EXECUTIVE SUMMARY

1.0 INTRODUCTION

"KALYANI ISPAT LIMITED" has proposed to set up an integrated steel plant along with captive power generation plant to implement new manufacturing facilities for production of Iron Ore Pellets, Sponge Iron, MS Billets, Steel Rerolled products, Ferro Alloys or Pig Iron; Tube/Pipe Mill; Galvanizing Unit and Fly Ash products comprising of Waste Heat Recovery Boiler (WHRB) and Circulating Fluidized Bed Combustion (CFBC) Boiler and Steam Turbine & Generator. This is a Greenfield project and will be established in 44.67 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) Metallurgical Industries** and the AFBC based power plant falls under **Sector 1 (d) Thermal Power Plant**. The overall project activity is categorized as **Category "A"** therefore 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, MoEF & CC (Online Proposal No. IA/CG/IND/275403/2022 on 08 Jul 2022 whereas, Standard ToR was granted by EAC (Industry –I) vide. no. **F. No.IA-J-11011/1172/2007-IA-II(I)** on dtd.18th July 2022.

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.

EIA process requires the primary baseline data collection to know the information on the biophysical, social and economic backgrounds of Greenfield 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.

1.1 IDENTIFICATION OF PROJECT

The company "**KALYANI ISPAT LIMITED**" proposes Greenfield project for steel complex involving Iron Ore Pellets plant, DRI Kilns, Steel Melting Shop along with CCM & AOD, Rolling Mill through **Hot Charging and Reheating** Furnace, Captive Power plant through **WHRB and CFBC**, Pipe/Tube Mill, Galvanizing unit and Fly Ash Bricks manufacturing unit. The project is proposed to be located at Village – **Kopedih,** Tehsil - Rajnandgaon, District – **Rajnandgaon** (CG –491 111). The proposal is to seek Environmental Clearance based on energy efficient as well as approved technology process. The product profile has been finalized based on the market demand and the technology process compatibility.

The detail of proposed plant facilities is as follows.

TABLE 1
PROPOSED PLANT DETAILS WITH CAPACITY

S. No.	Process plant	Proposed configuration of the plant	Product Name	Capacity (in TPA)
1	DRI Kiln (Coal Fired)	500TPD X 4 No.	Sponge Iron	660,000
2	Induction Furnace along with CCM and LRF	Induction Furnace (20Tons X 8Nos); LRF (25Tons x 1 No) and AOD (25Tons x 1 No).	MS Billets	465,696

S. No.	Process plant	Proposed configuration of the plant	Product Name	Capacity (in TPA)
3	Hot Rolling Mill			478,500
	a. Hot Charging Rolling Mill	Electrical driven Rolling Mill about 980TPD	Rerolled Steel product (Wire Rod, TMT bar, Structure Steel, Strips etc.)	323,400
	b. Billet Reheating Furnace	Reheating Furnace based Rolling Mill about 470TPD	Re-rolled Steel products (Wire rod, Rebar, TMT, Strips, Structural Steel etc.)	155,100
4	Pellet plant	1.2 MTPA x 1 Nos.	Iron Ore Pellets	1,200,000
5	Sub-Merged Arc Furnace	Electrically operated Sub-Merged Arc Furnace 9 Mva x 2 nos	Silico Manganese	36,000
			And/or	
			Ferro Silicon	22,500
			And/or	
			Ferro Manganese	46,000
			And/or	
			Pig Iron	63,000
6	Captive Power Plant (Boiler and TG based)	Waste Recovery Heat Boilers (WHRB)	Captive Power	50 MW
		Circulating fluidized bed combustion (CFBC)		25 MW
7	Pipe Mill/Tube Mill	470 Tones per day	MS Pipes/ Tubes	155,100
8	Galvanized Unit	470 Tones per day	Galvanized products	155,100
9	Fly Ash Bricks/ Block making unit	Fly Ash product making facilities	Fly Ash Bricks/ Blocks	41,500

1.2   LOCATION OF THE PROJECT

Total 44.67 Hectare land has been acquired by company for implementation of project. The proposed Greenfield is located at Khasra No. 481/1, 481/2, 482, 483/1, 483/2, 483/3, 483/4, 483/5, 484, 485/1, 486/1, 486/2, 486/3, 487/1, 487/2, 491/2, 491/3/4, 492/1, 492/2 496/1, 496/2, 498, 499/1, 499/2, 499/3, 499/4, 499/5, 499/6, 499/7, 499/8, 499/9, 499/10, 502/1, 502/2, 502/3, 503, 504/1, 504/2, 505/1, 505/2, 506/1, 506/2, 506/3, 506/4, 507/2, 509/1, 510/2/3, 510/4, 510/5, 511/2, 511/3, 515/1, 519/2, 521, 525/3, 526, 529/2, 530, 531, 532/1, 532/2, 534/2, 536, 538, 539/1, 542/2, 545/4, 546/1, 546/2, 559/1, 559/2, 560, 561, 562, 563, 564/1, 564/2, 564/3, 565, 567/1, 567/3, 567/4, 568/1, 568/2, 568/4, 570, 573/1, 573/2, 573/3, 574/1, 576, 583/1, 583/2, 583/4, 584/1, 585/1, 585/2, 585/3, 585/4, 585/5, 586, 587, 588/3, 589, 590/1, 590/3, 590/4, 591, 594/1, 594/2, 594/3, 594/4, 595/1, 595/2, 595/3, 595/4, 595/5, 596/1, 596/2, 596/3, 597/1, 597/2, 598/1, 598/2, 598/3, 598/4, 600/2, 600/3, 495, 500, 501/1, 501/2, 501/3, 501/4, 566, 571/1, 571/2, 599, , 504/3, 504/4, 588/2, 507/1, 508/1, 508/2, 509/2, 510/1, 568/3, 569, 574/2, 575/1, 575/2, 575/3, 575/4, 583/3, 584/2/3, 588/1, 590/2, 592/1, 593/1, 592/2, 593/2, 597/3, 861/2 & 861/3 Nos. at Village -Kopedih, Tehsil – Rajnandgaon, District – Rajnandgaon (CG – 491111).

The proposed site is located at Village – **Kopedih,** Tehsil & District – **Rajnandgaon** (CG – 491111). The project site can be reached from through NH-53 which is approx. 0.9Km in East direction from the site. Murhipar nearest railway station which is about - 4.8Kms/ WNW and Rasmadha is another nearest railway station which is about - 4.0 Kms/NE and Nearest Airport is Raipur Airport which is at a distance of 56 km in East direction.

The study area of 10 km radial distance from the project site is shown in **Figure 1**.

