

EXECUTIVE SUMMARY

For

**GREENFIELD PROJECT FOR PRODUCTION OF SPONGE IRON 231,000 TPA;
MILD STEEL BILLETS 232,848 TPA; REROLLED STEEL PRODUCTS THROUGH
HOT CHARGING AND THROUGH REHEATING FURNACE 225,863 TPA
(171,144 TPA THROUGH HOT CHARGING & 54,719 TPA THROUGH BILLET
REHEATING FURNACE); CAPTIVE POWER OF 25 MW (16 MW THROUGH WHRB
AND 9 MW THROUGH AFBC); SILICO MANGANESE 36,000 TPA AND/ OR FERRO
MANGANESE 46,000 TPA AND/ OR FERRO SILICON 20,000 TPA AND/ OR
PIG IRON 63,000 TPA FROM 9 MVA X 2 NOS SAF;
AND FLY ASH BRICKS 36,700 TPA
LOCATED AT VILLAGES MUDPAR & RAMPURA, TEHSIL NAWAGARH,
DISTRICT BEMETARA, CHHATTISGARH**

Terms of Reference File No. IA-J-11011/307/2021-IA-II(IND-I) dated 5th May, 2022
Category A1, Schedule 3 (a) Metallurgical Industries and 1(d) Thermal Power Plant
Baseline Monitoring Period: Pre Monsoon Season (1st March 2021 – 31st May 2021)
Additional Baseline Data (15 April 2022 – 15 May 2022)

PROJECT PROPONENT



M/s. VAP ISPAT PRIVATE LIMITED

ENVIRONMENTAL CONSULTANT



M/s Anacon Laboratories Pvt. Ltd., Nagpur

QCI - NABET Accredited EIA Consultant for
Metallurgical Industries (Ferrous & Non Ferrous) (Sector 8) and Thermal Power Plant (Sector 4)
MoEF&CC (GOI) Recognized Laboratory
ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
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Report No. ANqr /PD/20A/2022/196

MAY 2022

EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. VAP Ispat Private Limited has proposed to implement facilities for production of Sponge Iron, MS Billets, Steel Rerolled products, Ferro Alloys Plant, Fly Ash products along with captive power generation plant comprising of Waste Heat Recovery Boiler (WHRB) and Atmospheric Fluidized Bed Combustion (AFBC) Boiler and Steam Turbine & Generator. This is Greenfield project and will be established in 30.80 Ha total land area.

As per Environmental Impact Assessment Notification dated 14th September, 2006 and subsequent amendment thereof, the Sponge Iron, Steel Melting Shop (Induction Furnace) and Ferro Alloys Plants falls under **Sector 3 (a)** and the AFBC based power plant falls under **Sector 1 (d)**. The overall project activity is categorized as **Category “A”**; therefore, it require Environmental Clearance (EC) to be obtained from EAC (Industry –I), MoEFCC, New Delhi.

The application for prior Environmental Clearance (Form-1) for proposed metallurgical project was submitted to EAC, MoEFCC, New Delhi (Online Proposal No. IA/CG/IND/261323/2021) on 28th March, 2022.

The proposal was considered by the Expert Appraisal Committee (EAC) and ToR was granted on 05.05.2022 (vide. file no. : IA-J-11011/307/2021-IA-II(IND-I)).

Anacon Laboratories Pvt. Ltd., Nagpur, is QCI-NABET accredited in ‘Category A’ environment consultant organization has been assigned to undertake an Environmental Impact Assessment (EIA) study and preparation of Environment Management Plan (EMP) for various environmental components, which may be affected due to the impacts arising out of the proposed project.

The Environmental Impact Assessment (EIA) report is prepared for obtaining Environmental Clearance (EC) from Ministry of Environment, Forest and Climate Change (MoEFCC), New Delhi and the Consent for Establishment from the Chhattisgarh Environment Conservation Board (CECB) for the proposed Greenfield project.

The draft report is submitted for public hearing as per the EIA Notification (dated 14th September 2006) and subsequent amendment thereof. The final report will be upgraded after public hearing.

1.1 IDENTIFICATION OF PROJECT

M/s. VAP Ispat Private Limited proposes Greenfield project involving Sponge Iron kilns, Induction Furnaces, Rolling Mills, Submerged Arc Furnaces, Captive Power Plant (AFBC + WHRB) and Fly Ash Brick manufacturing unit. The project is located at Village – Mudpar and Rampura, Tehsil – Nawagarh, District – Bemetara (CG –491332). The proposal is to seek Environment Clearance based on energy efficient as well as well proven technology process.

**TABLE 1
PROPOSED CAPACITY DETAILS OF THE PLANT**

S. No.	Process plant	Proposed configuration of the plant	Product Name	Capacity (in TPA)
1	DRI Kiln (Coal Fired)	350TPD X 2 No.	Sponge Iron	231,000
2	Induction Furnace along with CCM and LRF	Induction Furnace (20 MT X 4 Nos.) and LRF (20 MT x 1 No)	MS Billet	232,848
3	Hot Rolling Mill			225,863
	a. Hot Charging Rolling Mill	Electrical driven Rolling Mill about 388 TPD	Rerolled Steel product (Wire Rod, TMT bar, Structure Steel etc.)	171,144
	b. Billet Reheating	Reheating Furnace based	Rerolled Steel products	54,719

S. No.	Process plant	Proposed configuration of the plant	Product Name	Capacity (in TPA)
	Furnace	Rolling Mill about 124 TPD	(Rerolled Structural Steel etc.)	
4	Captive Power Plant (Boiler and TG based)	WHRB	Captive Power	16 MW
		AFBC		9 MW
5a)	Submerged Arc Furnace	2 Nos. of furnace with 9MVA as input power capacity	Silico Manganese	36,000
			And/ Or	
5b)			Ferro Manganese	46,000
			And/ Or	
5c)			Ferro Silicon	20,000
	And/ Or			
5d)			Pig iron	63,000
6	Fly Ash Bricks/ Block making unit	Fly Ash Brick/ Block Making	Fly Ash Bricks/ Blocks	36700
7	Producer gas Plant (Based on Coal)	Coal Producer gas plant will be of 2.2 Meter dia. and capable to gasifier upto 1100 kg/ Hour Coal to produce 1800 to 3600 NM3 per hour producer gas	Producer gas	30,240 Thousand NM ³ Producer Gas per annum

1.2 LOCATION OF THE PROJECT

The proposed project located at Village – Mudpar & Rampura, Tehsil – Nawagarh, District – Bemetara (CG – 491332). The nearest city is Mungeli which is around 16.5 km in NW direction. Nearest airport is Bilasa Devi Kevat Airport, Domestic Airport (Bilaspur Airport) which is around 38.00 km at NNE direction. The project site can be reached from nearest city Mungeli through SH-10 which is adjacent from the site and from District headquarters Bemetara through National highway namely NH-130. The project is well connected to all weather road. Nearest railway station is Bhatapara Railway Station which is about 28.6 km in SE from the project site.

1.3 EIA/ EMP REPORT

As per approved ToR obtained from EAC (Industry –I), MoEFCC, New Delhi, baseline environmental monitoring was already conducted during pre-monsoon season (1st March 2021 – 31st May 2021) and additional one month from 15th April 2022 to 15th May 2022 has been considered for determining the status of ambient air quality, ambient noise levels, surface and groundwater quality, soil quality, status of flora, fauna and eco-sensitive areas and socio-economic status of the villages within 10 km radius study area from the project site (**Figure 1**). The observations of the studies are incorporated in the EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the EIA- EMP report.

