name the most pressing problems faced by your area? (आपके क्षेत्र में आने वाली समस्याओं का नाम)	Sanitation <i>स्वच्छता</i>
		Drainage <i>उत्सर्जकता</i>
		Drinking water <i>पीने का पानी</i> <i>Iron water</i>
		Roads <i>सड़के</i>
		Environment <i>पर्यावरण</i>
2.5	Are there frequent illnesses or Disease? What if क्या लगातार बीमारियां होती हैं/कितनी	Yes <i>हां (निर्दिष्ट करें)</i>
		No <i>(नहीं)</i>

**3. PERCEPTIONS & OPINIONS**

3.1	Are you aware of the details of the project? (क्या आप परियोजना के विवरण से अवगत हैं?)	<input checked="" type="checkbox"/> Yes <i>(हां)</i>
3.2	How to get information about the project? (आपको प्रोजेक्ट के बारे में कैसे पता चला)	Television <i>(दूरदर्शन)</i>
		News Paper <i>(समाचारिक समाचार पत्र)</i>
		Government officer (सरकारी अधिकारी)
		Village peoples <i>(गाँव के लोग)</i>
3.3	Have you get any Benefit from this project? (क्या आपको इस परियोजना से कोई लाभ हुआ है?)	<input checked="" type="checkbox"/> Yes <i>(हां)</i>
		No <i>(नहीं)</i>
3.4	Is there Employment development due to this project? (क्या इस परियोजना के कारण रोजगार का विकास हुआ है?)	<input checked="" type="checkbox"/> Yes <i>(हां)</i> <i>Possible</i>
3.5	Is there any Area development due to project? (क्या परियोजना के कारण कोई क्षेत्र विकसित है?)	<input checked="" type="checkbox"/> Yes <i>(हां)</i> <i>May be</i>
		No <i>(नहीं)</i>
3.6	Do you aware any issue related to environment pollution due to this project? If Yes (Provide details) (क्या आप इस परियोजना के कारण पर्यावरण प्रदूषण से संबंधित किसी मुद्दे से अवगत हैं/यदि हाँ (विवरण दें))	<input checked="" type="checkbox"/> Yes <i>(हां (निर्दिष्ट करें))</i> <i>Dust from factory</i>
		No <i>(नहीं)</i>
3.7	Does the proposed project would change the way you live and work? How? (क्या प्रस्तावित परियोजना आपके जीवन स्तर को बदल देगी? बदल देती है तो कैसे?)	<input checked="" type="checkbox"/> Yes (How) <i>हां (कैसे)</i> <i>Can't say</i>
3.8	Are you happy and support the project? क्या आप प्रस्तावित परियोजना से खुश हैं और क्या आप विकास परियोजना का समर्थन करते हैं?	<input checked="" type="checkbox"/> Yes <i>(हां)</i> <i>Exporting employment</i>
		No <i>(नहीं)</i>

Investigators Name (आपका नाम)	<i>Pradeep</i>	Respondent Name and Signature (उत्तरदाता का नाम और हस्ताक्षर)	<i>Loknath Ray</i>
Date	<i>10/11/2024</i>		

**4. Remark / Note:** *Iron concentration is high in drinking water. Road condition isn't good.*

**ULTRA-TECH** Environmental Consultancy & Laboratory

**Socio Economic Survey Questionnaire**

**PROJECT DETAIL**  
 Name of the Project : Proposed Expansion of Rolling Mill & Ingot/Billet of IF  
 Name of the Proponent : Purbanchal Concast Pvt. Ltd.  
 Type of Project : Expansion

**1. IDENTIFICATION**

1.1	Name of the Respondent (परिचार प्रमुख का नाम)	<u>Romakanta Parik</u>
1.2	Address (पता)	<u>Netajini</u>
1.3	Sex (Male / Female) लिंग (पुरुष / स्त्री)	<u>Male</u>
1.4	How long have you lived here? (तुम कितनी देर तक यहाँ रह चुके होगे)	<u>46</u> - Year
1.5	Family size (परिचार का आकार)	<u>8</u>
1.6	Education (परिचार प्रमुख का शिक्षण)	Illiterate निरक्षर
		Primary (Class 1-5) प्राथमिक (कक्षा 1-5)
		SSC/HSC एलएससी / एचएससी
		Graduate / Post Graduate ग्रेजुएट / पोस्ट ग्रेजुएट
		Technical (Diploma/ITI) तकनीकी (डिप्लोमा / आयटीआई)
1.7	Occupation (व्यवसाय)	Others (Specify) अन्य (निर्दिष्ट करें)
		Daily Wage labour दैनिक मजदूरी
		Self employed स्वयं-व्यवसायिक
		Service - Government सरकारी - सेवा
		Service Private निजी - सेवा
1.8	Are other family members also working? (क्या परिवार के अन्य सदस्य भी काम कर रहे हैं?)	Housewife गृहिणी
		House Maid गृहकार्यी (घरवाली / बर्तन)
		Unemployed बेरोजगार
Yes (Provide details) हाँ (विवरण प्रदान करें)	No (नहीं)	

**2. BASIC AMENITIES**

2.1	Source of Drinking Water (पेयजल का स्रोत)	Tap in the House (घर का नल)
		Common Tap (सार्वजनिक नल)
		Other अन्य (निर्दिष्ट करें)
2.2	Type of cooking fuel (खाना पकाने के ईंधन का प्रकार)	LPG/Gas (एलपीजी) गैस
		Kerosene (कerosene) तेल
		Firewood (कचड़ी)
		Other अन्य (निर्दिष्ट करें)
2.3	Type of toilet (शौचालय का प्रकार)	Private (in your own house) निजी (अपने घर में)
		Common (shared by others) सार्वजनिक (दूसरे द्वारा साझा)
		Public सार्वजनिक

**3. PERCEPTIONS & OPINIONS**

2.4	Name the most pressing problems faced by your area? (आपके क्षेत्र में आने वाली समस्याओं का नाम)	Sanitation स्वच्छता
		Drainage जलनिकास
2.5	Are there frequent illnesses or Disease? What if क्या लगातार बीमारियाँ होती हैं और क्या	Drinking water पीने का पानी
		Roads सड़कें
		Environment पर्यावरण
		Other... अन्य (निर्दिष्ट करें)
		Social Problems सामाजिक समस्या
Yes हाँ (निर्दिष्ट करें)	No नहीं	

3.1	Are you aware of the details of the project? (क्या आप परियोजना के विवरण से अवगत हैं?)	Yes (हाँ)	No (नहीं)
3.2	How to get information about the project? (आपको प्रोजेक्ट के बारे में कैसे पता चला)	Television (दूरदर्शन)	News Paper (सामाजिक समाचार पत्र)
		Government officer (सरकारी अधिकारी)	Village peoples (गाँव के लोग)
3.3	Have you get any Benefit from this project? (क्या आपको इस परियोजना से कोई लाभ हुआ है?)	Yes (हाँ)	No (नहीं)
3.4	Is there Employment development due to this project? (क्या इस परियोजना के कारण रोजगार का विकास हुआ है?)	Yes (हाँ)	No (नहीं)
3.5	Is there any Area development due to project? (क्या परियोजना के कारण कोई क्षेत्र विकास हो रहा है?)	Yes (हाँ)	No (नहीं)
3.6	Do you aware any issue related to environment pollution due to this project? If Yes (Provide details) (क्या आप इस परियोजना के कारण पर्यावरण प्रदूषण से संबंधित किसी मुद्दे से अवगत हैं? यदि हाँ (विवरण दें)	Yes (निर्दिष्ट करें)	No (नहीं)
		Yes (How) हाँ (कैसे)	No (नहीं)
3.7	Does the proposed project would change the way you live and work? How? (क्या प्रस्तावित परियोजना आपके जीवन स्तर को बदल देगी? बदल देती है तो कैसे?)	Yes (हाँ)	No (नहीं)
3.8	Are you happy and support the project? क्या आप प्रसन्न हैं और परियोजना का समर्थन करते हैं?	Yes (हाँ)	No (नहीं)