1.3   EIA/EMP REPORT

In line with the approved ToR obtained from EAC (Industry –I), MoEF&CC, New Delhi, baseline environmental monitoring was conducted during Pre-monsoon season (1st March 2022 – 31st May 2022) 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 report.
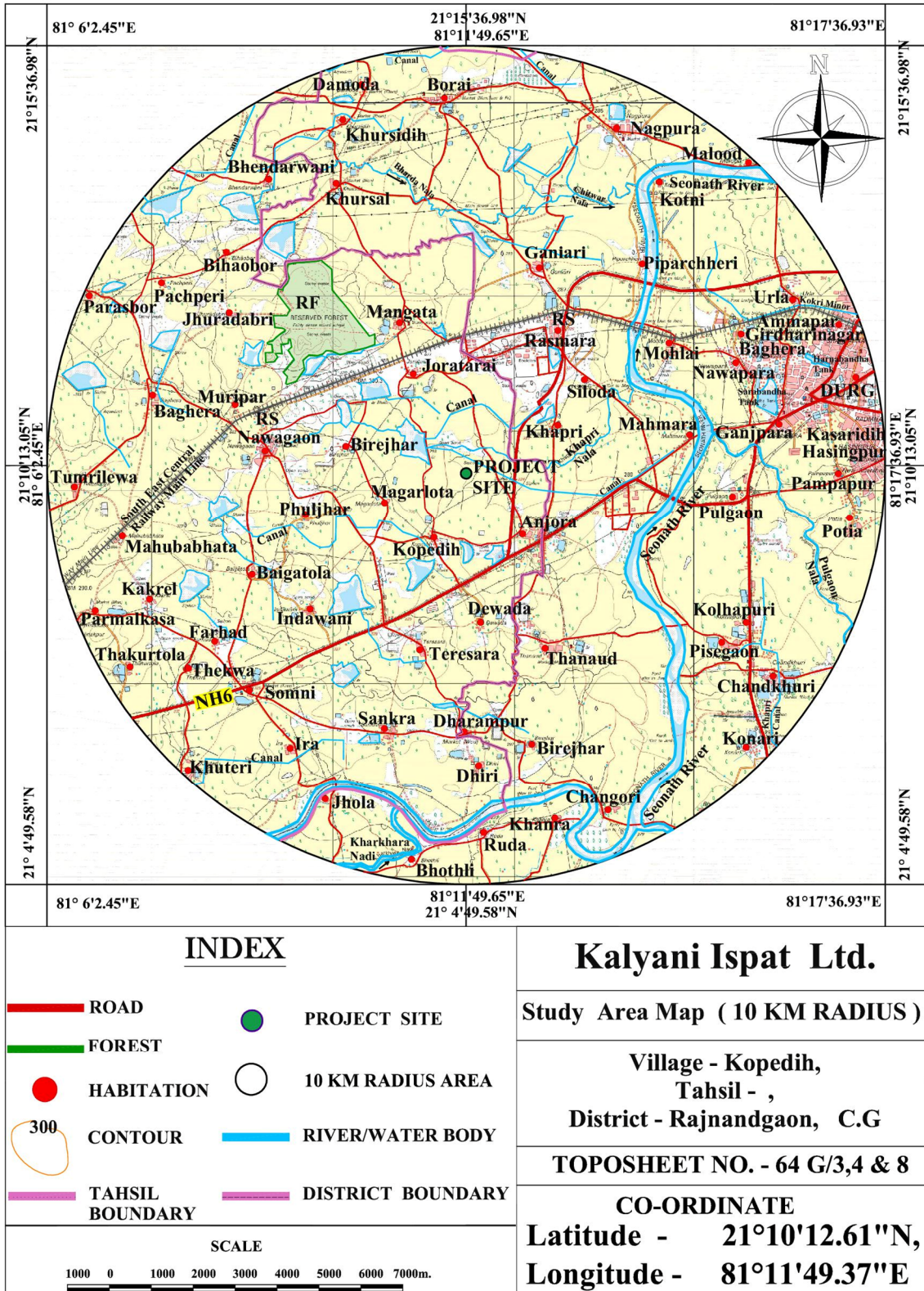

FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)

TABLE 2
DETAILS OF ENVIRONMENTAL SETTINGS

Sr. No.	Particular	Details		
1	Plant Location	Village- Kopedih, Tahsil & District- Rajnandgaon (Chhattisgarh); Pin Code – 491 111		
2	Coordinates	Point	Latitude	Longitude
		BP1	21°10'30.21"N	81°12'2.66"E
		BP2	21°10'22.46"N	81°12'8.71"E
		BP3	21°10'19.64"N	81°11'54.84"E
		BP4	21°10'15.30"N	81°11'43.90"E
		BP5	21°10'5.47"N	81°11'35.81"E
		BP6	21°10'14.00"N	81°11'36.15"E
		BP7	21°10'1.61"N	81°11'38.90"E
		BP8	21° 9'58.16"N	81°11'54.21"E
		BP9	21°10'15.92"N	81°12'3.38"E
		BP10	21°10'8.14"N	81°12'0.11"E
3	Topo sheet no.	64G/3, 64G/4 & 64G/8		
4	Elevation	Min 288 m. – Max 292m		
5	Nearest representative IMD station	IMD Raipur – 47.9km/E		
6	Nearest highway	NH 53, 0.9 KMs/E		
7	Nearest railway station	Murhipar - 4.8Kms/ WNW Rasmada - 4.0 Kms/NE		
8	Nearest airport	Raipur Airport , Distance - 56.0 , Direction – E		
9	District Headquarters	Collectorate Office, Rajnandgaon, Distance -8.0 , Direction – ENE		
10	Nearest State/National boundaries	Madhya Pradesh – 56.2 km/NW Maharashtra, , Distance - 56.5,Direction – WNW		
11	Seismic Zone	Zone-II [As per IS :1893 (Part-I): 2002]		
12	Nearest major city with 2,00,000 population	Durg – 8.2 kms/ENE		
14	Nearest village	Kopedih – 1.4 Kms/SW		
15	Hills/valleys	None within 10 Kms		
16	Nearest tourist place	1. Maitri Bagh Zoo, Bhilai 15.8Kms/E 2. Dada Dadi Nana Nani Park 9.2Kms/ENE 3. Jungle Safari at Managata Park – 5.0 Kms /NNW		
17	Archaeologically important places	Jagannath Temple - 17.5 Kms/E		
18	Protected areas as per Wildlife Protection Act,1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Nil		
19	Forest's land	Reserve Forest Nr. Mangata Village 3.7 KM/ NW		
20	Defence Installations	Nil		
21	Notified ECO- Sensitive Zone	Nil		
22	Water Bodies	1.Shivnath River - 4.9km/E ; 2.Kharkhara Nadi- 7.7km/S 3.Khapri Nala - 0.3km/N ; 4.Bharda Nala - 5.7km/N 5.Pulgaon Nala- 5.7km/E ; 6.Khapri Canal - 7.0km/ESE 7.Chitwar Nala - 6.7km/NNE ; 8.Sarabandha Talab - 7.0km/ENE		