EIA - EMP report along with the proposed management plan to control/ mitigate the impacts. Environmental Management Plan is suggested to implement the pollution control in the project.

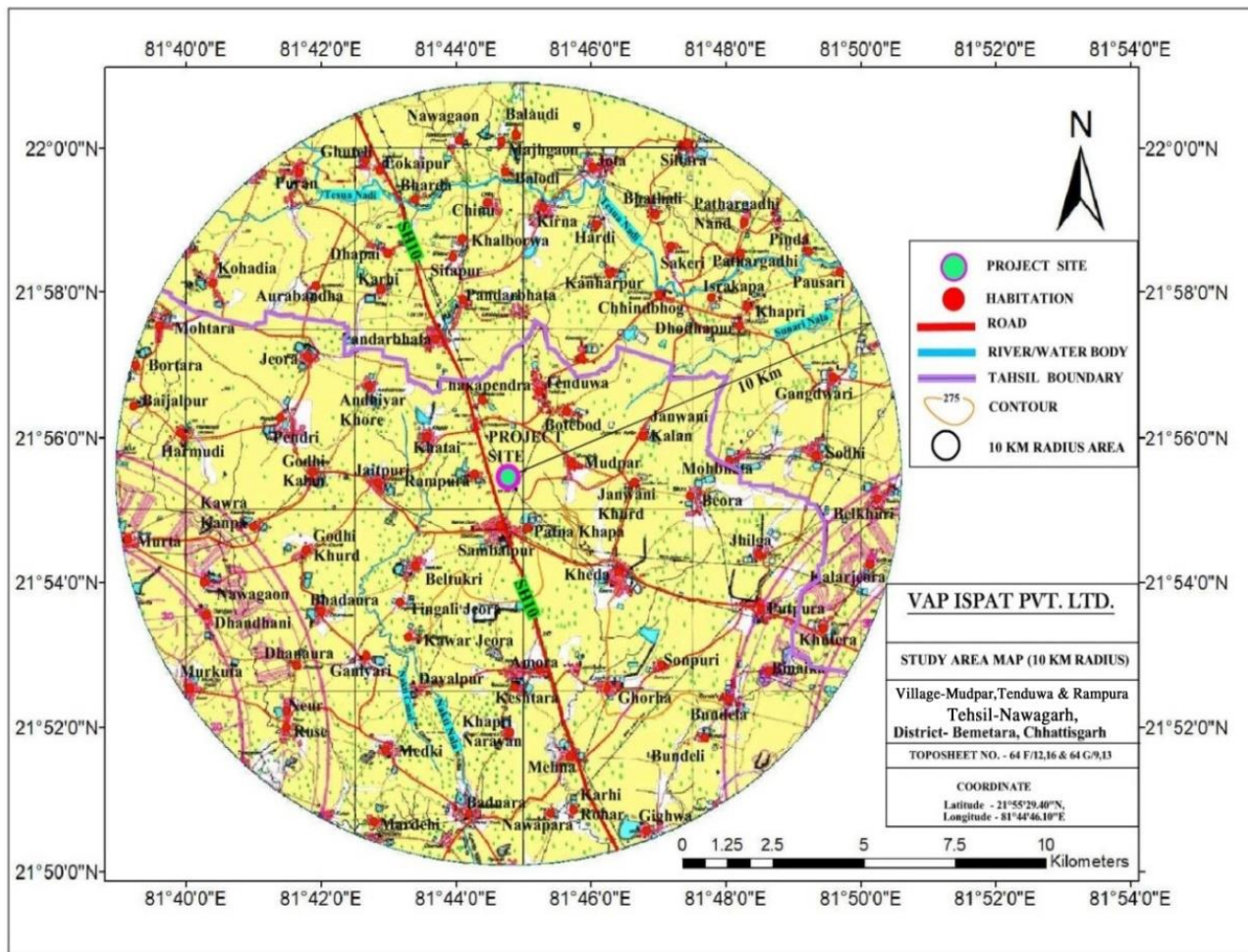


FIGURE 1 A: STUDY AREA (10 KM RADIAL DISTANCE)

**TABLE 2
DETAILS OF ENVIRONMENTAL SETTINGS**

Sr. No.	Particular	Details																																																																																				
1.	Plant Location	Villages – Mudpar & Rampura, Tehsil - Nawagarh, District - Bemetara (CG)																																																																																				
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3.	Climatic	Mean annual rainfall is 1252.8 mm																																																																																				

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	Conditions	Temperature: Pre monsoon 20.6 ^o C (Min.) 41.7 ^o C (Max.) : Winter 13.3 ^o C (Min.) 31.0 ^o C (Max) : Post monsoon 17.3 ^o C (Min.) 31.8 ^o C (Max.) Source: IMD, Raipur																																											
4.	Land Form, land Use and Ownership	The project is proposed on the land of 30.80 Hectare. The existing landuse pattern of proposed site is agriculture without significant natural vegetation. Sufficient flat land, free from major undulations is available for construction. Green belt will be developed in 10.17 Ha. (i. e. 33.03%).																																											
5.	Topo sheet no.	64F/12, 64F/16, 64G/9 and 64G/13																																											
6.	Elevation	285 m.																																											
7.	Nearest IMD station	Raipur- 79.1 KM/SSW																																											
8.	Nearest Highway	SH 10 – adjacent/W ; NH 130 (SH 2) – 17.6 KM/SE																																											
9.	Nearest Railway Station	Bhatapara Railway Station 28.6 KM/SE																																											
10.	Nearest airport	Bilasa Devi Kevat Airport, Domestic Airport (Bilaspur Airport) 38 KM/ENE																																											
11.	District Headquarters	Bemetara – 31.5 KMs/SW																																											
12.	State/National boundaries	Madhya Pradesh- 66.6 KM/NW																																											
13.	Seismic Zone	Zone-II [As per IS :1893 (Part-I): 2002]																																											
14.	Major city with 2,00,000 population	Mungeli – 16.5 KM/NW																																											
15.	Nearest village	Rampura – 0.5 KMs/W ; Mudpar – 0.97 Kms/E																																											
16.	Hills/ valleys	None within 10 Kms																																											
17.	Nearest tourist place	Nil																																											
18.	Archaeologically important places	Chilpi Range- 64.20 KMs/ WNW																																											
19.	Protected areas as per WPA,1972	Nil																																											
20.	Forest's land	Nil																																											
21.	Defence Installations	Nil																																											
22.	Notified ECO-Sensitive Zone	Nil																																											
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24.	Nearest Industries	None within 10 KM																																											
25.	Areas occupied	1	Gov. Primary Hospital	0.90 KM	SSW																																								

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by sensitive man-made land uses (hospitals, schools, places of worship, Universities, Community Hall etc.) and Vulnerable groups who could be possibly be affected.	2	Primary Health Cente Mudpar	1.0 KM	SSW	
	3	Sub Health Center, Tendua	1.40 KM	NNE	
	4	Govt. Primary School, Tendua	1.40 KM	NNE	
	5	Primary & middle School khatai	1.9 KM	NW	
	6	Primary School Rampura	0.70 KM	NNW	
	7	Higher Secondary School, Sambalpur	1.0 KM	S	
	8	Primary & middle school Sambalpur	1.10 KM	S	
	9	Govt.High School Kheda	3.2 KM	SE	
	10	Govt. Primary School Jarhapara	4.6 KM	S	
	11	Boharhi Mata Mandir,sambalpur	1.7 KM	SW	

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION

2.1.1 Manufacturing process of Sponge Iron (DRI)

- Iron ore, coal, dolomite/limestone is fed in the weighed quantity and the kiln is rotated at 0.5 RPM speed. A temperature between 1000°C to 1050 °C is maintained in about 70% of the kiln length towards discharge end side for required reaction.
- After the reaction, the product is taken into an indirect cooling drum cooler. The product is cooled to 1000C and taken for product separation and then taken for final use.
- The kiln has three functions; heat exchange, chemical reaction in vessel and conveying solids.