Investigators Name: Sanku Respondent Name and Signature: Romakanta  
 Date: 10/05/2024

**4. Remark / Note:**

**ULTRA-TECH** Environmental Consultancy & Laboratory

**Socio Economic Survey Questionnaire**

**PROJECT DETAIL**

Name of the Project : *Proposed Expansion of Rolling Mill & Installation of IF*  
 Name of the Proponent : *Purbanchal Concast Pvt. Ltd.*  
 Type of Project : *Expansion*

**1. IDENTIFICATION**

1.1	Name of the Respondent (परिवार प्रमुख का नाम)	<i>Samlata Acharya</i>
1.2	Address (पता)	<i>Bushi bhita</i>
1.3	Sex (Male / Female) लिंग (पुरुष / स्त्री)	<i>Female</i>
1.4	How long have you lived here? (तुम कितनी देर तक यहां रह चुके हो?)	<i>32 - Year</i>
1.5	Family size (परिवार का आकार)	<i>3</i>
1.6	Education (परिवार प्रमुख का शिक्षण)	Illiterate निरक्षर
		Primary (Class1-5) प्राथमिक (कॉर्स 1-5)
		SSC/HSC एसएससी / एचएससी
		Graduate /Post Graduate ग्रेजुएट / पोस्ट ग्रेजुएट
		Technical (Diploma/ITI) तकनीकी (डिप्लोमा/ आर्टीआय)
1.7	Occupation (व्यवसाय)	Others (Specify) अन्य (निर्दिष्ट करें)
		Daily Wage labour दैनिक मजदूरी
		Self employed स्वयं-व्यवसायिक
		Service - Government सरकार - सेवा
		Service Private निजी - सेवा
		Housewife गृहिणी
1.8	Are other family members also working? (क्या परिवार के अन्य सदस्य भी काम कर रहे हैं?)	House Maid गृहकार्य (घुसवाई / बर्तन)
		Unemployed बेरोजगार
		Yes (Provide details) हां (विवरण प्रदान करें)

**2. BASIC AMENITIES**

2.1	Source of Drinking Water (पेयजल का स्रोत)	Tap in the House (घर का नाल)
		Common Tap (सार्वजनिक नाल)
		Other अन्य (निर्दिष्ट करें)
2.2	Type of cooking fuel (खाना पकाने के ईंधन का प्रकार)	PG/Gas (एलपीजी) गैस
		Kerosene (मिट्टी तेल)
		Firewood (सकड़ी)
		Other अन्य (निर्दिष्ट करें)
2.3	Type of toilet (शौचालय का प्रकार)	Private (in your own house) निजी (अपने घर में)
		Common (shared by others) सार्वजनिक (दूसरों द्वारा साझा)
		Public सार्वजनिक

2.4	Name the most pressing problems faced by your area? (आपके क्षेत्र में आने वाली समस्याओं का नाम)	Sanitation स्वच्छता
		Drainage जलनिकास
		Drinking water पीने का पानी
		Roads सड़कें
		Environment पर्यावरण
2.5	Are there frequent illnesses or Disease? What if क्या लगातार बीमारियां होती हैं/कौनसी	Other... अन्य (निर्दिष्ट करें)
		Social Problems सामाजिक समस्या
		Yes हां (निर्दिष्ट करें)

**3. PERCEPTIONS & OPINIONS**

3.1	Are you aware of the details of the project? (क्या आप परियोजना के विवरण से अवगत हैं?)	Yes (हां)
		No (नहीं)
3.2	How to get information about the project? (आपको प्रोजेक्ट के बारे में कैसे पता चला)	Television (दूरदर्शन)
		News Paper (स्वामिक समाचार पत्र)
		Government officer (सरकारी अधिकारी)
		Village peoples (गांव के लोग)
3.3	Have you get any Benefit from this project? (क्या आपको इस परियोजना से कोई लाभ हुआ है?)	Other (अन्य)
		Yes (हां)
3.4	Is there Employment development due to this project? (क्या इस परियोजना के कारण रोजगार का विकास हुआ है?)	No (नहीं)
		Yes (हां)
3.5	Is there any Area development due to project? (क्या परियोजना के कारण कोई क्षेत्र विकास है?)	Yes (हां)
		No (नहीं)
3.6	Do you aware any issue related to environment pollution due to this project? If Yes (Provide details) (क्या आप इस परियोजना के कारण पर्यावरण प्रदूषण से संबंधित किसी मुद्दे से अवगत हैं? यदि हां (विवरण दें)	Yes (निर्दिष्ट करें)
		No (नहीं)
3.7	Does the proposed project would change the way you live and work? How? (क्या प्रस्तावित परियोजना आपके जीवन स्तर को बदल देगी? बदल देती है तो कैसे?)	Yes (How) हां (कैसे)
		No (नहीं)
3.8	Are you happy and support the project? क्या आप प्रस्तावित परियोजना से खुश हैं और क्या आप विकास परियोजना का समर्थन करते हैं?	Yes (हां)
		No (नहीं)

Investigators Name *Sanku* Respondent Name and Signature *Samlata Acharya*  
 Date तारीख - अवरदाता का नाम और हस्ताक्षर

**4. Remark / Note:**

## Findings and Conclusion:

Questions were asked to respondents to seek their opinions, perceptions and aspirations regarding the proposed project. Opinions are important vehicle through which one could understand the existing mental attitude of people in general and groups, and community in particular.

- Concerning the sex structure of the respondents, 51 percent of the respondents were males while 49 percent were females. As per survey data within study area female population is little less than male population, whereby males are dominant in culture.
- The average household size was found to be 4 members.
- Education is one of the keys to success and development and as such, people pay much attention to their educational status. Most of the sample respondents interviewed had some kind of formal education. Nearly three fourth of the respondents had attained education till graduation to Post Graduation, whereas 10 percent of the respondents have completed SSC/HSC. 5 percent of the respondents have education till primary class (Class 1-5).
- Questions were asked about the number of earning members in the family their type of income and their respective jobs. Most of the respondents are engaged in tourism and tea industry, besides tea, the most widely cultivated crops include maize, millets, paddy, cardamom, potato and ginger. Study area and surrounding area of Darjeeling had become an important tourist destination as early as 1860. It is reported to be the only location in eastern India that witnesses large numbers of foreign tourists.
- House constitutes the most vital aspect of the basic needs of man and basic amenities form an integral part of the housing facility. Basic amenities are measured through the availability of drinking water facility, toilet, drainage, garbage disposal, electricity, cooking fuel etc. Local Government authority, Panchayati raj, Grampanchayat / Nagar panchayat provide drinking water, sanitation facility. All respondent using LPG Gas for cooking fuel.
- Availability of toilet is an important indicator of the sanitation. All respondent are using private own toilet facility.
- When asked about the most pressing problem faced in surrounding area respondent highlighted the Road quality problem. But still the people were happy.
- Questions were asked to respondents to seek their opinions, perceptions and aspirations regarding the project. Opinions are important vehicle through which one could understand the existing mental attitude of people in general and groups, and community in particular. All of respondents were aware of the project, which reflects that the project proponent has carried out regular consultation with the local peoples. All of the respondents are in support of the project fully. Their only demand is to give the preference to local people for permanent job in proposed and existing project. Also while in proposed construction activity worker, labour contractors, transporters, raw material suppliers, and boats etc. preference should be given to local peoples.