Sr. No.	Particular	Details			
		9.Naya Talab - 7.5km/ENE ; 10.Branch Canal Crossing through project area- N 11. Seasonal Minor Drain passing through project area			
23	Nearest Industries	**S.No.**	**Name of the Industries**	**Distance (KM)**	**Direction**
		1.	Crest Steel & Power Pvt. Ltd.	Rasmada Industrial Area – 0.94Kms/N	
		2.	Jai Balaji Industries Ltd.		
		3.	Maruti nonwoven fabric Pvt. Ltd.		
		4.	Polybond Projects Pvt. Ltd.		
		5.	Prakash panel Industries		
		6.	Raipur Power & Steel Ltd.		
		7.	J. D. Ispat		
		8.	Keshar industries	7KMs	ES
		9.	JD Food Products Pvt. Ltd. Rasmada -	Rasmada Industrial Area – 0.94Kms/N	
		10.	Ramani Ice cream co ltd. durg		
		11.	Micro Technocam Equipments Pvt Ltd		
		12.	Shree Ram Equitech Pvt Ltd.		
		13.	Topworth Steels and Power Pvt. Ltd		
		14.	RB RUNGTA STEELS & FOOD PRODUCTS PVT. LTD - Flour mill	Tendesara Ind. Area 2.28Kms / SW	
		15.	Sai Chemicals Private Limited		
		16.	Vrinda Engineers Pvt Ltd Unit_2		
		17.	P.S. Steel Tubes Ltd. - Iron & Steel Industry		
		18.	Simplex Engineering & Foundry Works Pvt. Ltd. - Unit 3 (Tedesara) -		
		19.	Rani Sati Agro Food Pvt. Ltd	7.2	SE
		20.	Khusrool Quartz mine	6.1	NW
		21.	Hi-Tec Rock Fibre Pvt.Ltd.	6.6	SW
24	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, Universities, Community Hall etc.) and Vulnerable groups who could be possibly be affected.*	1.Chhatrapati Shivaji Institute of Pharmacy- 6.70 km/SE 2.Govt Higher secondary school, Tedesara - 4.00 km/ SSW 3.Govt.Adarsh Mahavidhyalaya Somni -5.50km/SW 4.Sun Public School - 7.80km/SE 5.Govt ITI Durg- 7.00km/SE 6.Apollo College Of Nursing - 3.10km/ESE 7.Shivam Public high School - 6.90km/ENE 8. Govt. Higher secondary school Station Murhipar. - 4.60km/NW 9.Govt Higher secondary school, Takiya Para - 8.60km/ENE 10.BM COLLEGE - 7.60km/ESE			

| | | 11.BHARTI UNIVERSITY - 7.80km/SE
12.kopedih tedesara Rajnandgaon – Hospital - 1.50km/SSW
13.Maitri College of Dentistry And Research Center - 2.50km/ESE
14.Primary Hospital - 7.40km/NW
15.Central India Institute of Mental Health and Neurosciences - 2.30km/SSW
16.Nagpura Jain Mandir - Jain temple - 6.60km/N
17.Chatagarh - Hindu temple - 4.60km/ENE
18.ICM Church Mudhipar, Rajnandgaon -   4.50km/WNW
19.Community Hall - 7.60km/NE |

2.0   PROJECT DESCRIPTION

2.1   PROCESS DESCRIPTION

2.1.1 Manufacturing Process of Iron ore palletization

Iron Ore Pellet Plant produces Pellets using Iron ore and additives such as limestone, bentonite, coke, anthracite coal, quartzite which are passed through balling disc/drum and the green pellets so formed are passed through a furnace either straight grate or rotary kiln to produce High Grade Pellet which are used in Steel making in Blast furnace or Direct reduction plants for steel making. Pelletizing plant includes five processes, after Raw material receiving:

1) Pre-treatment

2) Additive and Binder proportionating and Mixing

3) Balling

4) Induration

5) Pellet screening /HL

2.1.2 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 10000C to 1050 0C 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.

2.1.3 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.

2.1.4 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):

- Subsequent to the production of molten steel the production of quality requires refining of the same for which one Ladle Refining Furnace with 25 MT ladle will be setup with three electrode arcing facility with complete provision to carry out desulphurization and de-phosphorization if required.

- The liquid steel containing in the ladle will be brought to LRF and after due processing of the liquid steel the ladle will be transferred to CCM.

AOD (Argon Oxygen Decarburization):

- In the production of Low Carbon steel; Special Steel; stainless steel and other high-alloy grades that contain highly oxidizable elements such as chromium and aluminium, lowering the levels of carbon by regular oxygen injection has the undesirable consequence of oxidizing the alloying elements as well. The argon-oxygen decarburization (AOD) process alleviates this problem by diluting the injected oxygen with argon.

- After initial melting the metal is then transferred to an AOD vessel where it will be subjected to three steps of refining; decarburization, reduction, and desulfurization.

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.

- The cooling and casting will be done through a highly automated controlled cooling software governed mechanism by which the casted billet will be so cooled that the temperature of billets will not fall below 1050^0C. The case formation in the CCM mould starts with drop in surface temperature below 1520^0C, the liquid metal inside the case contains enough energy for maintaining the overall temperature of billet for hot online rolling. In the CCM section hot billet shearing machines will be installed with each casting strand, so as to facilitate the cutting of billets to proper length for feeding in to the rolling mill.

- Hot Billets are will be directly transferred from CCM to Rerolling Mill / Wire Rod Mill through conveyor.

- The billets in hot form are sized by the Hot Sharing Machine or Gas cutters and then it's directly transferred to wire rod making section without being cooled down and maintain required temperature for rolling.

- The Billets are rolled through the roughing stands and intermediate stands and then through the finishing stands for cooling. In cased required to be rolled in wire Rod then fed to Block mill. Then it goes to coiler/bending machine. The cold Wire rod is then sold to market by loading on trucks.

2.1.5 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.

2.1.6 Process of Power Generation

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.

CFBC 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 and flow diagram of Pipe/Tube Mill

- Steel Pipes Tubes are manufactured from mild steel strips sliced from Hot Rolled Low Carbon Steel coils The strip passes through a series of drive forming and fin rolls and takes the required circular shape and is welded continuously by passage of an electric current of high frequency across the abutting edges.

- The steel pipes tubes thus formed and welded pass through the sizing sections where dimensional deviations if any are corrected before the tubes are cut into required length by automatic cutting machines. The tubes are then end deburred and pressure tested. Thereafter protective surface finishing operations such as hot dip Galvanizing or varnishing is done as per specific requirement. The tubes are offered as plain, bevelled, threaded ends or with flanges.

2.1.8 Process and flow diagram of Galvanising unit

Following process involved in galvanizing of steel;

- Pickling/cleaning of MS Pipe or Tube to remove surface oxides and impurities

- Mechanical Scraping of the surface

- Annealing of strips if required

- Pre-treatment, cleaning and degreasing by special solvent like sodium hydroxide solution and followed by pickling

- Galvanizing of MS Strips/Pipes by immersing of Rerolled product/ Pipe or Tubes in the molten bath of Zinc followed by water quenching

- Inspection of Galvanized

- Dispatch to market

2.1.9 Process of brick making from waste

- To make 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 in the appropriate proportion before mixing it all together.