2.1.2 Manufacturing process of Steel Melting Shop with CCM and Hot Charging Rolling Mill

- Induction Furnaces with medium power input capacity of 7.5 to 6.5 MVA each will be setup with automatic charging facility and Power Sharing software.
- The melting process involves taking sample of Sponge Iron & Pig Iron; Iron Powder and mild steel scrap, end cutting from rolling mills or scrap from user units is taken from raw material storage.
- Homogeneous molten mass is poured hydraulically into the ladle.

LRF (Ladle Refining Furnace):

The production of molten steel the production of quality requires refining of the same for which one Ladle Refining Furnace

CCM:

The ladle containing liquid steel is placed on the Continuous Casting Machine platform and continuous casting of hot billet is carried out in the same.

2.1.3 Manufacturing process of Rolling mill

Raw Material i.e. Billet procured from outside is cut to size; either by Gas Cutting. The sized billets are then pushed into Billet reheating furnace fired with Coal Producer Gas. Steel Pieces are rolled through all stands in order to get required shape of finished goods.

2.1.4 Manufacturing process of Ferro Alloys Plant

High Carbon Ferro/ Silico Manganese as a finished product produced through a conventional submerged arc electric furnace.

Pig Iron is also proposed to produce alternately from the same submerged arc furnace by using lower grades Iron ore and Magnetite Iron ores and takes the liquid Iron (Hot Metal) to Induction Furnaces for production of steel.

2.1.5 WHRB based Power Generation

The Waste heat Recovery boilers are attached with DRI Kiln. The flue gases released from DRI Kilns will be passed through Waste Heat Recovery Boiler, where waste heat will be recovered and steam will be generated in required temperature and pressure. The source of energy is the heat content in waste flue gases released from DRI Kilns.

2.1.6 AFBC Based Power Generation

- In an AFBC boiler, the fluidized bed media, which consists of ash, sand, limestone and other such materials is heated to the ignition temperature of the fuel.
- Fuel, such as char, is continuously supplied to the bed as it burns very quickly in the high bed temperatures of almost 1000°C.
- The heat generated from this combustion is used to produce steam which, like in WHRB systems, will produce power through a steam generator.

2.1.7 Process of brick making from waste

Fly ash bricks Fly ash, Lime, Sand and Gypsum along with slag from the induction and arc furnaces are fed into a pan mixer, where water is added, all is mixed together, mixture is poured in moulds, dried in atmospheric temp. & pressure and after curing for 25 days, bricks are removed from moulds.

2.2 LAND REQUIREMENT

The detail of land use planning in the project area is provided as follows:

**TABLE 3
AREA STATEMENT**

S. NO.	Proposed Land Use	Area (In Ha.)	Area (In %)
	Built-up Area		
[A]	(a) Main Building and shed	11.14	36.17
	(b) Truck Parking	1.53	4.97
	(c) Admin and Utilities	0.61	1.98
	Sub Total ::	13.28	43.12
	Road and Paved		
[B]	Road and Pave	2.37	7.69
	Raw Material/ Finished Product storage	2.02	6.56
	Sub Total ::	4.39	14.25
	Greenbelt		
[C]	Greenbelt	10.17	33.02
	Sub Total ::	10.17	33.02
	Open Area		
[D]	Reservoir	1.2	3.90
	Open Area	1.76	5.71
	Sub Total ::	2.96	9.61
Grand Total		30.8	100.00

2.3 RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

The raw material will be transported through rail and truck. Coal from SECL, Iron Ore from Odisha Iron Ore Mine and from NMDC, will be transported through rail upto nearest railway siding at Bhatapara and thereby transported to site through covered truck.

2.3.1 Solid and Hazardous waste generation

The total estimated solid waste generation will be 254,491.00 TPA and 6 KLA Hazardous Waste in the form of oil/ spent oil, 750 TPA sludge from ETP. It will be disposed by scientific manner. The generated Char Dolochar will be used in own captive power plant, Bottom Flue Dust ash, Defective and Miss Roll, Ash from Coal firing in Mill, Fly Ash from Char Dolo char, Ash from Coal, Fluidized Bed Material will be used for own brick making unit. Slag and refractory waste will be given/ sold to metal recovery units.

2.4 WATER REQUIREMENT & SOURCE

Estimated water requirement will be 1500 KLD, out of which 41 KLD will be used for domestic purposes. Total Yearly water requirement will be 1500 KLD * 330 days = 495000 KLA. The management had decided to implement a 75,000 KL Rain water collection Tank which will be enough to cater water requirement of 50 days and in rainy day of 75 days water requirement will be met through rain water collections in it. Therefore, it is considered that about 75 days (1,12,500 KLA) water requirement will be met through rain water and rain water collection, and balance 255 days water (3,82,500 KLA) will be sourced from Surface Water i.e. from Agar River.

Proposed source of water is Surface water i.e. from Agar River and collected rain water. Recharge of the ground water through rain water collection ponds and wells will be developed. The area falls under Semi Critical zone as per CGWA guideline.

2.5 POWER REQUIREMENT & SUPPLY

Total power requirement will be 47 MW out of which 25 MW will be met through captive power plant and 22 MW will be sourced through State Grid (CSPDCL) In addition to this total 2 Nos of 3300 kVA DG sets are proposed for emergency backup.

2.6 MANPOWER REQUIREMENT

M/s. VAP Ispat Pvt. Ltd. will provide employment to 900 peoples as direct employment which includes 45 people as administrative staff and 855 people will be production staff. Preference will be given to local people, depending upon their qualification and skill.

2.7 FIRE FIGHTING FACILITIES

In order to combat any occurrence of fire in plant premises, a central firefighting facility is proposed which will have access to various units of the plant. In addition to this, all plant units, office buildings, laboratories, etc. will be provided with adequate number of portable fire extinguishers to be used as first aid fire appliances.

2.8 PROJECT COST

The project cost of the project is estimated as Rs. 32,500.00 Lakhs.

3.0 EXISTING ENVIRONMENTAL SCENARIO

3.1 BASELINE ENVIRONMENTAL STUDIES

Baseline environmental studies were conducted at project site along with 10 km radial distance from the project site. The baseline environmental quality data for various components of environment, viz.

Air, Noise, Water, Land were monitored during Pre- monsoon Season 1st March 2021 to 31st May 2021 & 15th April 2022 to 15th May 2022.

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated At Site (1st March 2021 – 31st May 2021)

Predominant Wind Direction	Pre-monsoon season
First Predominant Wind Direction	W (10.06%)
Second Predominant Wind Direction	WSW (10.06%)
Calm conditions (%)	1.59
Avg. Wind Speed (m/s)	2.55

The status of ambient air quality within the study area was monitored for pre - Monsoon Season of the year 2021 and 2022 at 9 locations covering project site. The levels of Respirable Particulate Matter (PM₁₀), Fine Particulates (PM_{2.5}), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and carbon monoxide (CO), Ammonia, Ozone, Benzene and BAP were monitored. The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 3(A)** for period March 2021- May 2021 and Table (B) for 15th April 2022 to 15th May 2022.