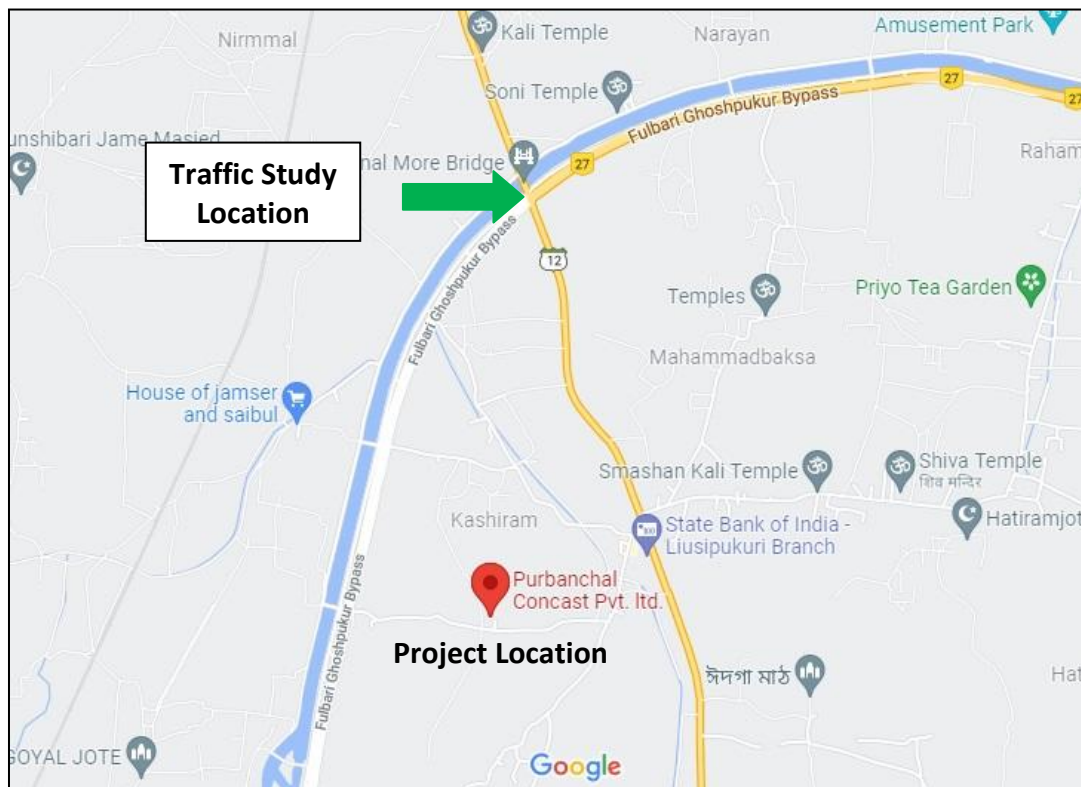
### 3.11 Traffic Survey

The traffic survey, to ascertain the traffic density in the study area was conducted on the junction of NH-27 and the connecting road (Fulbari Ghoshpukur Bypass) to project location of Purbanchal Concast 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 3.26**.

**Table 3.26: 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:  $PCU\ unit = No\ of\ vehicles * PCE\ of\ those\ particular$



**Figure 3.21: Location of the Node for Traffic Survey**

Traffic study was carried out at 1 node at the junction of NH-27 and the connecting road (Fulbari Ghoshpukur Bypass) to project location of Purbanchal Concast Pvt. Ltd. as shown in **Figure 3.21**.

#### Node-1

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

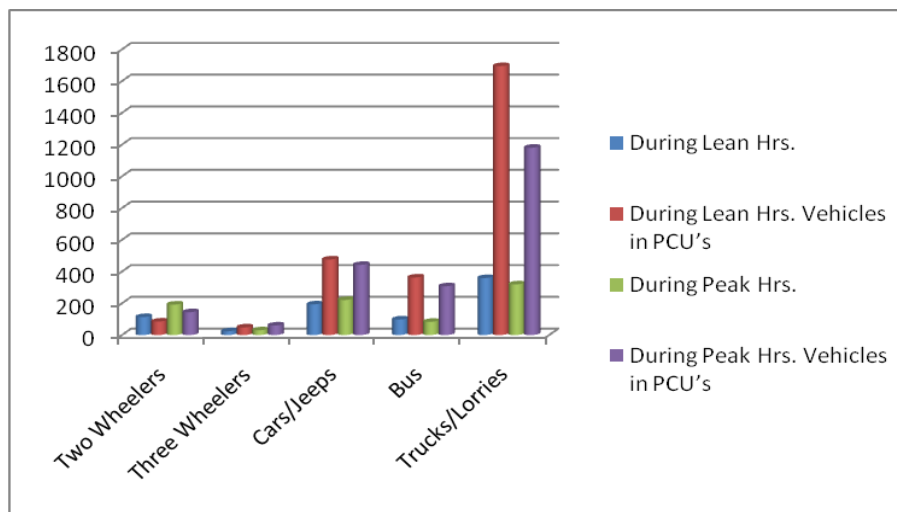
Data was collected by physically counting the number of vehicles plying in both directions at Node 1. The hourly counts were carried out for the different type/category of vehicles. The variation in the traffic flow at the given road along with the number of vehicles during peak hour & lean hour is presented in the **Table 3.25** and **Figure 3.22**.

**Table 3.25: Traffic Survey, Node I**

	<b>During Lean Hrs.</b>	<b>During Lean Hrs. Vehicles in PCU's</b>	<b>During Peak Hrs.</b>	<b>During Peak Hrs. Vehicles in PCU's</b>
Two Wheelers	113	84.75	192	144
Three Wheelers	24	48	30	60
Cars/Jeeps	193	476	221	442
Bus	98	362.6	83	307.1
Trucks/Lorries	359	1694.6	319	1180.3
<b>Total</b>	<b>787</b>	<b>2665.95</b>	<b>845</b>	<b>2133.4</b>

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 3.22: 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 = 2133

Existing Volume/Capacity ratio =  $2133/3600 = 0.58$

The level of service is "C" that is Good.

**Table 3.26: Level of Service**

Sl. No.	Existing Volume/Capacity	Level of Services
1	0.0 to 0.2	"A" (Excellent)

Sl. No.	Existing Volume/Capacity	Level of Services
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  $3.7 \times 30 / 9 = 12.33$  per hour during peak hours.

#### Traffic Flow at **Node I**

Total volume during peak hours in PCUs after completion of the project (V) = 2133.4 + 12.33 = 2145.73

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

Modified Existing Volume/Capacity ratio will be  $(V/C) = 2146/3600 = 0.59$ . The level of service of the road will remain “C” after the proposed project that is “**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 FAIR. 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. Purbanchal Concast Pvt. Ltd. at Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District-Darjeeling West Bengal-734434. 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 existing plant operates in an area of 41735.88 sq.m under the ownership of the project proponent and there are no forests or ecologically sensitive land within the existing site.

The current project will take place within the existing plant premises itself. 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 3 nos. of Induction Furnace with CCM and 1 no. of Rolling Mill 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 proposed 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 levelling, 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 levelling. The excavated soil for foundation pad will be used for levelling. 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<sub>2</sub>, NO<sub>x</sub>, 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 Purbanchal Concast Pvt. Ltd. The land is industrial and also does not have any 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 with CCM and Rolling Mill. 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 with CCM and Rolling Mill. 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 Purbanchal Concast 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 (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>). 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 & DG Set. Stack emissions would be constituted of mainly PM<sub>10</sub> & PM<sub>2.5</sub>. The capacity of proposed 3 nos. Induction Furnace will be 15T each. The capacity of the existing DG set is 45 kVA and capacity of proposed DG set will be 320 kVA. The details of stack emission are given in **Table 4.1**.

