

**SUMMARY ON
ENVIRONMENTAL IMPACT ASSESSMENT
REPORT**

OF

NR Iron and Power Pvt. Ltd.

[Integrated Steel Plant]

at

Shivpuri Village, Raigarh Tehsil & District, Chhattisgarh

Submitted to

**CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Chhattisgarh**

1.0 PROJECT DESCRIPTION

NR Iron and Power Pvt. Ltd. has proposed to establish an Integrated Steel Plant, a Greenfield project comprising of Iron Ore Beneficiation Plant (1 x 5.2 MTPA); Pellet Plant (1 x 3.8 MTPA); Producer Gas Plant (4,27,500 NM³/Hr-1496 MNm³/annum); Coal Washery Units (2 x 2.5 MTPA - 5.0 MTPA); Coke Oven Units (2 x 1.25 MTPA - 2.5 MTPA); Lime Calcination Plant (2,64,000 TPA); Sinter Plants (3 x 150 m²) to produce sinter of 52,03,440 TPA; Blast Furnaces (3 x 1590 m³) to produce liquid metal of 47,22,300 TPA; DRI Kilns (4 x 600 TPD) – to produce sponge iron of 7,92,000 TPA; WHRB Power through DRI kilns – (4 x 14 MW - 56 MW); Power generation through BF gases - 75 MW; Power generation through Coke Oven gases - 150 MW; CFBC based Power Plant of 2 x 250 MW (500 MW); SMS # 1 – 1 x 100 T EAF + 2 x 120 T LRF + 9/18 Billet Caster; SMS # 2 - 1 x 100 T EAF + 2 x 120 T LRF + 9/18 Bloom Caster; SMS # 3 - 4 x 85 T EOF /BOF + Slab & Mini Slab Caster; SMS # 4 - 2 x 40 T AOD/VOD + 9/18 Billet Caster to produce Billets, Blooms, Slabs, Mini slabs; Rolling Mill # 1 – 0.5 Million TPA Long Product Mill (Structural); Rolling Mill # 2 - 1.0 - MTPA Plate Mill; Rolling Mill # 3- 1.0 Million TPA Cold Rolling Mill; Rolling Mill # 4 - 0.5 Million TPA Pipe Mill; Rolling Mill # 5 - 0.5 Million TPA Stainless Steel Mill; Rolling Mill # 6 - 0.5 Million TPA TMT Bar Mill; Ferro Alloys (8 x 24 MVA : FeSi – 1,49,100 TPA / FeMn – 5,36,760 TPA / SiMn – 3,06,720 TPA / FeCr– 3,19,500 TPA); Oxygen Plant (Oxygen - 198 Mm³/annum, Nitrogen - 594 Mm³ /annum, Argon - 19.8 Mm³/annum; Brick Manufacturing Unit - 330 Million Bricks/Year and Briquetting Plant- 2100 kg/hr.at Shivpuri Village, Raigarh Tehsil & District, Chhattisgarh.

Total land envisaged for the proposed project is **299.009 Ha.** Out of which **177.766 Ha.** is Govt. land, allotted by Chhattisgarh State Industrial Development Corporation (CSIDC Ltd.) for 99 years of lease and **121.243 Ha.** is Private land, registered on company name.

Table No. 1.1: Land Use Classification of Project Area

S.No.	Type of land	Extent (in Ha.)	Khasra no.	Status of land acquisition	Status of land diversion
1.	Govt. land allotted by CSIDC on lease	177.766	12/5 & 28/2	Land is allotted by CSIDC Ltd. on lease for 99 years vide lease deed dt. 07.07.2023.	Land diversion is not required as it is Govt land allotted by CSIDC Ltd.
2.	Private land	121.243	11/1,11/2, 11/3,11/4, 12/2, 12/3, 12/4, 12/6, 12/7, 12/8, 12/9,	Entire private land is registered in the name of NR Iron and Power	Land is diverted for Industrial purpose

			12/69, 15, 28/4, 28/5, 28/6, 30/3/ख, 30/10, 30/11, 34/1, 34/2, 34/8, 34/9, 14/3, 14/5, 14/1, 14/2, 14/6, 14/11, 28/2, 12/5	Pvt. Ltd.	
	Total Land	299.009			

The project cost envisaged for the proposed project is **Rs. 8,917Crores.**

The proposed project activity is listed at schedule no. 3(a) Metallurgical Industries (ferrous & non-ferrous), 2(a) Coal Washeries, 2(b) Mineral Beneficiation and 1(d) Thermal Power Plants under Category "A" of the schedule of the EIA Notification, 2006 and appraised at Central Level.