TABLE 3(A)
SUMMARY OF AMBIENT AIR QUALITY RESULTS
(PERIOD – 1ST MARCH 2021 TO 31ST MAY 2021)

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
1	Project Site	1. Min	57.1	22.4	7.4	12.8	0.209	4.7	5.5
		2. Max	73.0	31.8	10.3	17.6	0.266	6.9	7.8
		3. Avg	64.8	26.5	8.7	15.2	0.246	5.9	6.8
		4. 98 th	72.5	31.5	10.3	17.4	0.265	6.7	7.8
2	Mudpar	1. Min	61.8	24.9	7.0	16.2	0.283	5.0	5.7
		2. Max	79.6	32.3	10.9	20.0	0.363	8.1	8.7
		3. Avg	70.4	28.6	9.1	18.6	0.324	6.5	7.1
		4. 98 th	77.8	32.1	10.7	20.0	0.357	7.9	8.5
3	Tenduwa	1. Min	54.3	21.2	7.0	14.1	0.263	3.8	5.5
		2. Max	66.8	29.1	9.7	18.4	0.323	5.3	8.1
		3. Avg	61.2	24.7	8.3	16.4	0.296	4.6	6.9
		4. 98 th	66.8	29.0	9.6	18.4	0.321	5.3	8.1
4	Andhiyar Khore	1. Min	52.9	19.7	6.7	13.9	0.253	4.8	5.1
		2. Max	63.6	25.4	8.7	18.3	0.293	6.4	7.5
		3. Avg	58.2	22.7	7.6	15.7	0.274	5.6	6.5
		4. 98 th	63.5	25.1	8.6	18.0	0.291	6.4	7.5
5	Rampura	1. Min	55.7	20.9	7.3	14.6	0.341	5.3	5.4
		2. Max	74.2	29.6	11.4	19.3	0.383	7.6	9.0
		3. Avg	62.5	25.2	9.6	17.2	0.365	6.7	7.4
		4. 98 th	72.6	29.3	11.4	19.3	0.382	7.6	8.8
6	Beltukari	1. Min	46.3	16.8	6.4	13.7	0.243	4.8	6.0
		2. Max	63.4	25.1	8.1	17.7	0.285	7.4	7.9
		3. Avg	56.7	21.5	7.2	16.1	0.263	6.1	6.8
		4. 98 th	63.1	24.9	8.0	17.7	0.284	7.4	7.8
7	Amora	1. Min	65.9	23.9	7.5	18.3	0.298	4.9	6.4
		2. Max	79.7	30.6	13.2	28.9	0.464	10.4	10.7
		3. Avg	72.8	27.0	10.4	23.1	0.385	7.8	8.6
		4. 98 th	79.6	30.1	12.8	27.7	0.458	10.3	10.4
8	Kheda	1. Min	61.1	22.2	7.3	14.5	0.318	5.2	6.4
		2. Max	73.8	31.2	10.2	20.6	0.398	9.3	11.2
		3. Avg	68.6	26.6	8.7	17.7	0.351	7.1	7.9
		4. 98 th	73.7	31.2	10.2	20.4	0.396	9.1	10.6
9	Khapri	1. Min	43.3	17.6	5.9	11.8	0.206	4.3	4.8

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
		2. Max	60.8	27.1	10.4	18.4	0.268	6.7	7.7
		3. Avg	52.6	21.8	7.6	14.8	0.236	5.7	6.4
		4. 98 th	60.7	26.7	9.9	17.8	0.265	6.6	7.7
CPCB Standards			100 (24hr)	60 (24hr)	80 (24hr)	80 (24hr)	2 (8hr)	100 (8hr)	400 (24hr)

**TABLE 3(B)
SUMMARY OF AMBIENT AIR QUALITY RESULTS
(PERIOD – 15TH APRIL 2022 TO 15TH MAY 2022)**

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
1	Project Site	1. Min	57.3	21.8	7.0	12.6	0.219	5.1	5.3
		2. Max	69.2	27.1	9.4	16.9	0.284	6.4	7.4
		3. Avg	63.5	24.2	8.4	14.6	0.256	5.8	6.3
		4. 98 th	68.8	26.9	9.4	16.8	0.282	6.4	7.3
2	Mudpar	1. Min	62.3	24.5	8.1	15.6	0.298	5.5	6.2
		2. Max	75.9	34.8	10.0	19.7	0.349	7.8	8.8
		3. Avg	70.2	30.5	9.1	17.4	0.325	6.7	7.5
		4. 98 th	75.7	34.7	9.9	19.6	0.348	7.8	8.8
3	Tenduwa	1. Min	57.3	20.5	7.3	15.1	0.271	4.3	6.0
		2. Max	65.9	27.8	10.4	18.5	0.339	5.5	9.0
		3. Avg	61.8	23.8	8.7	16.3	0.307	4.9	7.1
		4. 98 th	65.8	27.6	10.3	18.3	0.337	5.5	8.8
4	Andhiyar Khore	1. Min	52.7	19.6	6.4	13.6	0.244	5.1	5.8
		2. Max	64.1	24.3	8.6	18.1	0.311	7.4	7.7
		3. Avg	57.7	21.8	7.4	15.3	0.286	6.1	6.7
		4. 98 th	63.5	24.2	8.5	18.0	0.310	7.3	7.6
5	Rampura	1. Min	62.3	25.9	8.3	15.3	0.247	7.0	6.7
		2. Max	72.2	30.4	11.3	21.5	0.452	9.9	12.2
		3. Avg	67.6	28.1	9.8	18.8	0.381	8.1	9.2
		4. 98 th	72.1	30.3	11.2	21.3	0.450	9.8	12.1
6	Beltukari	1. Min	49.9	18.8	5.9	13.5	0.254	4.1	5.3
		2. Max	59.9	25.4	7.8	17.7	0.284	6.3	7.4
		3. Avg	54.4	22.6	6.9	16.1	0.271	5.2	6.5
		4. 98 th	59.6	25.3	7.7	17.7	0.284	6.2	7.4
7	Amora	1. Min	67.0	22.7	8.7	19.5	0.329	5.4	7.1
		2. Max	76.6	37.5	12.0	25.5	0.380	9.5	9.2
		3. Avg	73.1	29.2	10.5	22.5	0.356	7.6	8.3
		4. 98 th	76.5	37.0	12.0	25.3	0.379	9.5	9.2
8	Kheda	1. Min	59.3	22.2	6.9	15.6	0.301	5.9	6.1
		2. Max	71.8	28.6	9.9	21.6	0.374	7.9	8.8
		3. Avg	65.7	25.4	8.2	18.3	0.337	6.9	7.4
		4. 98 th	71.7	28.4	9.8	21.4	0.372	7.8	8.7
9	Khapri	1. Min	48.6	20.7	6.7	14.5	0.228	4.8	6.0
		2. Max	60.8	25.2	9.3	20.0	0.266	7.2	7.6
		3. Avg	55.7	23.1	7.8	17.2	0.251	6.3	6.8
		4. 98 th	60.7	25.1	9.2	19.9	0.266	7.2	7.5
CPCB Standards			100 (24hr)	60 (24hr)	80 (24hr)	80 (24hr)	2 (8hr)	100 (8hr)	400 (24hr)

3.3 AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 08 monitoring locations; those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 4**.