**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 Modelling**

#### **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.

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.* 126

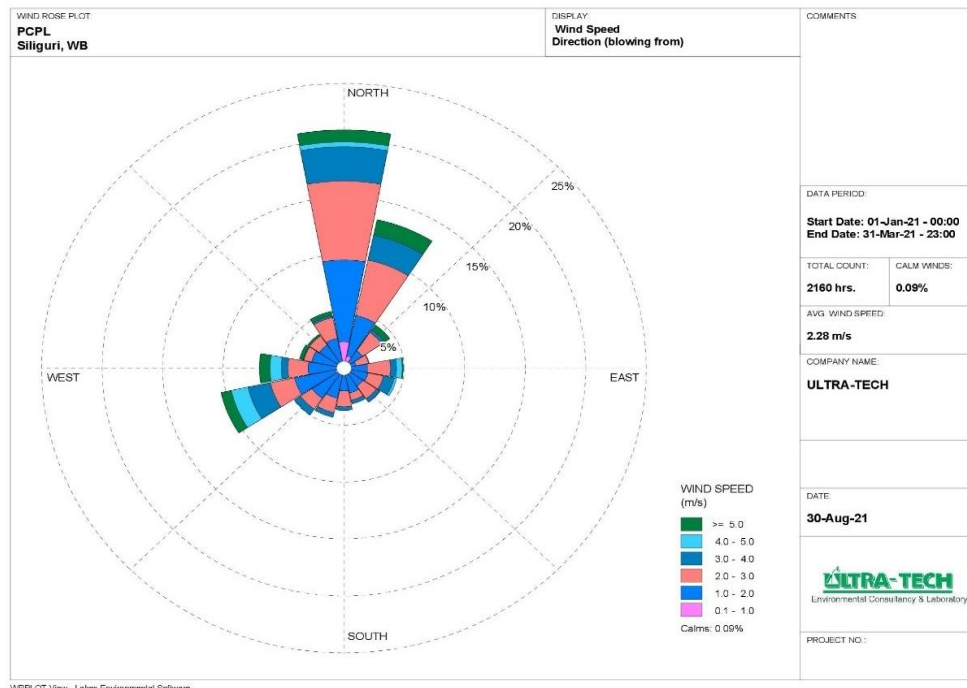
**Table 4.1: Detail of Proposed Facilities**

Name	Config.	Production Capacity
Rolling Mill	1X25TPH	Rolling Mill Products [TMT Bar] 200000 TPA
Induction Furnace	3X15T	MS Billet/Ingot 200000 TPA
Continuous Casting Machine (CCM)	1X2 Strand	

**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 of wind speed & direction, temperature, cloud amount and rainfall are used for Winter season (January to March 21). Mean wind speed is 2.20 m/s. Calm is low and observed value is 0.09%. Northerly and North-northerly winds are dominant which is followed by South south-westerly as shown in Figure 4.1 below.



**Figure 4.1: Wind Rose (winter season)**

**Emission Data**

In the proposed unit, 3x15T Induction Furnace with CCM and 1x25 TPH Rolling Mill will be installed. There will be production 200000 TPA MS Ingot/Billet and 200000 TPA Rolling Mill product (TMT Bar). Stack & Emission Data of Proposed units and the existing DG set are given in Table 4.2.

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

Stack attached to	Stack Height from GL, meters	Exit gas Velocity, m/sec	Top Stack Dia, m	Exit gas Temp, °C	PM (mg/N M <sup>3</sup> )	PM (g/s)	Standard (mg/NM <sup>3</sup> )	APCM
<b>EXISTING</b>								
DG Set (45 kVA)	4 (above DG room)	18	0.05	50	0.1 g/kW-hr		≤ 0.3 g/kW-hr	Acoustic Enclosure & Exhaust Muffler
<b>PROPOSED</b>								
Stack attached to	Stack Height from GL, meters	Exit gas Velocity, m/sec	Top Stack Dia, m	Exit gas Temp, °C	PM (mg/N M <sup>3</sup> )	PM (g/s)	Standard (mg/NM <sup>3</sup> )	APCM
Induction Furnace (3X15T)	30 (for each IF)	10	2.25	100-120	<150	4.52	150	Bag filter & Cyclone Separator
DG Set (1X320 kVA)	6 (above DG room)	18	1	50	0.1 g/kW-hr		≤ 0.2 g/kW-hr	Acoustic Enclosure & Exhaust Muffler

Hourly meteorological data recorded at site for January to March 2021 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

### Frame work of Calculation

USEPA Dispersion model ISCST3 is used for prediction of impact covering the radial distance of 10 km in the grid interval of 400 m over 51 grids net-work for each pollutant separately. Prediction is made for PM<sub>10</sub> with APC (Bag filter efficiency 80%) and in the worst- case scenario when there is no APC for the proposed units. There will be no emission from the existing units as the existing Reheating Furnaces will remain unutilized. The predicted results and output from ISCST3 are given below in Table 4.3 & 4.4.

**Table 4.3: Predicted 24-hour Incremental GLCs (µg/m<sup>3</sup>) with APC due to proposed units**

Pollutants	Max. Base Line	Maximum Incremental GLC	Total GLC	Distance(m) Direction
PM <sub>10</sub>	96.4	3.2	99.6	600 m, South (Liusipukuri village)

Note – With APC

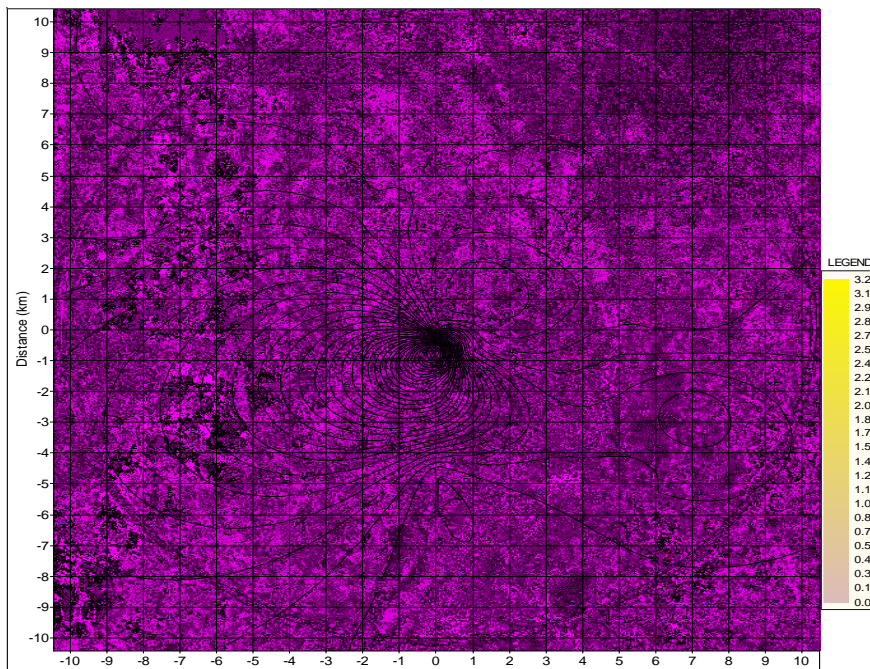
**Table 4.4: Predicted 24-hour Incremental GLCs (µg/m<sup>3</sup>) without APC due to proposed units**

Pollutants	Max. Base Line	Maximum Incremental GLC	Total GLC	Distance(m) Direction
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Pollutants	Max. Base Line	Maximum Incremental GLC	Total GLC	Distance(m) Direction
PM <sub>10</sub>	96.4	16.0	112.4	600 m, South (Liusipukuri village)

**Note** – Without APC

Incremental values of PM<sub>10</sub> are 3.2µg/m<sup>3</sup> and 16.0µg/m<sup>3</sup> in the worst- case scenario due to proposed unit when unit is operated with and without Air Pollution Control Equipment. Incremental GLCs are superimposed on Baseline value; Total GLCs are 99.6 and 112.4 µg/m<sup>3</sup> as shown in above Table 4.3 and Table 4.4.



**Figure 4.2: 24 -h Incremental Concentration of PM<sub>10</sub> is 3.27µg/m<sup>3</sup> at 600 m, South in Liusipukuri village due to proposed unit**

The following measures will be adopted for controlling the fugitive dust emission within the 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.
- Electricity backup shall be provided to all APCDs
- In case of APCD failure, operation shall be stopped by consulting plant engineer and safety officials.