In order, to obtain Environmental Clearance for the proposed Steel Plant, (CAF, Form – I Part A & B), copy of pre-feasibility report and proposed ToRs were submitted to the Honourable Ministry of Environment, Forests & Climate Change (MoEF&CC), New Delhi 28th June 2023 vide Proposal No. IA/CG/IND1/425731/2023. Subsequently TOR letter was issued vide letter File No. IA-J-11011/179/2023–IA-II (IND-I), dated 21st February 2024. Draft EIA report has been prepared incorporating the Terms of Reference & is being submitted to CECB for conducting Public hearing/consultation.

Pioneer Enviro Laboratories & Consultants Private Limited, Hyderabad, which is accredited by NABET, Quality Council of India, vide certificate No. NABET/EIA/ 2225/ RA 0282, for preparing Environmental Impact Assessment (EIA) report for Metallurgical Unit, have prepared EIA report for the proposed project by incorporating the TOR approved by Ministry of Environment, Forests & Climate Change, New Delhi. The report contains detailed description of the following:

- Characterization of status of environment with in an area of 10 km radius from the plant for major environmental components including air, water, noise, soil, flora, fauna and socio-economic environment.
- Assessment of air emissions, liquid waste and solid waste from the proposed project along with the noise level assessment.

- Environmental Management Plan comprising of emission control measures proposed to be adopted in the proposed project, solid waste management, Greenbelt development.
- Post Project Environmental Monitoring & Budget for Environmental Protection Measures.

1.1 ENVIRONMENTAL SETTING WITHIN 10 Km. RADIUS OF THE PLANT SITE

The following is the environmental setting within the 10 Km. radius of the Project site:

Table No. 1.2: Environment Setting within 10 Kms. radius of the site

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks						
1.	Type of Land	Out of total land 299.009 Ha., 177.766 Ha. of land Govt. Land allotted by Chhattisgarh State Industrial Development Corporation (CSIDC) and remaining 121.243 Ha. of land is Private Land (same is diverted for Industrial Purpose)						
2.	Type of Land (Study Area)	As per LULC the land use within 10 Km. is as follows: Settlements / Air strip- 3.2%, Industrial area – 9.2%, Tank / River / Reservoir etc. – 9.5%, Dense Forest/Scrub Forest – 38.1%, Single crop – 24.3%, Land with scrub – 10.4%, Land without scrub – 3.2%, Ash Storage Yard / Ash Pond – 2.1%						
3.	National Park / Wildlife sanctuary / Biosphere reserve / Tiger Reserve / Elephant Corridor / migratory routes for Birds	Nil However as per secondary sources, Movement of Elephants has been observed within 10 km. radius of the project site. Conservation plan will be prepared and budgetary approval will be obtained from PCCF, Govt. of Chhattisgarh.						
4.	Historical places / Places of Tourist importance / Archeological sites	Maa Banjari Temple - 2.3 Kms. (Aerial) Ram Jharna Temple – 7.1 Kms. (Aerial) Singhanpur Cave – 9.3 Kms. (Aerial)						
5.	Critically polluted area as per MoEF&CC Office Memorandum dated 13 th January 2010	None And also the Plant area does not fall in the areas given in Hon'ble NGT order issued vide dated 10 th July 2019.						
6.	Defence Installations	Nil						
7.	Nearest village	Shivpuri Village – Adjacent to the Project site in Southern direction Delari Village: 0.5 Kms. – West Direction (Aerial) Gerwani Village: 0.5 Kms. – East Direction (Aerial)						
8.	Nearest Hospital	ESI hospital Taraimal - 1.5kms (NNE)						
9.	Forests	Following are list of Reserved and Protected Forests p: <table border="1" data-bbox="831 1991 1442 2069"> <thead> <tr> <th>Name</th> <th>Distance (Kms.)</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Name	Distance (Kms.)	Direction			
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10.	Water body	<p><u>Within the Project site:</u> Two water bodies are present within the project site and same will be utilized as Water Reservoir for storage of water.</p> <p><u>Study area:</u></p> <table border="1"> <thead> <tr> <th>Water Body</th> <th>Distance (Kms.)</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>Gerwani Nala</td> <td>Adjacent</td> <td>N</td> </tr> <tr> <td>Kelo River</td> <td>1.4</td> <td>E</td> </tr> <tr> <td>Pajhar Nadi</td> <td>6.7</td> <td>ENE</td> </tr> <tr> <td>Jam Nala</td> <td>0.19</td> <td>N</td> </tr> <tr> <td>Dewanmunda Nala</td> <td>2.9</td> <td>NW</td> </tr> <tr> <td>Korapali Nala</td> <td>2.3</td> <td>NW</td> </tr> <tr> <td>Barade Nala</td> <td>6.7</td> <td>WSW</td> </tr> <tr> <td>Bodojuri Nala</td> <td>6.5</td> <td>NW</td> </tr> <tr> <td>Tipakhol Tal</td> <td>6.0</td> <td>S</td> </tr> <tr> <td>Kokritaral Tal</td> <td>6.6</td> <td>SSW</td> </tr> <tr> <td>Kosam Nala</td> <td>8.0</td> <td>NW</td> </tr> <tr> <td>Rabo dam</td> <td>9.5</td> <td>NNW</td> </tr> <tr> <td>Chui Nala</td> <td>9.9</td> <td>NE</td> </tr> <tr> <td>Gardharasi Nala</td> <td>9.5</td> <td>NNE</td> </tr> <tr> <td>Ratrot Nala</td> <td>4.9</td> <td>NE</td> </tr> <tr> <td>Banjari Nala</td> <td>2.7</td> <td>NE</td> </tr> <tr> <td>Karanara Nala</td> <td>2.4</td> <td>ENE</td> </tr> </tbody> </table>	Water Body	Distance (Kms.)	Direction	Gerwani Nala	Adjacent	N	Kelo River	1.4	E	Pajhar Nadi	6.7	ENE	Jam Nala	0.19	N	Dewanmunda Nala	2.9	NW	Korapali Nala	2.3	NW	Barade Nala	6.7	WSW	Bodojuri Nala	6.5	NW	Tipakhol Tal	6.0	S	Kokritaral Tal	6.6	SSW	Kosam Nala	8.0	NW	Rabo dam	9.5	NNW	Chui Nala	9.9	NE	Gardharasi Nala	9.5	NNE	Ratrot Nala	4.9	NE	Banjari Nala	2.7	NE	Karanara Nala	2.4	ENE
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11.	Road	Site is well connected to SH # 1 (Ambikapur – Gharghoda State Highway) which is adjacent to the site																																																						
12.	Nearest Highway	SH # 1 (Ambikapur – Gharghoda State Highway) – Adjacent to the project site																																																						
13.	Nearest Railway Station	Kirodimal Nagar Railway Station - 8.4 Kms. SSW																																																						