- After mixing; the mixture is shifted to hydraulic presses for where the mixture is given its brick like shape.

- The molded bricks are then carried into the open area where they are air dried and cured in an autoclave to give them its rigidity.

2.2 LAND REQUIREMENT

The project is proposed on the land of 44.67 Hectare out of total 44.67 Ha. Land, M/s. KIL have obtained firm agreement for sale for 42.48 Ha.(i.e. 95 %) and balance land of 2.19 Hectare is under advance stage of negotiation and we will get this done at our responsibility. Presently land is defined as Agricultural land, it will be permanently diverted to industrial purpose. These lands are located outside the master plan area and have no land use assigned to it by the State Govt. Green belt will be developed in 15.00 Ha. (i. e. 33.57%). The company has signed MOU with State Govt., therefore the in-principle letter from CG Govt. for diversion of land will be issued while Company has entered into agreement with the private land owners for procurement. Company will complete the process in due course. Total **33.57%** area will be developed as Greenbelt area. The land will be diverted to industrial purpose. The land details are provided **Table 3**.

TABLE 3
AREA STATEMENT

Land Use	Area (In Hectare)	In %
Built Up Area	15.57	34.85%
Road and Paved area	4.70	10.52%
Parking	1.50	3.36%
Green Belt area	15.00	33.58%
Reservoir	1.00	2.24%
Open Area	6.90	15.45%
Total	**44.67**	**100.00%**

2.3   RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

Availability of raw material is abundant within 500 km area of Rajnandgaon District. Fuel consumption will be mainly source from local sources. No linkage compulsion to acquire most of this raw material which are available in open market. Iron ore and coal are the basic bulk raw materials, which are also procured through market through negotiation and open bidding. Iron Ore can also be procured from NMDC and OMC through bidding. Coal is also allowed to be imported. Bulk Material like Iron Ore; Coal etc. are proposed to be brought by Rail up to nearest railway siding at Rasmada or Murhipar . From there will be transported by covered truck through road to the plant. Whereas the other raw material required for the project is Lime stone/Dolomite/ Refractory, CI/ Pig Iron Heavy Scrap; Ferro Alloys are readily available within 50 km -100 km radius and these will be transported through covered trucks.

2.3.1 Solid and Hazardous waste generation

The details of solid and hazardous waste generations are given in **Table 4** and **5**, respectively.

TABLE 4
SOLID AND HAZARDOUS WASTE GENERATION AND ITS DISPOSAL

Name of Waste generated	Qty (TPA)	Proposed Disposal Plan
Coal Ash from Pellet plant	42,000	Captive use in own Fly Ash Brick unit
Char / Dolochar (SID)	165,000	Captive use in own Captive Power plant
Kiln Accretion & Refractory waste (SID)	1300	Sold to authorized recyclers
Bottom Flue Dust Ash (SID)	132,000	Used for Road making and Land filing.
Mill Scale (IF)	4,752	Captive use in Ferro Alloys Plants
Refractory & Ramming Mass waste (IF)	594	Sold to authorized recyclers
Defective Billets (IF)	4,752	Reused in own Induction furnace
Slag from Induction Furnace	86,130	Captive use in own Fly Ash Brick unit
Defective and Miss Roll (RM)	9,900	Reused in own Induction furnace
Mill Scale (RM)	6,601	Captive use in Ferro Alloys Plants
Ash from Coal firing in PG Plant (RM)	6,930	Used in own Fly Ash Brick making unit
Slag from Ferro Alloys Plant	39,789	Used for Road making and Land filing.
Fluidized Bed Material (PP)	150	Used in own Fly Ash Brick making unit
Fly Ash from Char / Dolochar (PP)	123,750	Captive use in own Fly Ash Brick unit
Ash From Coal (PP)	36,552	Sold to Cement plants
MS Scrap Generated (Pipe Mill)	15,510	Reused in own Induction furnace
Total	**6,75,710**	

TABLE 5
HAZARDOUS WASTE GENERATION

Type of Hazardous Waste	H. W. Category (as per HWM Schedule I)	Quantity (In TPA)	Disposal
Zinc dross Generated (Galvanizing)	6.2	387	Sold to authorized recyclers
Mill Scale Generated in Pickling etc. (Galvanizing)	6.2	1,551	Sold to authorized recyclers
Acid Neutralization Lime Sludge Generated (Galvanizing)	35.3	1861	Sold to authorized recyclers
Lead Dross generation (Galvanizing)	9.1	19	Sold to authorized recyclers
Waste Oil/Used Oil	5.1	8 KL/annum	Will be given to authorized recycler having authorization from competent authority.

2.4 WATER REQUIREMENT & SOURCE

Estimated water requirement will **be 4400 KLD**, out of which 62 KLD will be used for domestic purposes. Total Yearly water requirement will **be 4400 KLD * 330 days = 1452,000 KLA**. which will be sourced from Surface Water i.e. from already built Rasmada Dam, from CSIDC, for which in principle sanction for allotment of water has already been received from State Investment promotion Board. Further, the management had decided to implement a 66,000 KL Rain water collection Tank which will be able to collect sufficeint rain water during rainy days which would continously be collecting rain water during the rainy days. Which extends to almost 75 days. Thus water requirement will be met through rain water collections from it for 75 days. The balnce water after the rain days will be sufficient to cater water requirement of 15 days. Therefore, it is considered that about 90 days (396,000 KL) water requirement will be met through rain water and rain water collection. Therefore, the net requirement from surface source per annum will be about 10,56,000 KLA. However, the company has sought permission for full capacity.

2.5 POWER REQUIREMENT & SUPPLY

The total power requirement will be 98 MW out of which 75 MW power requirement will be fulfilled through captive generation i.e. 75 MW (25 MW AFBC+ 50MW WHRB) and remaining 23 MW will be sourced through State Grid (CSPDCL). In addition to these total 2 No's of 5000 kVA DG sets are proposed for emergency backup.

2.6 MANPOWER REQUIREMENT

M/s. KIL will provide employment to 1230 peoples as direct employment which includes 60 people as administrative staff and 1170 people will be production staff. Preference will be given to localpeople, depending upon their qualification and skill.

2.7 FIRE FIGHTING FACILITIES

In order to combat any occurrence of fire in plant premises, fire protection facilities are envisaged for the various units of the plant. 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 94792.00 Lakhs (Including CER)

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, and Land were monitored during **Pre-monsoon season (1st March 2022 – 31st May 2022)**

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated At Site (1st March 2022 – 31st May 2022)

Predominant Wind Direction	Pre-monsoon season
First Predominant Wind Direction	WSW (18.80%)
Second Predominant Wind Direction	SW (15.90%)
Calm conditions (%)	1.45
Avg. Wind Speed (m/s)	3.0

The status of ambient air quality within the study area was monitored for pre-monsoon season at 8 locations. All these 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind, cross wind directions and reference point. The levels of Respirable Particulate Matter (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,), 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 6**.