- Ash from ESP and 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.
- In FBC boiler circulating bed feeding system is suggested to reduce NO<sub>x</sub> emissions
- Sufficient suction hoods shall be provided at charging point of furnace to avoid higher concentration at work environment
- Considering higher SO<sub>2</sub> and NO<sub>x</sub> emission rate, installation of wet scrubbers are suggested after PM cleaning system.

### **Noise Environment**

The major noise generating sources are from the cooling tower, steel melting section, rolling mill section, transformer, machine shop, DG sets, 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 128 KL per day, out of which 14 KL will be used for domestic purpose from where around 11 KL sewage water will be generated which will be treated in MBBR technology based STP of 20 KL capacity.

For industrial cooling purpose, around 100 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 47 KLD.

The source of water is Ground water.

### **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 to 104  $\mu\text{g}/\text{m}^3$  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  $\mu\text{g}/\text{m}^3$  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  $\mu\text{g}/\text{m}^3$  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:

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.* 131

- ❖ 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<sub>x</sub> and SO<sub>x</sub> 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<sub>2</sub>
- ❖ 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
- ❖ 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<sup>1</sup>
- ❖ 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 about 41735.88 m<sup>2</sup> 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<sub>2.5</sub> is 60 µg/m<sup>3</sup> (annual average) and the same, based on the epidemiological studies, is recommended as 10 µg/m<sup>3</sup> (annual) by WHO. Thus

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<sup>1</sup><http://CPCB.nic.in/divisionsofheadoffice/pci2/Noise-vehicle.pdf>  
[http://cpcb.nic.in/divisionsofheadoffice/pci2/noise\\_rules\\_2000.pdf](http://cpcb.nic.in/divisionsofheadoffice/pci2/noise_rules_2000.pdf)

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.

### ***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 4.7: Details of Solid Waste Generation & Management**

<b>Industrial Waste</b>		
<b>Type of Waste</b>	<b>Quantity</b>	<b>Treatment/Disposal</b>
Slag	1726 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	850TPM	Sold to contractor for sinter plant /Reused in the plant
Ash	15 TPM	Land Filling/Will be given to the cement manufacturers

STP Sludge	0.5 Kg/Day	Will be used as manure for gardening
Sludge from Settling tank	6.81 Kg/Day	WBPCB authorized/approved site
Dust from APC System	194 TPM	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
Sludge from Scrubber	0.25TPM	Sludge from scrubber is being used for land filling at Project Site
<b>Municipal Solid Waste (MSW)</b>		
<b>Type of Waste</b>	<b>Quantity (Kg/Day)</b>	<b>Treatment/ Disposal</b>
Wet Garbage	23	To be disposed off as per MSW Rules
Dry Garbage	53	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 tippie and truck tippie; 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 4.8: Specifications of Spark Arrestor & Bag Filter**

<b>Spark Arrestor</b>	
Total gas volume	40,000 Nm <sup>3</sup> /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
<b>Bag Filter Unit</b>	
Gas volume	40,000 Nm <sup>3</sup> /hr
Air to cloth ratio	1.43 m <sup>3</sup> /min/m <sup>2</sup>
Total filtration area	465.74 m <sup>2</sup>
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 <sup>3</sup> /hr at 6-8 kg/cm <sup>2</sup>
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 <sup>3</sup>

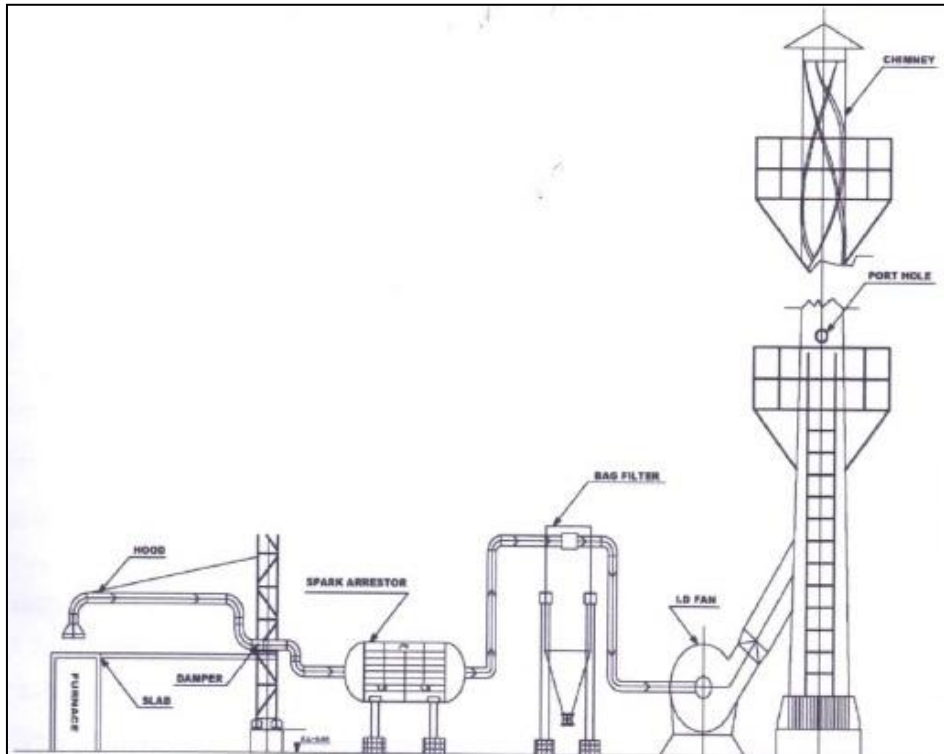
The bag house will be an equipment that will ensure filtration of particulates nuisances, dust from the induction furnace and will ensure that the system will give emission levels less than 30 mg/Nm<sup>3</sup> well specified within the pollution control limits.

### **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<sub>2</sub>, NO<sub>x</sub> 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  $30 \text{ mg/Nm}^3$ .
- ❖ 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  $\text{NO}_x$  and  $\text{SO}_x$  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, DG sets, 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 (11 KLD) generated after proposed project will be treated in a MBBR technology based STP of 20 KL capacity.

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 20 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:

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. An underground storage tank of 144KL is proposed to be constructed in the northern part of the plant area. **Table 4.9** is showing the Rain water harvesting potential calculation

**Table 4.9: Rain Water harvesting potential calculation**

Catchment area	Area in Sq. m.	Rainfall in m	Runoff coefficient	Filter efficiency	Total runoff generated (cum/annum)
Roof Top of building/Shed	21288.76	2.4	0.85	90%	39086.16
Open Land	1320.52	2.4	0.20	90%	570.46
Green Belt	13940.95	2.4	0.15	90%	4516.87
<b>Total</b>					<b>44173.50</b>

The total rainwater harvesting potential is 44173.50 m<sup>3</sup>/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, ETP operators 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 4.10: 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 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.

Activity	Environmental Attributes	Causes	Impact Characteristics			
			Nature	Duration	Reversibility	Significance & Mitigation measures
Waste water discharge	Water	Only Domestic waste water	Direct Negative	Long Term	Reversible	In the process there will be 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 STP 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 4.11: Overall Matrix**

Environmental Area \ Environmental Impact	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 Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, Darjeeling by Purbanchal Concast 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 proposed project will take place within the existing plant premises itself.