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks
		direction Bhupdeopur Railway Station - 9.2 Kms. WSW direction
14.	Nearest Port facility	Nil within 10 Kms. radius.
15.	Nearest Airport	Nil within 10 Kms. Radius. (However, Jindal Airstrip is present at a distance of 7.3 Kms. from the project site)
16.	Nearest Interstate Boundary	Nil within 10 Km. Radius. (Chhattisgarh – Odhisa Interstate border - 16.5 Kms.)
17.	Costal Regulation Zone [CRZ]	Nil
18.	Seismic zone as per IS-1893	Seismic zone – II MSL of the Project area – 248 m to 281 m
19.	R & R	<p>Field Survey / Study has been conducted in the Shivpuri village pertaining to requirement of R & R Plan and Socio-economic Environmental Impacts due to the proposed project on the surrounding villages during 4th Oct. to 11th Oct. 2023 by M/s. Seamless Consultancy, Hyderabad.</p> <p><u>Following are the observations regarding R & R:</u></p> <ul style="list-style-type: none"> • The proposed project of M/s NR Iron and Power (P) Ltd., does not fit into the ambit of “public purpose” and the nature of projects criteria as stipulated by under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLAR&R Act, 2013). Hence it is unlikely that the appropriate Government may consider land acquisition of Shivpuri as necessary for establishing the project. • Since the project proponent’s concern is to minimize adverse environmental impacts on the inhabitants of Shivpuri village, other sustainable alternatives will be explored, especially through adoption of better and proven manufacturing and pollution control technologies to address environmental concerns. • Land acquisition of a village and R&R of affected families is a long drawn and highly time-consuming process. Further, it may lead to loss of assets and livelihoods leading to economic distress and also emotional discard and disturbance to the residents. • Land acquisition and R&R process will not be acceptable to the majority of residents of Shivpuri at any point of time and hence may not pass

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks
		<p>through the Social Impact Assessment and public hearing stages even if the State Government concedes to consider land acquisition request.</p> <p>As per the field survey / study and interactions with the households, it was explored to assess the mindset of the villagers for rehabilitation and resettlement. Initial response points to that 90% of the residents of Shivpuri village were quite unwilling to entertain the very thought citing their strong roots and emotional attachment with the village for generations. They were reluctant to leave the place at any cost. Only 10% expressed their initial preparedness for relocation provided attractive monetary compensation is offered and better alternative residential facilities created in a suitable location.</p> <p><u>Accordingly, the project proponent is prepared to commit to conceive and implement an appropriate plan to:</u></p> <ul style="list-style-type: none"> • Create core production facilities away from Shivpuri village boundaries and locating common, auxiliary and support facilities close to the village border • Create residential colony for the project personnel adjacent to the village • Develop and maintain a 50 mtr wide thick green belt having a large number of 50' tall trees on all three sides of the boundary with the village • Raise 10 mtr high dust screen on all three sides of the boundary with the village • Assume responsibility for strengthening and maintaining the existing physical infrastructure such as roads, water distribution, sanitation, greenbelts etc., in the village. • Re-construction of the existing primary school building which is in a dilapidated condition • Installing all the latest pollution control equipment to contain emissions within the prescribed limits • Organizing periodical health camps and extending healthcare support to the villagers • Develop a comprehensive plan for undertaking Women and Youth empowerment, Skill development, Poverty alleviation and farmers education and awareness on remunerative and

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks
		sustainable farming.
20.	Litigation / court case is pending against the proposed project / proposed site and or any direction passed by the court of law against the project	Nil

1.2 PLANT CONFIGURATION AND PRODUCTION CAPACITY

Following is the proposed plant configuration and proposed production capacities:

Table No.1.3: Proposed Plant Configuration & Production Capacities

S.No.	Unit (Product)	Unit Configuration	Production Capacity
1.	Iron Ore Beneficiation Plant (I/O concentrate)	1 x 5.2 MTPA (throughput capacity)	5.2 MTPA (throughput capacity)
2.	Iron Ore Pelletization Plant (Pellets)	1 x 3.8 MTPA	3.8 MTPA
3.	Producer Gas Plant (Producer Gas)	4,27,500 Nm ³ /Hr	4,27,500 Nm ³ /Hr
4.	Coal Washery (Washed coal)	2 x 2.5 MTPA (throughput capacity)	5.0 MTPA (throughput capacity)
5.	Non-Recovery Type Coke Ovens (Coke)	2 x 1.25 MTPA	2.5 MTPA
6.	Lime Calcination Plant (Lime stone & Dolomite)	4 x 200 TPD	0.264 MTPA
7.	Sinter Plants (Sinter)	3 x 150 m ²	52,03,440 TPA
8.	Blast Furnaces (Liquid Pig Iron)	3 x 1590 m ³	47,22,300 TPA
9.	DRI Kilns (Sponge Iron)	4 x 600 TPD	0.792 MTPA
10.	SMS # 1 (MS Billets)	1 x 100 T EAF + 2 x 120 T LRF + 9/18 Billet Caster	0.528 MTPA
11.	SMS # 2 (MS Blooms)	1 x 100 T EAF + 2 x 120 T LRF + 9/18 Bloom Caster	0.528 MTPA
12.	SMS # 3 (Slabs / Mini Slabs)	4 x 85 T EOF/BOF + Slab/ Mini Slab Caster	2.64 MTPA
13.	SMS # 4 (Billets)	2 x 40 T AOD/VOD + 9/18 Bloom Caster	5,01,600 TPA
14.	Rolling Mill # 1	1 x 1,515 TPD	0.5 MTPA