**TABLE 4
AVERAGE NOISE LEVELS IN THE STUDY AREA**

Sr. No.	Monitoring Locations	Average Equivalent Noise Level	
		Leq _{Day}	Leq _{Night}
Residential Area			
1.	Botebod	52.1	41.1
2.	Sambalpur	52.8	43.3
CPCB Standards dB(A)		55.0	45.0
Commercial Area			
3.	Mudpar	57.9	44.2
4.	Patna Khapa	56.9	46.0
CPCB Standards dB(A)		65.0	55.0
Silence Zone			
5.	Chakapendra	46.3	37.9
6.	Rampura	48.8	38.7
7.	Khatai	48.2	38.6
CPCB Standards dB(A)		50.0	40.0
Industrial Area			
8.	Project site-	56.8	42.0
CPCB Standards dB(A)		75.0	70.0

Source: Field monitoring and analysis by Anacon Laboratories Pvt. Ltd., Nagpur

3.4 SURFACE AND GROUND WATER RESOURCES & QUALITY

3.4.1 Geology and Hydrogeology

Geological field survey methodology:

1. Secondary data collection for the study with the help of satellite imageries, GSI reports and research paper if available, it is very helpful for planning of field survey in 10 km radius.
2. During field survey, verification of secondary data available with actual geology of that area observed during site visit. For field survey GPS, toposheet map and Google imagery plays very important role.
3. Geological sequence is observed along sites such as Nallah cutting, Exposures along Road/Highway construction sites and nearby opencast mining areas.
4. Geological maps are prepared with the help of District Resource Map of GSI and data collected through field survey.

Hydrogeological Survey methodology:

1. Secondary data collection for the study area with the help of CGWB brochures and data available with state ground water departments like long term water levels data, groundwater usage, etc.
2. During field survey well inventory is critically done to assess water level scenario in particular season to verify the secondary data.
3. In case of mining projects pumping test are carried out to assess the aquifer parameters. In case of thermal power plant, ash pond sites are critically surveyed qualitatively as well as quantitatively so as to foresee the probable impact on it and discuss the preventive measures.
4. Groundwater level maps are prepared as per water level data of Govt. agencies and data collected through field survey.
5. Groundwater recharge and harvesting techniques are suggested as per CGWA guidelines.

Regional Geology:

10 km radius study area is mainly comprised of sedimentary rock formations, like stromatolitic limestone, shale with chert with clay bands and laterites are observed in flat areas. All these formations are of Proterozoic age. There are no major geological structure present in study area as far as concern with construction of buildings and other structure. Study area falls in seismic zone-II i.e. low damage risk zone.

Site specific Geology:

Project area consists of Limestone, shale and soil cover, which is having thickness of around 1.0-1.5 meter. Outcrops are very rare in project site.

3.4.2 Water Quality

Groundwater and surface water quality was assessed by identifying 8 groundwater (Borewell/ handpump) locations in different villages and 5 surface water samples.

A. Groundwater Quality

The analysis results indicate that the pH ranged 6.82 – 7.26. The TDS was ranging from 332 – 381 mg/l. Total hardness was found to be in the range of 178.10 – 196.86 mg/l. The fluoride concentration was found to be in the range of 0.18 – 0.31 mg/l. The nitrate and sulphate were found in the range of 6.81 – 11.87 mg/l and 8.27 – 12.87 mg/l respectively. The chloride concentration was found in the range of 21.43 to 30.76 mg/l. The Total suspended solid concentration was found below detection limit (DL -10mg/l) at all sampling location. Heavy metals like As, Pb, Ni was found below detection limit i.e. BDL (DL-0.01), BDL (DL-0.001), BDL (DL-0.1) respectively and Iron was found in the range of 0.08 to 0.21 mg/l.

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.52 – 8.36 which is well within the specified standard of 6.5 to 8.5. The pH of water indicates whether the water is acid or alkaline. The TDS was observed to be 390 – 518 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 234.35 – 292.94 mg/l as CaCO₃ which is also within the permissible limit of 600 mg/l. The levels of chloride and sulphate were found to be in the range of 17.94 – 32.81 mg/l and 21.53 – 104.81 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O₂) dissolved in water. Because fish and other aquatic organisms cannot survive without oxygen, DO is one of the most important water quality parameters. The reported value of range of 5.2 – 6.3 mg/l. Phosphorus (as PO₄) is an important nutrient for plants and algae. Because phosphorus is in short supply in most fresh waters, even a modest increase in phosphorus can cause excessive growth of plants and algae that deplete dissolved oxygen (DO) as they decompose. PO₄ concentration was found to be in the range of 0.31 – 0.81 mg/l. COD ranges from 21.37 – 46.94 mg/l and BOD ranges from 6.54 – 14.56 mg/l.

C. Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. All surface water samples were found to be bacteriologically contaminated. Presence of total coliforms in surface water indicates that a contamination pathway exists between any source of bacteria (septic system, animal waste, etc.) and the surface water stream. A defective well can often be the cause when coliform bacteria are found in well water. For surface water, treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose. Groundwater samples were not found to be bacteriologically contaminated.

3.5 LAND USE LAND COVER CLASSIFICATION

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-1 (IRS-P6), sensor-LISS-3 having 23.5m spatial resolution and date of pass 5th MAY 2021 satellite image with reference to Google Earth data. In order to strengthen the baseline information on existing land use pattern, the following data covering 10 km radius is approximate about 21°50'13.70"N to 22° 0'40.80"N latitude and 81°39'8.02"E to 81°49'52.77"E longitude and elevation 240 to 310 meters are used as per the project site confined within that area.

The Land Cover classes and their coverage are summarized in **Table 5**.

TABLE 5
LU/LC CLASSIFICATION SYSTEM

LU/LC Classification System				
Sr. No.	Level-I	Level-II	Area (Sq. Km ²)	Percentage (%)
1	Built-up land	Settlement	20.54	5.93
		Road Infrastructure	4.25	1.23
2	Agricultural Land/ Crop Land	Single Crop	238.45	68.89
		Double Crop	67.58	19.52
3	Scrubs/ Wastelands	Open Scrub	0.64	0.18
4	Water bodies	River/Nala/Stream	1.81	0.52
		Dam	0.31	0.09
		Pond/Lake	12.56	3.63
		Total	346.14	100

3.6 SOIL QUALITY

For studying soil quality of the region, sampling locations were selected to assess the existing soil conditions in and around the proposed project site representing various land use conditions. The physical, chemical properties and heavy metals concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 30 cm. Total 8 samples within the study area were collected and analyzed.

Physical Characteristics of Soil

Physical characteristics of soils were determined through specific parameters viz. particle size distribution, bulk density, porosity, water holding capacity, texture.