TABLE 6
SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Location			PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	CO mg/m^3	Ozone $\mu g/m^3$	NH_3 $\mu g/m^3$
1	Project Site	1	Min	56.0	23.2	6.7	14.9	0.223	4.6	4.4

Sr. No.	Location			PM$_{10}$ µg/m^3	PM$_{2.5}$ µg/m^3	SO$_2$ µg/m^3	NO$_2$ µg/m^3	CO mg/m^3	Ozone µg/m^3	NH$_3$ µg/m^3
		2	Max	72.9	33.0	10.7	21.1	0.387	9.1	7.6
		3	Avg	64.5	28.3	8.7	18.7	0.281	6.8	6.1
		4	98th	72.4	32.6	10.4	21.1	0.380	9.0	7.6
2	Kopedih	1	Min	55.4	18.2	7.3	14.7	0.241	5.2	4.6
		2	Max	70.1	31.4	9.5	20.9	0.326	7.7	6.8
		3	Avg	62.6	23.9	8.3	17.2	0.276	6.5	5.7
		4	98th	69.0	30.1	9.4	20.5	0.322	7.6	6.7
3	Khapri	1	Min	57.0	21.8	7.3	15.3	0.260	5.8	5.4
		2	Max	72.0	30.9	11.0	21.2	0.337	8.8	8.0
		3	Avg	65.1	26.5	8.9	17.8	0.294	7.3	6.7
		4	98th	71.5	30.5	10.7	20.6	0.332	8.6	8.0
4	Rasmada	1	Min	63.7	27.6	9.8	19.8	0.294	6.2	5.4
		2	Max	84.7	36.2	15.4	28.0	0.446	11.2	9.7
		3	Avg	73.2	31.6	12.4	23.1	0.367	8.7	7.5
		4	98th	83.4	36.2	14.9	27.5	0.435	11.0	9.6
5	Magarlota	1	Min	47.9	14.2	6.4	13.3	0.216	4.8	4.1
		2	Max	63.5	24.1	8.4	19.5	0.278	7.0	6.1
		3	Avg	57.2	20.4	7.5	16.2	0.245	5.8	5.2
		4	98th	63.4	23.7	8.4	19.1	0.274	6.9	6.1
6	Indawani	1	Min	52.9	18.8	6.8	13.0	0.216	4.3	3.8
		2	Max	66.7	28.1	9.7	19.7	0.325	7.2	7.1
		3	Avg	60.6	22.7	8.1	16.7	0.264	6.1	5.5
		4	98th	66.4	27.2	9.4	19.4	0.313	7.2	6.9
7	Jortarai	1	Min	59.7	24.2	9.0	16.8	0.290	5.9	6.0
		2	Max	83.2	34.8	13.6	26.5	0.367	10.3	8.6
		3	Avg	71.5	29.2	10.8	21.4	0.335	8.1	7.2
		4	98th	81.9	34.0	13.2	26.0	0.365	10.0	8.5
8	Anjora	1	Min	58.2	21.9	7.7	16.6	0.255	5.8	5.2
		2	Max	78.8	32.9	11.1	23.0	0.351	8.7	8.0
		3	Avg	67.6	27.5	9.1	19.5	0.306	7.4	6.3
		4	98th	77.8	32.7	11.0	22.8	0.349	8.6	7.8
CPCB Standards				**100 (24hr)**	**60 (24hr)**	**80 (24hr)**	**80 (24hr)**	**2 (8hr)**	**100 (8hr)**	**400 (24hr)**

From the above results, it is observed that the ambient air quality at all the monitoring locations was within the permissible limits specified by CPCB.

3.3   AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 8 monitoring locations. The monitoring results are summarized in **Table 7.**

TABLE 7
SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq_{Day}	Leq_{Night}
Residential Area			
1.	Kopedeeh	51.2	41.6
2.	Anjora	53.7	42.8
3.	Birejhar	48.9	39.5
CPCB Standards dB(A)		**55.0**	**45.0**
Commercial Area			
4.	Rasmada	56.4	45.1
5.	Jortarai	55.8	43.6
CPCB Standards dB(A)		**65.0**	**55.0**
Silence Zone			
6.	Khapri	47.1	38.2
7.	Magarlota	46.8	37.7
CPCB Standards dB(A)		**50.0**	**40.0**
Industrial Area			
8.	Project Site	52.5	41.8
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   Regional Geology:

10 km radius study area is mainly comprised of Limestone, sandstone, Shale of Chhattisgarh Super group. There are no major geological structure present in study area and other structure. Study area falls in seismic zone-II i.e. low damage risk zone.

Site specific Geology:

Project area consists of Limestone, sandstone; Shale and soil cover which is having thickness of around 1.0-1.2m. Outcrops are very rare in project site

3.4.2   Regional Hydrogeology:

Entire study area is comprises of Shale, Sandstone and limestone. The primary porosity and permeability of these rock formations is very good in sandstone and in case of limestone it is intermediate and in shale it is poor due to compact interconnected spaces. The ground water in these formations occurs in bedded and cavernous area. Generally sandstone acts as good aquifers in the area.

Depth to water level scenario in the study area:

Pre-monsoon Water levels- 3.5 to 9.5 m bgl

Post-monsoon water levels: 0.5 to 2.5 m bgl

3.4.3   Geomorphology

Study area is comprises of undulating plains and Alluvial fans. Flood plains are observed along River courses. There are no major geomorphological structures present in study area.

3.4.4 Water Quality

A. Surface Water Quality

The analysis results indicate that the pH ranged between 6.58 – 7.81 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 294 – 677 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 132.61 – 357.10 mg/l as $CaCO_3$ 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 46.62 – 118.5 mg/l and 8.62 – 27.01 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O_2) 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 5.7 – 6.4 mg/l. Phosphorus (as PO_4) 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. PO_4 concentration was found to be in the range of 0.32 – 0.51 mg/l. COD ranges from 21 – 36 mg/l and BOD ranges from 5.92 – 9.47 mg/l.

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 0.29 to 0.52 mg/l.

B. Groundwater Quality

The analysis results indicate that the pH ranged 6.21 – 7.82. The TDS was ranging from 271 – 443 mg/l. Total hardness was found to be in the range of 119.07 – 193.95 mg/l. The fluoride concentration was found to be in the range of 0.17 – 0.48 mg/l. The nitrate and sulphate were found in the range of 6.52 – 10.68 mg/l and 9.71 – 32 mg/l respectively. The chloride concentration was found in the range of 43.71 to 61.05 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 0.18 to 0.41 mg/l.