S.No.	Unit (Product)	Unit Configuration	Production Capacity		
	(Structural Steel)				
15.	Rolling Mill # 2 (Plate Mill)	1 x 3,030 TPD	1.0 MTPA		
16.	Rolling Mill # 3 (Cold Rolling Mill)	1 x 3,030 TPD	1.0 MTPA		
17.	Rolling Mill # 4 (Pipe Mill)	1 x 1,515 TPD	0.5 MTPA		
18.	Rolling Mill # 5 (Stainless Steel Mill)	1 x 1,515 TPD	0.5 MTPA		
19.	Rolling Mill # 6 (TMT Bar Mill)	1 x 1,515 TPD	0.5 MTPA		
20.	Coal Gasifier for Rolling Mill # 1	4,500 Nm ³ /Hr	4,500 Nm ³ /Hr		
21.	Ferro Alloys Plant (FeSi / FeMn / SiMn / FeCr)	8 x 24 MVA	FeSi – 1,49,100 TPA / FeMn – 5,36,760 TPA / SiMn – 3,06,720 TPA / FeCr– 3,19,500 TPA		
22.	Oxygen Plant	Oxygen	6,00,000 m ³ /day	198 Mm ³	
		Nitrogen	18,00,000 m ³ /day	594 Mm ³	
		Argon	60,000 m ³ /day	19.8 Mm ³	
23.	Power Plant (781 MW)	WHRB	Blast Furnace	3 x 25 MW	75 MW
			DRI Kilns	4 x 14 MW	56 MW
			Coke Oven	2 x 75 MW	150 MW
		CFBC		2 x 250 MW	500 MW
24.	Bricks Manufacturing Unit	10,00,000 Bricks/day	10,00,000 Bricks/day		
25.	Briquetting Unit	2,100 Kg/hr.	2,100 Kg/hr.		

1.3 RAW MATERIAL REQUIRMENT

The following will be the raw material requirement for the proposed project:

Table No.1.4: Raw Material Requirement, Source & Mode of Transport

S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
1.	Beneficiation Plant - 52,00,000 TPA				
i.	Iron Ore Fines	52,00,000	Chhattisgarh / Odisha	~ 150 Kms.	By Rail & Road (Covered trucks)
2.	Pellet Plant – 38,00,000 TPA				
i.	I/O Concentrate	41,80,000	Own generation	---	Through Conveyor
ii.	Anthracite Coal	76,000	SECL Chhattisgarh / Jharkhand, Odisha	~ 150 Kms.	By Rail & Road (Covered trucks) & Through vessel.
iii.	Bentonite	34,200	Gujarat	~ 900 Kms.	By Road