Regular cultivation practices increase the bulk density of soils thus inducing compaction. This results in reduction in water percolation rate and penetration of roots through soils. The soils with low bulk density have favourable physical conditions whereas those with high bulk density exhibit poor physical conditions for agriculture crops. The bulk density of the soil in the study area ranged between 1.539 - 1.724 g/cc which indicates favourable physical condition for plant growth. The water holding capacity is between 28.43 - 33.46%. Infiltration rate, in the soil is in the range of 19.52 – 24.15 mm/hr

Chemical Characteristics of Soil

pH is an important parameter indicative of alkaline or acidic nature of soil. It greatly affects the microbial population as well as solubility of metal ions and regulates nutrient availability. Variation in the pH of the soil in the study area is found to be neutral (6.72 – 7.18) in reaction. Electrical conductivity, a measure of soluble salts in the soil is in the range of 204.72 – 316.58 µS/cm

The important soluble cations in the soil are calcium and magnesium whose concentration levels ranged from 216.52 – 263.91 mg/Kg and 46.28 – 121.54 mg/Kg respectively. Chloride is in the range of 54.39 – 257.31 mg/Kg. Organic matter and organic carbon present in the soil influences its physical and chemical conditions and is responsible for stability of soil aggregates. Organic matter and organic carbon were found in the range of 0.41% – 1.32% and 0.24% – 0.76%

3.7 BIOLOGICAL ENVIRONMENT

Floral composition in Study Area

Total 98 plant species were enlisted within the study area out of which habit wise details are given below:

- a. **Trees:** Total 44 species were found in the study area
- b. **Shrubs (small trees):** Total 30 species were enumerated from the study area.
- c. **Herbs:** In the study area 13 species were observed.
- d. **Bamboo & Grasses:** 07 species were enlisted from the study area
- e. **Climbers and Twiners:** Total 03 species of climbers/ twiners were recorded in the study area.
- f. **Parasite Plant:** 1 species enlisted in the study area.

RET (Rare, Endangered and Threatened species) STATUS

According to IUCN Status report 2013 out of total 98 plant species identified with study area. Among the observed species most of the species belongs to the least concern (LC), Data Deficient (DD) and Not Assessed (NA), as per IUCN status. Thus, none of reported species in study area belongs to Rare, Endangered or Threatened category.

Fauna Details:

As per IUCN RED (2013) list

Among the reported animals all wild fauna including avifauna are categorized under least concern category.

As per Indian Wild Life (Protection) Act, 1972

Wild Life (Protection) Act, 1972, as amended on 17th January 2003, is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country.

Some of the sighted fauna were given protection by the Indian Wild Life (Protection) Act, 1972 by including them in different schedule.

Among the Avifauna in the study area, All birds observed in the study area are protected in Schedule-IV as per Wild Life Protection Act (1972) and subsequent amendments thereof.

Among mammals in the study area, Common Langur (*Semnopithecus entellus*), Common Mongoose (*Herpestes edwardsi*), Rhesus macaque (*Macaca mulata*) and Indian fox (*Vulpes bengalensis*) are protected in Schedule-II as per Wild Life (Protection) Act, 1972. whereas, Black-naped hare (*Lepus nigricollis*) and Three stiped palm squirrel (*Funambulus pinnati*) are protected in Schedule IV while Rats are protected in Schedule-V as per Wild Life (Protection) Act, 1972.

Among the Herpetofauna, Russell's viper (*Daboia russelli*), Indian Cobra (*Naja naja*), Common Rat Snake (*Ptyas mucosus*), Common Worm Snake (*Ramphotyphlops braminus*) and Beaked Blind Snake (*Rhinotyphlops acutus*) were provided protection in Schedule-II as per Wild Life (Protection)

Act, 1972 and Common Indian Krait (*Bungarus caeruleus*), Indian Toad (*Bufo parietalis*) were protected in Schedule-IV as per Wild Life (Protection) Act, 1972.

3.8 SOCIO-ECONOMIC ENVIRONMENT

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data collection from census 2011 & District Census hand book 2011. Summary of the socio-economic status of the study area is given in **Table 6**. Details regarding education and infrastructure facilities 2011 are presented in **Table 6** and **Table 7** respectively.

TABLE 6
SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN STUDY AREA

No. of villages	37
Total households	11338
Total population	51704
Male Population	26230
Female population	25474
SC Population	11389
ST Population	1345
Total literates	28689
Total Illiterates	23015
Total workers	25252
Total main workers	20210
Total marginal workers	5042
Total non-workers	26452

Source: Primary census abstract 2011, State Chhattisgarh.

TABLE 7
INFRASTRUCTURE FACILITIES AVAILABLE IN THE STUDY AREA

Yr. 2011	Educa tion	Drinking water	Road	Power	Comm unicati on	Govt. PHC & SC	Bank & Society	Drainage	Recreat ion
Availability	100	100	95.83	100	62.50	35.42	25	47.92	85.42

Source: Primary census abstract 2011, State Chhattisgarh.

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

A number of aspects were studied in the villages surveyed for socio- economic studies. Following are the observations found during interviews, focused group discussions and as per the Questionnaire.

(1) Housing Pattern:

It is observed that, the housing pattern in study area varied from hatched to pucca (pakka) houses. Near about 70% of the houses were in pucca (pakka) form whereas 20% in semi pakka form and 10% houses were observed in kaccha form.

(2) Employment:

Main occupation in the study area is Agriculture, activities associated with it. The practices being adopted for agriculture are the conventional methods of farming but to get more yield out from the farms, modern agricultural practices need to be accepted. Other income generation sources of the area, small business; private jobs etc. The labours are getting daily wages in the range of 250-300 Rs, depending on type of work they set.

(3) Fuel:

The primary sources of cooking fuel were LPG, cow dung, wood etc.

(4) Main crops:

The principal crops grown in agricultural Commodities are Rice, Wheat, Millets; Cotton; Maize etc. Vegetables and Fruits were also seen in the study area. During discussion with villagers/ farmers it was revealed that, more than half the agriculture is rainfed. People having water facilities do more than one season farming.

(5) Migration from other states:

During survey it was found very less population is migrated from other states as there are few industries in area.

(6) Language:

Chhattisgadhi is the mother tongue of most of the population in state, along with Chhattisgadhi, Hindi and English are all official languages. Hindi and English are official languages because they are official languages of India's central government.

(7) Sanitation:

Toilet facilities were not proper in the villages. Community toilets should be built in most of the villages. The 50 % of the houses are toilet facility. There was no proper drainage line in the villages.

(8) Drinking water Facilities:

Wells and bore wells are the sources of drinking water and the water quality is good to drink. People are also using handpumps for the drinking water. The villages are having water ponds and water is available summer also.

(9) Education facilities:

The villages have primary and secondary schools but for higher education, students have to go to Bemetara or Mungeli. Some schools were having lack of good toilet facilities and needs to be renovated.

(10) Transportation facility:

For transportation purpose auto, jeep and private bus services were available in the study area; however villagers reported that transportation facilities were not frequently available. Private vehicles like bicycles & motor cycles were also used by villagers for transportation purpose.

(11) Communication facilities:

For communication purpose mainly mobile phones, newspapers & post offices were present in the villages.

(12) Medical facilities:

Malnutrition is a major problem in infants and children in many villages. The Primary & secondary data reveals that there are only 12 nos. of Sub Health Centers are there in the Study area. Patients have to go to bigger cities in case of major diseases.

(13) Electricity:

All villages were availing electricity facility for domestic and agriculture purposes. Solar Street lights were seen in some of the villages.

(14) Market facility:

Study area predominantly comes in rural area. In villages, small shops were available for daily need things. Weekly market facility was available in some villages. Wholesale market was available at Bemetara. The basic amenities exist at all villages.

(15) Recreation facilities: Smartphones, Television and radio are the main recreation facilities in the study area. Newspaper/ magazine facilities are also used by villagers.