- ❖ 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 project 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 (SO <sub>2</sub> , CO, NO <sub>x</sub> )	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 <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , 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
<b>I</b>	<b>A. Air Pollution &amp; Meteorology</b>				
	A	Stack Monitoring			
	1	Induction Furnace	Once	Online	Flue gas temp., velocity, flow, dust conc., SO <sub>2</sub> , NO <sub>x</sub>
	<b>B. Ambient Air Quality Monitoring</b>				
	1	3 - 4 No. of AAQ locations	Twice in a week	24 hr.	As per NAAQs 2009 PM, SO <sub>2</sub> , NO <sub>x</sub> ,
	<b>C. Meteorology</b>				
1	Wind speed, direction, temperature, relative humidity, atmospheric pressure, rainfall etc shall be monitored at plant.				
<b>II</b>	<b>A. Water quality</b>				
	1	Ground Water	Once in a month	Grab	Parameters specified under IS:2295 (Class C) and IS:10500,
<b>III</b>	<b>Industrial Noise Levels</b>				
	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)
	3	D G area			Noise levels in dB(A)
	<b>Ambient Noise Levels</b>				
	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)
<b>IV</b>	<b>Soil Quality</b>				
	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<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>& NO<sub>x</sub> 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 Mahananda River at a distance of 2.68 km towards East. There is also Tista sub canal and Tista Canal situated at 2.55 km & 0.6 km respectively from the project site within the study area. 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 Rs. 21 Crores. An initial budget of Rs.210 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	Capital Cost in INR (Lakhs)	Recurring Cost in INR (Lakh/Year)
1	Air Pollution Control System	90	20
2	Noise Control System	25	5
3	Green Belt Development	20	5
4	Environment Monitoring and Management	20	15
5	Water Pollution Control System	45	10
6	Occupational Health & Safety	10	25
<b>Total</b>		<b>210</b>	<b>80</b>

## 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 Kashiram Jote, Phulbari Ghoshpukur Bypass, Silliguri, District - Darjeeling West Bengal- 734434.

### 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:

<b>Harm</b>	Damage to person, property or environment.
<b>Hazard</b>	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.
<b>Risk</b>	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
<b>Consequence</b>	Effect due to occurrence of the event, which may endanger the environment permanently or temporarily and, or, loss of life and property.
<b>Environmental Disaster</b>	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 7.1.

**Table: 7.1: Hazard Identification for the proposed steel plant**

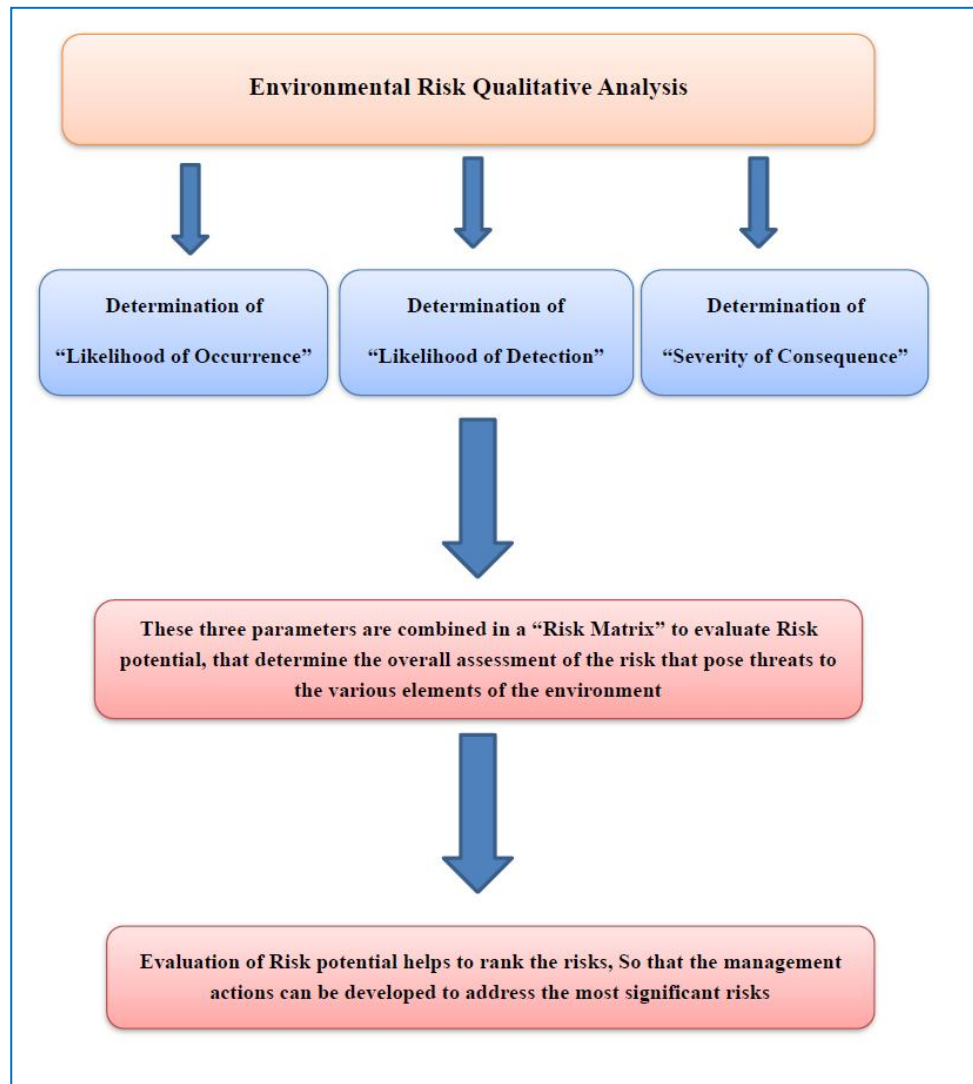
Group	Item	Nature of Hazard	Hazard Potential	Remarks
Raw materials handling	Water treatment chemicals like acids/alkalis	Toxic	Major	Bio-Corrosive
	Lube oil/grease	Fire	Moderate	Flammable
<b>Production Units</b>				
Steel Making	Release of untreated BOFs wastewater	Toxic	Major	Severe pollution of surface 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
<b>Utilities</b>				
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 Risk Analysis Flow Chart Procedure is explicitly depicted in **Fig. 7.1**



**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 compiled 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 be 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 Maharashtra State in 1993 where loss of human life to the extent of 3000 was recorded or industry related

*Draft EIA report for Proposed installation of 3x15T Induction Furnace with 1x2 stand of CCM for manufacturing of MS Ingot/Billet (200000 TPA) and 1x25 TPH Rolling Mill (200000 TPA) by M/s Purbanchal Concast Pvt. Ltd. at Darjeeling, West Bengal.*

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 Purbanchal Concast 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

<b>Chief Controller of Disasters (Factory General Manager)</b>					
<b>Team-1</b>	<b>Team-2</b>	<b>Team-3</b>	<b>Team-4</b>	<b>Team-5</b>	<b>Team-6</b>
Area	Medical	Material	Fire-Safety	Fire-Safety	Security
Co-Ordinator	Co-Ordinator	Co-Ordinator	Co-Ordinator	Co-Ordinator	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<sub>2</sub> 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 CO<sub>2</sub>, 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. Nitesh Sarwagy	Director	9435739383
2.	Mr. S S Chowhan	General Manager	9800012727

### ADDRESS & TELEPHONE DIRECTORY OF CIVIC AUTHORITIES

S. N.	Name	Designation	Office Ph no.
<b>District Administration</b>			
1	Smt. Banhishikha Dey, WBCS(Exe)	Additional District Magistrate(Development)	9434058105
2	Shri Anindya Sarkar WBCS(Exe)	The District Planning Officer, Darjeeling	8373072905
3	Shri Prem Kumar Bardewa WBCS (Exe)	The Additional Executive Officer, Siliguri Mahakuma Parishad	9434059573
<b>Police Administration</b>			
1	Deputy Commissioner of Police		0353-2433900
2	Emergency Number		100 0354-2254400

S. N.	Name	Designation	Office Ph no.
			2252057
<b>Health / Hospital</b>			
1	Desun Hospital ,Siliguri		90516 40000 90516 40000
2	Medica Cancer Hospital Rangapani,		9933356204 9933312626
<b>Disaster Management</b>			
1	District Disaster Management Control Room		0354-2255749
2	Siliguri Subdivision control Room		0353-2510166

## **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 existing land of M/s Purbanchal Concast 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. Purbanchal Concast 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. Purbanchal Concast 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. Purbanchal Concast 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 21 Crores. The project Proponent will allot 1% of the project cost i.e. around 21 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)			
		1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	Green Belt Development in nearby villages in consultation with local authorities	3	2	2	7
2	Street Solar Lighting in nearby areas	2	1.5	1.5	5
3	Organising Health check-up camp in nearby area	3	3	3	9
<b>Total</b>		<b>8</b>	<b>6.5</b>	<b>6.5</b>	<b>21</b>

### 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

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- 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<sub>x</sub> and SO<sub>x</sub> 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<sub>2</sub>.
- 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 conserve 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 project 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 remain the same.