Sr. No.	Locations	WQI	Quality	Remark
1	Project Site	53.55	Good	**Water quality assessed based upon above physico-chemical parameters and samples were found to be physico-chemically good and excellent.**
2	Kopedeeh	46.17	Excellent	
3	Anjora	49.71	Excellent	
4	Khapri	43.82	Excellent	
5	Rasmada	53.15	Good	
6	Jortarai	50.63	Good	
7	Birejhar	50.27	Good	
8	Magarlota	43.58	Excellent	

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 24th MAY 2020 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° 5'30.74"N to 21°15'24.97"N latitude and 81° 6'33.12"E to 81°17'35.54"E longitude and elevation 266 to 377 meters are used as per the project site confined within that area.

The Land Cover classes and their coverage are summarized in **Table 8.**

TABLE 8
LU/LC CLASSIFICATION SYSTEM

Sr. No.	Level-I	Level-II	Area (Sq. Km²)	Percentage (%)
1	Built-up land	Settlement	24.71	7.83
		Industrial Settlement	3.89	1.23
		Road Infrastructure	1.43	0.45
		Railway track	0.99	0.31
2	Agricultural Land/ Crop Land	Single Crop	138.84	43.99
		Double Crop	91.71	29.06
3	Forest	Reserved Forest	3.81	1.21
4	Scrubs/Wastelands	Open Scrub	19.59	6.21
5	Waterbodies	River/Nala/Stream/Canal	12.04	3.81
		Pond/Lake	12.84	4.07
6	Others	Stony Waste	5.75	1.82
		Total	**315.6**	**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. Total 8 samples within the study area were collected and analyzed.

The bulk density of the soil in the study area ranged between 1.624 - 1.742 g/cc which indicates favourable physical condition for plant growth. pH is found to be neutral 6.05 – 7.41 in reaction. Based on the pH values, soil nature in the study area is found to be from slightly acidic to slightly alkaline. As based on result of available concentration of major nutrients fertility status of soil with respect to NPK value is found to be in the range of 59.88 – 247.08 kg/ha (quality less to better), 21.3 – 76.9 kg/ha (quality less to sufficient) and 112.8 – 324.44 kg/ha (quality very less to better) respectively. Organic carbon was found in the range of 3.16% – 9.36% (quality more than sufficient).

3.7 BIOLOGICAL ENVIRONMENT

Floral composition in Study Area

Flora:

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

a. **Trees:** Total 43 species were found in the study area

b. **Shrubs (Small trees):** Total 23 species were enumerated from the study area.

c. **Herbs:** In the study area 15 species were observed.

d. **Bamboo & Grasses:** 10 species were enlisted from the study area

e. **Climbers and Twiners:** Total 5 species of climbers/ twiners were recorded in the study area.

f. **Parasite/epiphytic plant :** 2 species enlisted in the 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:

The fauna of the study area included Mammals, Reptiles, amphibians, Aves, Butterflies and fishes. For the documentation of the faunal biodiversity of the study area with respect to Mammals, Reptiles, Birds, Butterfly and Fishes species, a baseline survey was conducted during **Pre-Monsoon Season 2022**.

As per IUCN RED (2013) list

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. Among the reported animals, all are categorized under least concern category as per IUCN list.

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 and V as per Wild life protection Act (1972) and subsequent amendments thereof.

Among mammals; Jungle cat *(Felis chaus)*, Common Mongoose (*Herpestes edwardsi*), Rhesus macaque (*Macaca mulatta*), Langur (*Presbytis entellus*) and Indian Fox (*Vulpes bengalensis*) are protected in schedule –II. Whereas, Spotted Deer (*Axis axis*) and Wild Boar (*Sus scrofa*) are protected in schedule – III whereas; Black-naped hare (*Lepus nigricollis*) and Palm squirrel (*Funambulus pinnati*) protected in Schedule IV and Rats and Bats protected in Schedule V as per Wild life Protection Act (1972) and subsequent amendments thereof.

Among the Herpetofauna, Indian Cobra (*Naja naja*), Common Rat Snake (*Ptyas mucosa*) and Russell's viper (*Vipera russelli*) were provided protection as per Schedule-II of Wild life protection act, (1972) and Common Indian Krait (*Bungarus caerulus*), Oriental garden lizard (*Calotes versicolor*) & Indian bull frog (*Hoplobatrachus tigerinus*) were provided as per Schedule – IV of Wildlife Protection Act 1972 and as amended.

Among the Avifauna: All birds were observed in the study are included in schedule IV & V as per Wildlife Protection Act.

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 9**. Details regarding education and infrastructure facilities 2011 are presented in **Table 10** respectively

TABLE 9
SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA

Total households	24066
Total population	113734
Male Population	57511
Female population	56223
SC Population	12376
ST Population	586
Total literates	75675
Total Illiterates	38059
Total workers	55276
Total main workers	43580
Total marginal workers	11696
Total non-workers	58458

Source: Primary census abstract 2011, District Rajnandgaon and Durg State Chhattisgarh.

TABLE 10
IN PERCENTAGE DETAILS REGARDING INFRASTRUCTURE FACILITIES WITHIN 10 KM RADIUS STUDY AREA

Education	Govt. PHC & SC	Drinking water	Drainage	Communication	Transportation	Banks/ Society	Roads	Recreation	Power
100	45	100	53	96	98	95	100	98	100

Source: Primary census abstract 2011, District Rajnandgaon and Durg, State C.G

4.0   ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Air Environment

Impact on Air Environment

The impact on air environment mainly depends on magnitude of operation and threshold limit of the project. The source of emission will be mainly in form of fugitive emission and point source.

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 model simulations are done for the air pollutants due to proposed project. Ground level concentration has been carried out using hourly meteorological data and predicted incremental maximum contribution of particulate matter; SO_2 and NO_X are found to be 11.5 $\mu g/m^3$, 8.01 $\mu g/m^3$ and 8.07 $\mu g/m^3$ at project site.

Details of Air Pollution Control System/Mitigation measures

S. No.	Facilities	Air Pollution Control equipment	Emission Level
1.	Pellet Plant	Electro Static Precipitators (ESP) with a Chimney	PM <30 mg/Nm^3
2	DRI Kiln with WHRB's	• Dust extraction system, Electro Static Precipitators (ESP) with a Chimney • Bag Filters for Product house; Kiln discharge end and transfer points.	PM <30 mg/Nm^3
3	Steel Melting Shop with hot charging rolling mill	Movable suction hood along with Bag Filters with a chimney	PM <30 mg/Nm^3
4	Billet Reheating Furnace attached to Rerolling Mill	Waste heat recuperator with Wet Scrubber/Bag Filter with a Chimney	PM <30 mg/Nm^3
5	CFBC Boiler	Electro Static Precipitators (ESP) with a Chimney and Bag Filters at Coal conveyors	PM <30 mg/Nm^3
		Lime Dosing	SOx <100 mg/Nm^3
		Low NOx burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided	NOx <100 mg/Nm^3
6	Ferro Alloys and/or Pig Iron	4 Sets of Bag Filter with Chimney	PM <30 mg/Nm^3
7	Galvanization unit	Fume Extraction system along with Wet scrubber	PM <30 mg/Nm^3

Additional Measures to reduce/control pollution control

• Closed monitoring of real time emission data through OCEMS

• Data management through Distribution Control System (DCS) to take corrective action immediately in case of any exceedances

• Provision of Plant Interlocking with stack emission to avoid abnormal & emergency situation at any time.