3.8.1 Awareness and opinion of the respondents about the project

Awareness and opinion of public about the project is very significant. Public opinion is the aggregate of individual attitudes or beliefs. To know the awareness and opinion of the villagers about the project, group discussion, meeting with school teachers/ village leaders were carried out in the study area. It was found that very few people were aware about the proposed project. People demanded to know more about the project, about the benefits they will get due to coming of project and generation of employment for local people. They were happy to know about the project and they opined positively. They also demanded to take all the preventive actions to control pollution due to project and do social development activities in their villages.

3.8.2 Interpretation

The study area mostly consists of rural population. Most of the land in the study area is agricultural and no big industries are present within 10 km radius from the project site. The Socio- economy survey revealed that, although the main occupation in study area is Agriculture the people in villages are not getting good income from it. Modern agricultural techniques need to be encouraged. Trainings related to new technologies and methods of doing farming should be given to people in study area. Education is the base for development of area. This will rise to grow economy by creating opportunities to students to get jobs in different fields. Training to the youth for development of technical skills should be given so that the local they get good employment in industries. Health camps, women empowerment, entrepreneurship programs, training computer skills will be beneficial to the people to grow healthy and economically. Apart from this, the villages are lacking infrastructure facilities like community hall, bank facility, toilet facilities, open gyms, college facilities and sports clubs. These facilities should be promoted and provided to the villages hence will improve the standard of living.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 AIR ENVIRONMENT

The mathematical Model AERMOD was used for predicting the GLCs, which is entirely in line with the requirement of Central Pollution Control Board, New Delhi. In 1991, the U.S. Environmental Protection Agency (EPA) in conjunction with the American Meteorological Society (AMS) formed the AERMOD. AERMOD is a steady-state plume model aimed at short-range (up to 50 km) dispersion from stationary industrial-type sources.

The impact of a source or group of sources on air quality is evaluated using mathematical models. The widely accepted interpretation models simulate the relationships between air pollutant emissions and its impact on air quality. For the present study, this model is used for the prediction of maximum ground level concentrations.

The maximum ground level concentrations (GLCs) for particulate matter and gaseous concentration SO_2 , NO_x due to proposed condition were carried out. The predicted 24-hourly maximum concentration of particulate matter, SO_2 and NO_x are $1.63 \mu\text{g}/\text{m}^3$, $3.13 \mu\text{g}/\text{m}^3$ and $4.43 \mu\text{g}/\text{m}^3$

respectively.

The resultant concentration of particulate matter, SO₂ and NO_x are 81.23 µg/m³, 14.03 µg/ m³ and 24.43 µg/m³ at the distance of 608 m, 200 m and 141 m respectively in SW direction.

Details of Air Pollution Control System/ Mitigation measures

Name of Process	Type of Equipment	Emission controlled
DRI Kiln with WHRB	a) Dust extraction system, ESP with Chimney b) Bag Filters for Product house; Kiln discharge end and transfer points.	PM - 30 mg/Nm ³
Steel Melting Shop with hot charging rolling mill	Movable suction hood along with Bag Filters with a Chimney	PM - 30 mg/Nm ³
Ferro Alloy Plant	2 sets of Bag Filters with Chimney	PM - 30 mg/Nm ³
AFBC based power plant	ESP with Chimney And 2 Bag Filters at Coal conveyors	PM - 30 mg/Nm ³ , SO ₂ - 100 mg/Nm ³ , NO _x - 100 mg/Nm ³ and Mercury (Hg) – 0.03 mg/Nm ³
Billet Reheating Furnace based Rerolling Mill	Waste heat recuperator with Bag Filters with a Chimney	PM - 30 mg/Nm ³ , SO ₂ - 300 mg/Nm ³ and NO _x - 1000 mg/Nm ³

Additional Measures to reduce/control pollution control

- Roads will be frequently sprinkled with water
- Most of the materials like Sponge Iron ore will be stored under covered shed.
- In case of storage of Sponge Iron in open, it will be covered by tarpaulins to prevent spread of dust from it during transportation.
- Regular maintenance of vehicles and machineries will be carried out to control emissions.
- Green belt development would be taken up all along the roads, plant premises etc.
- Protective appliances will be provided to all the workers exposed in dusty atmosphere.
- Avoiding overloading of the trucks.
- Proper gradient of roads to reduce cumulative dust.
- Transportation of materials will be limited to day hours only
- Periodical maintenance of process machinery.
- End to end pavement of road.
- Fleet management to avoid unnecessary vehicle movement restriction.
- Daily sweeping of road to remove silt content.

4.2 NOISE ENVIRONMENT

During the normal operation of manufacturing process noise will be generated due to Induction Furnaces, Sponge Iron Plant, Billet Reheating Furnace, Rolling Mill, Captive Power Plant, Fly Ash Brick Plant and DG Set, etc. the ambient noise levels are expected to increase significantly with the attributes of the respective equipment, but this noise will be restricted close to the concerned equipment. The preventive measures are given below:

1. Equipment should be standard and equipped with silencer. The equipment should be in good working conditions, properly lubricated and maintained to keep noise within permissible limits.
2. High noise zone should be marked and earplugs shall be provided to the workmen near high noise producing equipment. The workmen should be made aware of noise and vibration impacts on their health and mandatory use earplugs.

3. Proper shifting arrangement shall be made to prevent over exposure to noise and vibration.
4. Tall trees with heavy foliage shall be planted along the boundary / project site / plantation area, which will act as a natural barrier to propagating noise.
5. Silent DG sets shall be used at project site.
6. Speed limits shall be enforced on vehicle.
7. Use of horns / sirens shall be prohibited.
8. Use of loud speakers shall comply with the regulations set forth by CPCB.
9. Regular noise monitoring shall be carried at construction camp / project site to check compliance with prevailing rules.

Vehicular Movement

There will be NOx emission impact observed 2656 gm/km-hr on the surrounding environment due to 332 vehicles/day. The impact due to the emission of other pollutants will be insignificant. This quantum spread over the whole day at Maximum production is considered low and shall not make significant impact on the transportation route on the road.

The LoS value from the proposed activity is found to be “Excellent” for adjacent road which is connected to NH200_24.6 km away highway which was also “very good”. So the additional load only of (166 trips/day) will add insignificant contribution on the carrying capacity of the concern roads. Hence it is concluded that it is not likely to have any significant adverse effect.

4.3 WATER ENVIRONMENT

The proposed implementation of the project may have some impact on the water environment. The impact may be on the source of water in the form of depletion of water resources of the area and in the form of deterioration of quality of natural water resources due to discharge of plant effluent. It is proposed that no effluent will be discharged outside the plant.

The various control measures that will be adopted are:

- Closed circuit water system implemented in DRI Division, Ferro Alloys, SMS and power plant division. The waste water generated will be treated in ETP of capacity 150 KLD.
- Treated domestic waste water will be reused for Gardening.
- Treated Industrial wastewater will be recirculated in processes.
- It is proposed to install 45 KLD STP based on MBBR technology.
- Rain water harvesting will be carried out.
- All stock piles will be on pucca flooring to prevent for any ground water contamination.

4.4 BIOLOGICAL ENVIRONMENT

Ecology & Biodiversity: Aspect - Impact identification and mitigation measures suggestion for proposed Greenfield project.

Sl.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
1.	Transportation, unloading & storage of Material and Movement of vehicle inside plant, Dust and sound generation due to proposed activities	Impact on human habitation (Rampura Village – 0.5 Km in West direction & Mudpar – 0.97 Km in East direction) in a scale of 3 out of 5 due to proposed project activity.	30 M thick greenbelt will be developed towards east and west direction from the project site.