**Technical Specifications of Spark Arrestor & Bag Filter**

**Table 10.1: Specifications of Spark Arrestor & Bag Filter**

<b>Spark Arrestor</b>	
Total gas volume	40,000 Nm <sup>3</sup> /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
<b>Bag Filter Unit</b>	
Gas volume	40,000 Nm <sup>3</sup> /hr
Air to cloth ratio	1.43 m <sup>3</sup> /min/m <sup>2</sup>
Total filtration area	465.74 m <sup>2</sup>
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 <sup>3</sup> /hr at 6-8 kg/cm <sup>2</sup>
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 <sup>3</sup>

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 30 mg/Nm<sup>3</sup> 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**

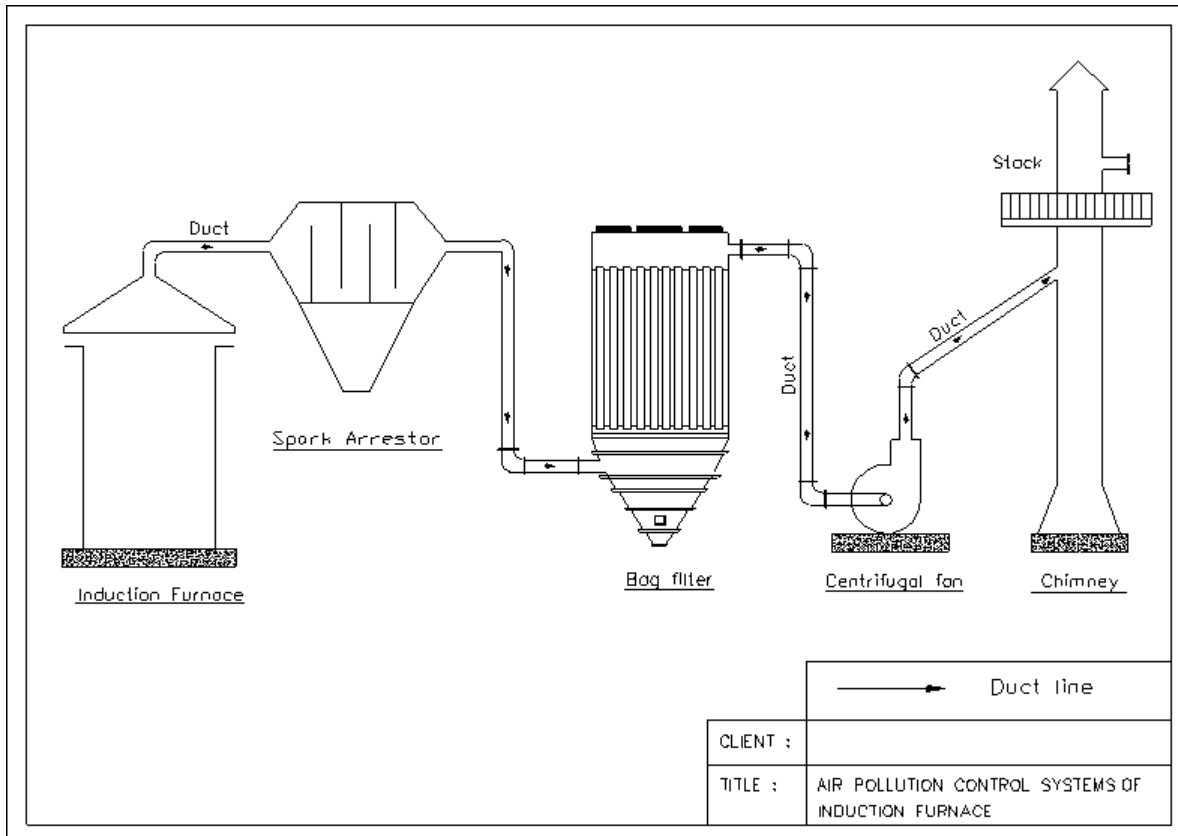
The transportation in the proposed project doesn't create any significant impacts to the environment. There will be a frequent movement of trucks in the plant premise for the transportation of raw materials and products but the proposed project involves only a small increase in truck numbers which will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

The vehicular movements can discharge SO<sub>2</sub>, NO<sub>x</sub> 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<sup>3</sup>.
- ❖ 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<sub>x</sub> and SO<sub>x</sub> 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.



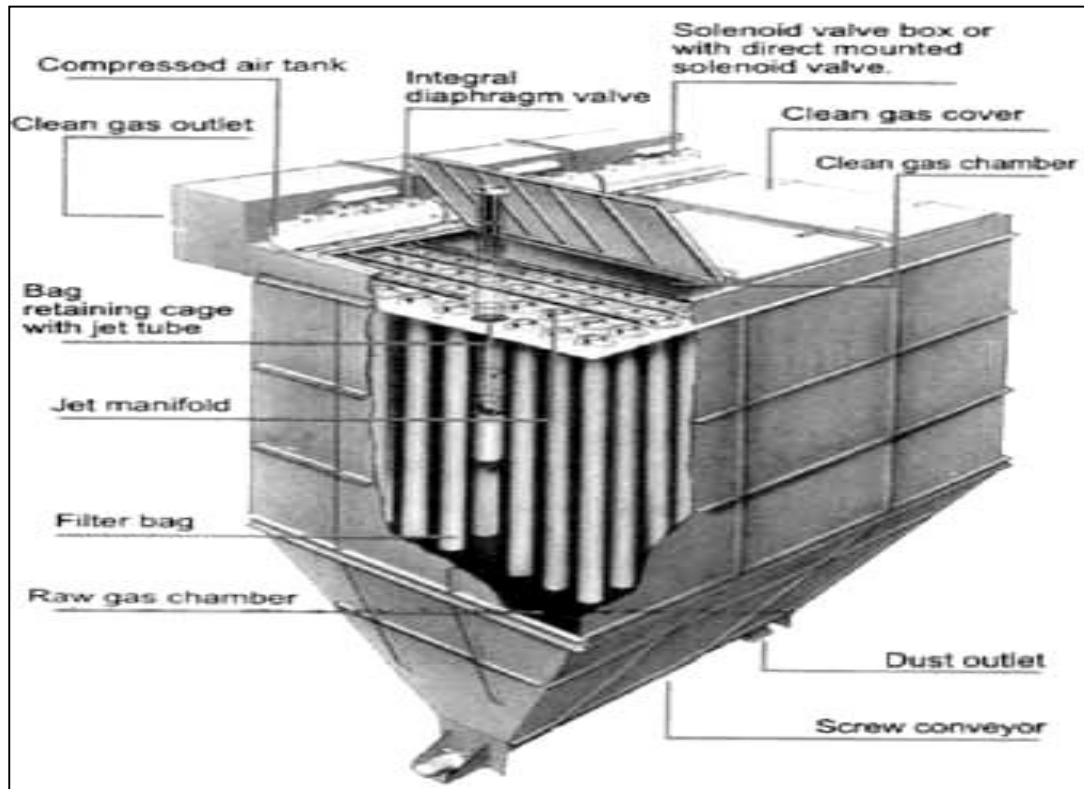
**Figure 10.1: Air Pollution Control System**

### 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 place 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 cloth 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, DG sets, 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 (44 KLD) generated after proposed project will be treated in STP and reused for Plantation.