• Roads will be frequently sprinkled with water.

• Most of the materials will be stored under covered shed.

• Regular maintenance of vehicles and machineries will be carried out in order to control emissions.

• Green belt development will 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 noise.

• 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 Impacts

- Day and night sound pressure levels are often used to describe the community exposure. The nearest human settlement Kopedeeh is 1.2 km away from project site and resultant noise level at this village are 51.6 dB(A) & 44.3 dB(A) at day night respectively.

- Full body vibration and hand-arm vibration impacts will be felt by operators sitting in heavy machineries and operating vibrating devices, respectively. Necessary precautions in workplace environment shall be exercised to reduce workplace vibration impacts.

Mitigation measures

➢ Site specific mitigation measures will be adopted at project site to attenuate noise levels to safe limits. It can be further concluded that in actual conditions due to presence of various topographical features in the path of sound propagation the noise levels will be further attenuated.

➢ Dense plantation will help to reduce noise pollution in the following ways –

- The sounds that are produced by the leaves helps muffle the noise.

- Hedging makes a thick front of the wall and blocks the noise.

- Thick tree trunks create a sound-absorbing buffer zone.

- They help in filtering the noise

➢ Equipment will be standard and equipped with silencer. The equipment will be in good working conditions, properly lubricated and maintained to keep noise within permissible limits.

➢ Most of the equipment's will be placed in closed room

➢ Equipment's will be placed on acoustic floor to reduce vibration and noise

➢ High noise zone will be marked, and earplugs will be provided to the workmen near high noise producing equipment.

➢ Use of PPE's awareness program will be provided to all workers.

➢ Proper shifting arrangement will be made to prevent over exposure to noise and vibration.

➢ Silent DG sets will be used site.

➢ Speed limits will be enforced on vehicle.

➢ Regular noise & vibration monitoring will be carried for all equipment's to check compliance with prevailing rules.

4.3 Impact on 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.

Mitigation measures

- The project will have a **750 KLD ETP** including for Galvanization Unit to treat Industrial waste water and **70 KLD** STP for treatment of domestic waste water. Treated Industrial water from ETP will be utilized in dust suppression, Fly Ash conditioning and Slag quenching whereas treated domestic wastewater from STP will be used for green belt and dust suppression purposes. The project site is located in an area classified as '**Safe Zone**' as per the guidelines of CGWB, moreover the source of water will be surface water.

- 674 KLD trade effluents treated in ETP (ETP Capacity 750 KLD). 698 KLD Treated water generated from ETP Plant out of which 60 KLD will be utilized in Dust suppression and Ash/Slag Quenching and remaining 638 KLD will be recycled in the system through RO and MEE.

- 49 KLD treated domestic water through STP will be used green belt development. Additional (69 KLD) fresh water will also use for Gardening Purposes. Thus Total 118 KLD will be used for Greenbelt/Gardening purposes.

- Raw material from the proposed project will be stored on concrete layer thus no seepage from the raw material piles anticipated.

- The material will be stored under adequate shed in order to prevent the leachate through runoff.

- Separate stockyards for storage of Raw materials, finish products and solid waste will be maintained.

- All stockyards will be designed with the impervious flooring to prevent leachate percolation.

- Garland drain will be provided to all stockyards area to prevent run-off containing suspended solids by routing the storm water drains through catch pits/sediment traps.

- Any spillage of hazardous waste (used oil/spent oil, ETP Slag, etc.) or contamination will be immediately removed.

- Periodic ground water monitoring at project site as well as nearby villages will be carried out.

- Rain water charged to ground water

- Closed circuit circulation system will be followed.

4.4 Impact on 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 (**Kopedih – 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 direction from the project site.
2.	Gaseous emission from Stack, Movement of vehicle inside plant and Raw material & finished product transportation,	Decline in photosynthetic activities, Stomatal index may be minimized, Crop yield will be reduced in absence of site specific mitigation measures	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

SI.	Project Aspects / Activities	Impacts	Mitigation Measures Suggested
	Product manufacturing		minimal as project activity will be carried out within the plant boundary limit with proper control measures. Greenbelt area of **15.00 Ha. (33.57%)** will be proposed for project with local species with broad leaves and higher canopy and fast growing tree species. Total plants are **37500 nos**. are proposed. Indigenous species for plantation is recommended **Control Measures to avoid impacts on agriculture crops** 1. Periodic maintenance of transport road in collaboration with PWD 2. Regular sprinkling of water through mobile tankers on raw material and finished product transportation road. 3. Covered Transport system 4. Plantation along the transportation route (both sides) 5. Monitoring of dust fall at agriculture land located in the vicinity of project site. 6. Green nets will be provided along the agriculture farm boundary facing in the vicinity of proposed plant and transport road 7. 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. 20.0 Lakhs towards capital cost and Rs. 8.0 Lakhs** towards recurring cost will be implemented. The detailed breakup of budget is given in **Ch. 10.**

4.5 Impact on Socio-economic environment

Positive Impacts

- There would be a multiplier effect 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.

- Economic growth due to development of area and increase in quality of life.

- Improvement in green cover due to the plantation of trees in the Study area, also are leading to a decrease in environmental pollution.

- Improvement in social and infrastructural development by the industries as a part of CER and EMP.

    Negative Impacts.

- Production of Sponge Iron and operation of Induction furnace can cause release of pollutants in the Air Environment and formation of tailing. Environmental pollution due to emission of pollutants may affect the health of the people.

- There may be increase in vehicles due to the proposed project leading to extra pressure on the traffic.

- During operation phase heavy vehicle movement lead to dispersed dust particles which affects the health of the workers and Local Peoples. Trucks, tankers and other vehicles may cause additional air pollution to the surrounding areas. The effects may be more prominent in nearby villages.

- Possibilities of Hazards and accident which may cause harm to the workers working or loss of life of the workers.

- Generation of Solid and Hazardous waste will be there, if the waste is not managed properly, it may cause contamination of the area, environment and health of the nearby population.

- If influx of workers from outside areas then there may an increased pressure on residential accommodation the neighbourhood.

Mitigation Measures

In order to mitigate the adverse impact likely to arise in social, cultural and economic aspects in the surrounding region due to the proposed project and improvement in quality of life following mitigation measures should be adopted:

- Adequate pollution control Equipment as per the CPCB Guidelines should be adopted and proper maintenance of industrial and pollution control equipment should be done to ensure minimum pollution.

- The efficiency of the pollution control equipment should be checked periodically to comply with the emission standards provided by CPCB and minimise the pollution levels.

- Ensure that roads are properly signed, vehicles are well maintained and drivers are well trained and safety conscious.