Sl.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
2.	Gaseous emission from Stack, Movement of vehicle inside plant and Raw material & finished product transportation, Product manufacturing	Decline in photosynthetic activities, Stomatal index may be minimized, Crop yield will be reduced in absence of site specific mitigation measures	<p>Air quality modelling outputs study revealed that, the resultant concentrations of particulate matter, sulphur di-oxide and oxides of nitrogen are well within the prescribed limits. The impact due to proposed project would be minimal as project activity will be carried out within the plant boundary limit with proper control measures.</p> <p>Greenbelt area of 10.17 Ha. (33.03%) will be proposed for project with local species with broad leaves and higher canopy and fast growing tree species. Total plants are 25425 nos. are proposed. Indigenous species for plantation is recommended</p> <p>Control Measures to avoid impacts on agriculture crops</p> <ul style="list-style-type: none"> • Periodic maintenance of transport road in collaboration with PWD • Regular sprinkling of water through mobile tankers on raw material and finished product transportation road. • Covered Transport system • Plantation along the transportation route (both sides) • Monitoring of dust fall at agriculture land located in the vicinity of project site. • Green nets will be provided along the agriculture farm boundary facing in the vicinity of proposed plant and transport road • Apart from the above, monitoring will be carried out by Environmental Cell of the company to assess effectiveness of the dust control system and complaints of farmers regarding impact on crops productivity/damage, if any. The complaints will be verified through agriculture department and if found correct, crop damage compensation will be paid as per the suggestions and recommendations of District agriculture department. Additional budget for dust control in the vicinity of proposed plant is Rs. 15.0 Lakhs towards capital cost and Rs. 6.0 Lakhs towards recurring cost will be implemented. The detailed breakup of budget is given in Ch. 10.

There is no ecological sensitive area like national park, sanctuary, biosphere reserve, within 10 km radial distance from the project site. No forest land involved in the project activities. Thus, no significant impact envisaged on biological environment.

4.5 SOCIO-ECONOMIC IMPACT

There is likely to be growth in the revenue generation and economy at local /regional. There will certainly be improvement in standard of living due to required facilities provided by management under CER. During operation phase heavy vehicular movements will lead to dispersed dust particles which will affect the health of the workers and Local Peoples. If influx of workers from outside areas then there will be an increased pressure on residential accommodation the neighborhood during construction phase.

The present land use will change from agriculture to industry. Moreover, the land is mostly low fertile barren land. The Increase in direct/indirect job opportunity shall take place. Services in the locality shall be used and accordingly growth in economic structure of the area will take place.

5.0 ENVIRONMENTAL MONITORING PROGRAM

Environmental monitoring shall be done as per the guidelines provided by CPCB/SPCB. The methods conducted or applied shall be approved or accepted by the any recognized body or authority i.e. MoEFCC/CPCB/SPCB. The suggested monitoring shall be done to ensure that Environmental management practices/technologies are adequate to meet the requirement of the prescribed norms as prescribed by state pollution control board.

Environment Management Department with suitably qualified and experienced staff and environmental laboratory to cater the routine monitoring requirement will be implemented in the plant.

As part of the Board structure, Audit & Compliance reporting team shall also oversee the environmental status inclusive of the conditions prescribed under various environmental consents and clearances, as and when obtained from various State and Central Govt. authorities, as well as the corporate norms, standards and targets that exceed the legal compliance requirements.

6.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The assessment of risk in the proposed project has been estimated for fire, explosion and toxicity and corresponding mitigation measures are suggested in the EIA/EMP report.

A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons is prepared and incorporated in the EIA/EMP report for ensuring safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of Disaster Management Plan, it will be widely circulated and personnel training through rehearsals. Site facilities, procedures, duties and responsibilities, communications, etc. are considered in details in the Disaster Management Plan.

7.0 PUBLIC CONSULTATION

The draft EIA-EMP report is submitted for public hearing as per the EIA Notification (dated 14th September 2006) and subsequent amendment thereof. The final report will be upgraded after public hearing.

8.0 PROJECT BENEFITS

The proposed project would provide development of area and consequent indirect and direct job opportunities which would finally result in improvement in the quality of life of people in the central region. M/s. VAP Ispat Pvt. Ltd. will carry community welfare activities in the following areas:

- Community development
- Education
- Health & medical care
- Drainage and sanitation
- Roads

The project proponent will comply with its obligation for CSR as per Company's Act too.

Corporate Environment Responsibility (CER) value of **Rs. 200 Lakhs** will be spent for the social infrastructure development.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

The major objective and benefit of utilizing Environmental Impact Assessment in project planning stage itself, is to prevent avoidable losses of environmental resources and values as a result of Environmental Management. Environmental Management includes protection/mitigation/enhancement measures as well as suggesting post project monitoring program. Environmental management may suggest revision of project site or operation to avoid adverse impacts. The industrial development in the study area needs to be intertwined with judicious utilization of nonrenewable resources of the study area and within the limits of permissible assimilative capacity. The Environment Management Plan (EMP) is required to ensure sustainable development in the study area of the proposed project site, hence it needs to be an all comprehensive plan for which the proposed industry, Government, Regulating agencies like Pollution Control Board working in the region and more importantly the affected population of the study area need to extend their cooperation and contribution.

Judicious use of the environmental management will be implemented with addressing of components of environment, which will be likely affected during construction and operation of the proposed project. The budgetary provision for EMP for proposed project towards Capital cost of **Rs. 1994 Lakhs** and Recurring Cost of **Rs. 78.5 Lakhs**.

10.0 CONCLUSION

The proposed Greenfield project of M/s. VAP Ispat Pvt. Ltd. will be beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater, traffic density, etc. will have to be controlled better than the permissible norms to avoid impacts on the surrounding environment in particular agriculture crop. Necessary pollution control equipment like ESP, bag house, Industrial sweeping machine, wheel washing system, Industrial grade vacuum cleaner, water sprinklers, enclosures, etc. form integral part of the plant infrastructure. Additional pollution control measures and environmental conservation measures will be adopted to control/ minimize the impacts on the environment and socio-economic environment of the area. Measures like development of green belt and plantation in nearby village and along transport road, adoption of rainwater harvesting/recharging in the plant and in nearby villages will be carried out. The proposed CER activities to be initiated by the industry will be helpful to improve the social, economic and infrastructure availability status of the nearby villages.

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed project will not add adverse pollution levels to the environment. As per employment point of view, it will be beneficial to the society and will help to reduce the demand-supply gap of steel to some extent and will contribute to the economic development of the region and thereby the country.

11.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed project of M/s VAP Ispat Pvt. Ltd. are carried out by M/s Anacon Laboratories Pvt. Ltd., Nagpur (M/s ALPL). M/s. Anacon established in 1993 as an analytical testing laboratory and now a leading Environmental Consultancy firm backed by testing lab for environment and food in Central India region. M/s ALPL is a group of experienced former Scientists from the Government Institutions and excellent young scientist of brilliant career with subject

expertise. It is recognized by Ministry of Environment & Forests, New Delhi for carrying out environmental Studies & accredited by Quality Council of India (QCI) for conducting Environmental studies having Accreditation Certificate No.: NABET/EIA/1922/RA 0150 dtd. 03 Feb 2020 Valid till September 30, 2022.