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 20 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 144kl. **Table 10.2** is showing the Rain water harvesting potential calculation

**Table 10.2: Rain Water harvesting potential calculation:**

Catchment area	Area in Sq. m.	Rainfall in m	Runoff coefficient	Filter efficiency	Total runoff generated (cum/annum)
Roof Top of building/Shed	21288.76	2.4	0.85	90%	39086.16
Open Land	1320.52	2.4	0.20	90%	570.46
Green Belt	13940.95	2.4	0.15	90%	4516.87
<b>Total</b>					<b>44173.50</b>

The total rainwater harvesting potential is 44173.50 m<sup>3</sup>/annum.

#### 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 10.3: Details of Solid Waste Generation**

Industrial Waste		
Type of Waste	Quantity	Treatment/Disposal
Slag	1726 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	850TPM	Sold to contractor for sinter plant /Reused in the plant
Ash	15 TPM	Land Filling/Will be given to the cement manufacturers

STP Sludge	0.5 Kg/Day	Will be used as manure for gardening
Sludge from Settling tank	6.81 Kg/Day	WBPCB authorized/approved site
Dust from APC System	194 TPM	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
Sludge from Scrubber	0.25TPM	Sludge from scrubber is being used for land filling at Project Site
<b>Municipal Solid Waste (MSW)</b>		
<b>Type of Waste</b>	<b>Quantity (Kg/Day)</b>	<b>Treatment/ Disposal</b>
Wet Garbage	23	To be disposed off as per MSW Rules
Dry Garbage	53	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

After the proposed project, the existing green belt will be extended over an area of 13940.95 m<sup>2</sup> (33.40%) within the plant premises of Purbanchal Concast Pvt. Ltd. at Kashiram Jote, Phulbari Ghoshpukur Bypass, Siliguri, District-Darjeeling West Bengal. Considering 1500 plants per Ha, around 3475 trees are required to be planted inside the plant. 175 nos. of trees have already been planted and 3300 nos. of trees have been proposed to be planted. Details of existing trees and proposed trees are tabulated below:

**Table 10.4(A): List of Existing Trees**

Sl. No.	Local Name	Scientific Name	Number of Tree
1	Ashwatha	<i>Ficus religiosa</i>	15
2	Aam	<i>Mangifera indica</i>	19
3	Lebu	<i>Citrus limon</i>	12
4	Thuja	<i>Thuja Occidentalis</i>	21
5	Debdaru	<i>Polyalthia longifolia</i>	26
6	Ganda	<i>Marigold</i>	37
7	Pathabahar	<i>Codiaeum variegatum</i>	9
8	Lemon Grass	<i>Cymbopogon</i>	16
9	Baobarang	<i>Embelia ribes</i>	20
<b>Total</b>			<b>175</b>

**Table 10.4(B): List of Trees for proposed plantation**

S. No.	Common name	Scientific name	Family	Number of Trees
1	Aam	<i>Mangifera indica</i>	<i>Anacardiaceae</i>	290
2	Akashmoni	<i>Acacia moniliformis</i>	<i>Mimosaceae</i>	325
3	Arjun, Arjuna	<i>Terminalia arjuna</i>	<i>Combretaceae</i>	280
4	Ashwatha	<i>Ficus religiosa</i>	<i>Moraceae</i>	115
5	Bot	<i>Ficus benghalensis</i>	<i>Moraceae</i>	80
6	Chatim	<i>Alstonia scholaris</i>	<i>Apocynaceae</i>	270
7	Debdaru	<i>Polyalthia longifolia</i>	<i>Anonaceae</i>	230
8	Ghoranim	<i>Melia azedarch</i>	<i>Meliaceae</i>	350
9	Jhaun	<i>Casuarina equisetifolia</i>	<i>Casuarinaceae</i>	200
10	Krishnachura	<i>Caesalpinia pulcherrima</i>	<i>Caesalpinaceae</i>	300
11	Nim	<i>Azadirachta indica</i>	<i>Meliaceae</i>	380
12	Radhachura	<i>Delonix regia</i>	<i>Caesalpinaceae</i>	335
13	Tantul, Tentuli	<i>Tamarindus indica</i>	<i>Caesal pinaceae</i>	145
<b>Total</b>				3300





**Figure 10.3: Existing Greenbelt of Purbaanchal Concast plant**

### ***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 display Poster, 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

Purbanchal Concast 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 21 Crores. The project Proponent will allot 1% of the project cost i.e. around 21 Lacs towards the CER activity.

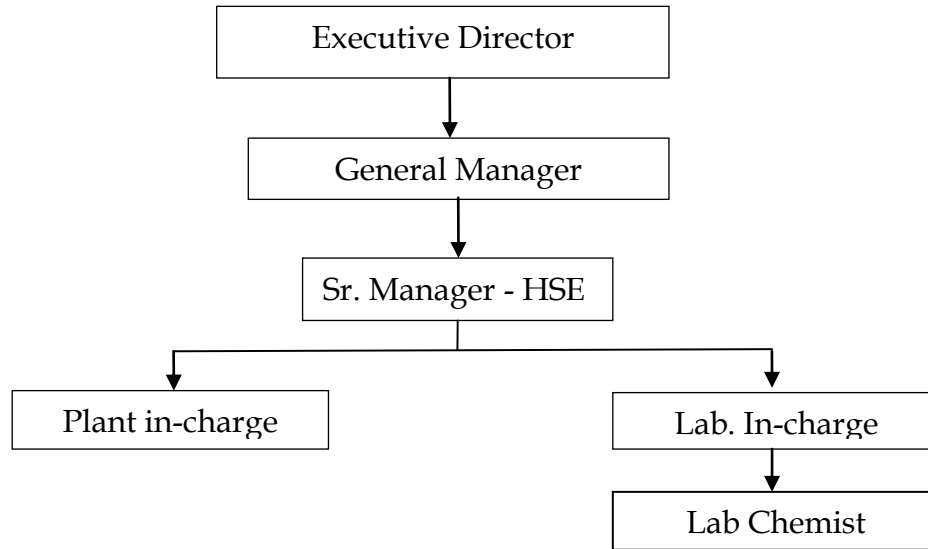
The proposed CER activities are shown in **Table 10.5**, although the heads can be changed on the basis of local demand analysis at the time of Public Hearing.

**Table 10.5: Year wise proposed CER Activities by Purbanchal Concast Pvt. Ltd.**

SI No.	PROPOSED PROGRAMME	AMOUNT (RS. IN LACS)			
		1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	Green Belt Development in nearby villages in consultation with local authorities	3	2	2	7
2	Street Solar Lighting in nearby areas	2	1.5	1.5	5
3	Organising Health check-up camp in nearby area	3	3	3	9
<b>Total</b>		<b>8</b>	<b>6.5</b>	<b>6.5</b>	<b>21</b>

#### 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 10.4: 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.




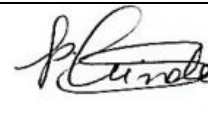


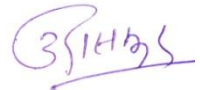


The EIA team involved for the proposed EIA Report is as mentioned in **Table 11.1.**

**Table 11.1: EIA Team**

SN	Name of the expert	Area of functional Expert (NABET Accredited)
2	Mr. Ram Sushil Mishra	EIA Coordinator
3	Mr. Shekhar Manohar Tamhane	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	Mr. Bappaditya Nath	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 'A'	M/s. PURBANCHAL CONCAST PVT LTD	Mr. Ramsushil Mishra		AP	Mr. Adhikrao Govind Yewale	
					AQ		
					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 Mr. Bappaditya Nath	 

**11.2 Laboratory for Analysis**

NAME OF LABORATORY	SCOPE OF SERVICES	ACCREDITATION STATUS
M/s. Bharat Foundation	<b>Monitoring and Analysis of:</b> <ul style="list-style-type: none"> <li>• Ambient Air Monitoring</li> <li>• Ground Water(Analysis)</li> <li>• Surface Water (Analysis)</li> <li>• Soil quality (Analysis)</li> <li>• Noise monitoring</li> </ul>	Accredited by NABL