- A Safety Environment should be prepared and every worker has to be trained with all safety equipment. All health and safety measures should be adopted by the company to ensure the safety of the workers and the surrounding society.

- Project proponent should take appropriate steps to keep environment clean and Green belts development/ Plantation along with the internal Road.

- Transportation of hazardous waste should be done as per CPCB Guidelines. The heavy trucks are covered to prevent spillage or dusting. The drivers should be imparted training.

- Priority will be given to local people on employment.

- Social infrastructure development activities should be proposed by the company.

5.0   ANALYSIS OF ALTERNATIVES (SITE AND TECHNOLOGY)

Site Selection

The proposed site to establish green field integrated steel plant with captive power plant at Village-Kopedih, Tehsil & District- Rajnandgaon (C.G.), Chhattisgarh was selected after considering a number of alternative locations. A number of factors influence the feasibility of location for such projects in which availability of adequate land and access to power infrastructure and transport network and adequate surface water are important.

One of the merits for selecting this site was that the seller company Vandana Ispat had previously received Environment Clearance from MOEF under EIA Notification 2006 vide letter No F. No. J-11011/1172/2007- IA II (I) Dated 08/10/2010.

Thus the availability of Logistic Support; Water; power; manpower; adequate land and safe distance from the habitat area as well as back ground existing pollution levels were some of the criteria of selecting the sites.

Alternative sites Evaluated : After signing the MOU with Gov. of Chhattisgarh on dated 21/01/2022 to set up a steel unit based on DRI the company was offered various lands also by Industry Department and Private land owners.

SELECTION OF ALTERNATIVE TECHNOLOGY

The following aspects of the project are dealing with the study of alternative technology in brief involved in each of the proposed products and choice of the technology based on environmental applicability, technical and financial viability. Selection of suitable production process and the capacity of the production units form the nucleus around which the basic concept of a plant is developed. While the selection of a process takes into account factors like type of product, availability of local raw material, process status, specific energy consumption, level of energy required, environment, and pollution etc., the capacity selection of major units would depend on the volume of production, available unit sizes, economies of scale, etc.

6.0   ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed project under the control of by General Manager (Plant Head) with a direct reporting to Board of Directors.

The company has proposed to set up its own Environment Monitoring lab as it is evident with the investment of about Rs 55 Lakhs on Capital cost towards monitoring equipment whereas Rs 18 Lakhs cost per year for monitoring of Environment. This facility will be created along with the gradual implementation of the project

In addition to the above as the proposed project comes into operation, NABL/MoEFCC accredited lab (Third party) will engaged to monitor all the environmental components as per CPCB/CECB norms.

7.0   ADDITIONAL STUDIES

7.1   PUBLIC CONSULTATION

The Draft EIA-EMP report for greenfield project is prepared as per the TOR issued by EAC (Industry - I), MoEF&CC, New Delhi and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

After completing the public consultation process, the points raised and commitment of project proponent during the public hearing will be incorporated in the final EIA-EMP report for final submission to Environmental Clearance.

7.2   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.

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the project site. On the other hand, risk analysis deals with the identification and quantification of risks occurring due to the plant equipment and personnel exposed, due to accident resulting from the hazards in the plant. The occupational and safety hazards and preventive measures, process hazards and their preventive measures, and storage hazards and preventing measures are provided in details in Chapter 7 of the EIA report.

The main objective of the risk assessment study is to determine damage due to major hazards having damage potential to life and property and provide a scientific basis to assess safety level of the facility. The secondary objective is to identify major risk in manufacturing process, operation, occupation and provide control through assessment and also to prepare on-site, off site plans to control hazards.

The assessment of risk in the proposed project has been estimated for material handling, movement of Trucks/Tippers, Dust hazards, Hazards, shock hazards, etc. and corresponding mitigation measures are suggested in the EIA/EMP report.

8.0   PROJECT BENEFITS

Proposed Social Welfare Arrangement

In addition to the activities along with budgetary provision provided under CER, M/s. KIL will also support social welfare activities under CSR obligation under companies act.

The Social welfare/CSR activities will aim at strengthening the bond between the project authorities and the local population in the vicinity of project area. In line with CSR policy, M/s KIL will carry community welfare activities in the following areas:

- Community development
- Education

- Health& medical care
- Drainage and sanitation

- Roads
- Drinking water supply occasionally in the event of water scarcity through tankers, etc.

- As per MoEF&CC vide its OM dated 30th Septmber 2020 has provided that the CER value for the project will be revised based on Public Hearing outcome and as per the commitments made by the project promoters during the Public hearing. Thus, CER are made in the proposal as per requirement considering O.M. dated 01/05/2018 and 30.09.2020 issued by MoEF&CC, New Delhi proposals regarding Corporate Environment Responsibility (C.E.R.). A CER budget of Rs. 450 Lakhs will be added on project cost. The final heads of expenditure and amount will be decided as

per Public consultation and requirement of the region to improve and strengthen surrounding environment which may be slightly impacted due to implementation of the proposed project activity

- The project benefits also entail revenue earnings to national and state exchequer through GST (Estimated Rs. 421 Crores Gross GST), road tax, income by registration of trucks & trailers, income tax, corporate tax, etc.

- It is estimated that **Total 1230** people will get direct employment due to proposed Greenfield project; the priority of management is to fulfill the requirement through local peoples. In addition, there will be indirect employment to more than **1500 persons** (as drivers, conductors and attendants of new trucks, passenger carrying vehicles, technicians in workshops and garage besides the plumbers, electricians and masons).

- The estimated cost of Plant and Machinery and Other Equipment is about Rs 65,550 Lakhs. Transporters and Erection people will also get opportunity for manufacture their respective plant and Machinery and equipment. This will add to GDP of the Nation.

- The company is likely to add about Rs 2339 Crores Turnover to the GDP due to which about Rs 421 Crores Gross GST will be payable to the Govt. The salary wages payment will be above Rs. 17.9 Crores per year. Payment towards power to the state grid will be more than Rs 259.19 Crore. All these will help to grow the National GDP and local area economy too.

- Preference will be given to local people, depending upon their qualification and skill. The salary wages payment will be above Rs.17.9 Crores per year.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan comprising following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.

- Minimization of natural resources and water.

- Ensure effective operation of all control measures.

- Monitoring of cumulative and longtime impacts.

- Ensure effective operation of all control measures.

- Control of waste generation and pollution.

The company will invest about Rs 51.86 Crores Capital cost on environment management plan and spent about Rs.1.41 Crores per year for operation and maintenance.

10.0 CONCLUSION

The proposed project of M/s. KIL 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. Necessary pollution control equipment like bag house, water sprinklers, enclosures, etc. are integral part of the plant infrastructure. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize 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 CSR/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, moreover, 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 KIL are carried out by M/s. Anacon Laboratories Pvt. Ltd., Nagpur (M/s. ALPL). 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 Certificate No.: NABET/EIA/2023/SA 0160 dtd. 13 April 2022 Valid till March 29, 2023.