S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
					(Covered trucks)
iv.	Lime Powder	95,000	Own generation	---	Through Conveyor
v.	Coke breeze	1200	Chhattisgarh & Jharkhand	~ 100 Kms.	By Road (Covered trucks)
3.	Producer Gas Plant- (4,27,500 Nm³/Hr)				
i.	Domestic Coal	12,82,500	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By Rail & Road (Covered trucks)
ii.	Imported Coal	820,822	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (Covered trucks)
4.	Coal Washery - 50,00,000 TPA				
i.	ROM Coal	50,00,000	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By rail & road (Covered trucks)
5.	Coke Ovens 25,00,000 TPA				
i.	Coking coal	37,50,000	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By rail & road (Covered trucks)
6.	Lime Calcination Plant (Dolomite) 2,64,000 TPA				
i.	Limestone	4,75,200	Chhattisgarh	---	By rail & road (Covered trucks)
ii.	Coal	42,240	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By rail & road (Covered trucks)
7.	Sinter Plant (Sintered Ore) 52,03,440 TPA				
i.	Iron ore fines	46,83,071	Chhattisgarh / Orissa	~ 150 Kms.	By rail & road (through covered trucks)
ii.	Limestone	6,68,000	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By rail & road (Covered trucks)
iii.	Dolomite	4,68,000	Odisha, Chhattisgarh, Jharkhand	~ 150 Kms.	By Rail & Road (Covered trucks)
iv.	Coke fines	4,43,000	Chhattisgarh / Odisha/ Maharashtra	~ 150 Kms.	By rail & road (Covered trucks)
v.	Mill scale	1,30,086	Own Generation	---	Internal Transfer (Covered trucks)
vi.	Dust from SMS, BF, Coke Oven	5,15,200	Own Generation	---	Internal Transfer (Covered trucks)
vii.	Sinter plant return	10,93,243	Own Generation	---	Internal Transfer (Covered trucks)
8.	Blast Furnace- 47,22,300 TPA				
i.	Sinter	52,03,440	Own Generation	---	Roller Conveyors





S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
ii.	Iron Ore Pellets	18,88,920	Own generation Odisha, Chhattisgarh, Jharkhand	~ 150 Kms.	By rail & road (Covered trucks)
iii.	(or)				
iv.	Iron ore	22,14,600	Odisha, Chhattisgarh, Jharkhand	~ 150 Kms.	By rail & road (Covered trucks)
v.	BF Coke	25,00,000	Own generation	---	Internal Transfer (Covered trucks)
vi.	Quartzite	94,446	Chhattisgarh, Jharkhand	~ 150 Kms.	Covered trucks
vii.	Dolomite	2,59,000	Odisha, Chhattisgarh, Jharkhand	~ 150 Kms.	By Rail & Road (Covered trucks)
viii.	Lime Stone	3,06,000	Own generation & external purchase from Odisha, Chhattisgarh, Jharkhand	---/~ 150 Kms.	Internal transfer by covered trucks By Rail & Road (Covered trucks)
9.	DRI Kilns (Sponge Iron) – 7,92,000 TPA				
i.	Iron Ore Pellets	11,48,400	Own generation	---	By Closed Conveyors
	(or)				
ii.	Iron Ore	13,46,400	Chhattisgarh / Orissa	~ 150 Kms.	By Rail & y Road (Covered trucks)
iii.	Indian Coal	10,29,600	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By Rail & Road (Covered trucks)
	(or)				
iv.	Imported coal	6,73,200	Indonesia/South Africa/ other countries also	~ 600 Kms. (from Vizag Port)	By sea, By rail & by Road (Covered trucks)
v.	Dolomite	39,600	M.P., Chhattisgarh & Imported from Bhutan	~ 200 Kms.	By Rail & Road (Covered trucks)
10.	CFBC Boilers [Power Generation-2 x 250 MW- 500 MW]				
i.	Indian Coal 100%	26,67,500	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By Rail & Road (Covered trucks)
	OR				
ii.	Imported Coal 100%	16,79,472	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (Covered trucks)
	Or/and				
iii.	Washery rejects	12,50,000	Own generation	---	Internal Transfer (through conveyors)
11.	Steel Melting Shop # 1 (Electric Arc Furnace (EAF)) – 5,28,000 TPA				



S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
i.	Sponge Iron	2,64,000	Own generation	---	Through Conveyors
ii.	Hot metal/Pig Iron	52,800	Own generation	---	Internal Transfer (piped conveyor) /covered trucks
iii.	Melting Scrap (end cuttings also)	79,703	Own generation, Odisha, Chhattisgarh, Jharkhand, WB & Imported	---/~ 150 Kms.	Internal transfer (Covered Trucks), By Rail & Road (Covered trucks) & Through vessel.
iv.	Slag Scrap	2,64,000	Own generation	---	Internal Transfer (Covered trucks)
v.	SiMn	7,895	Own generation	---	Internal Transfer (Covered trucks)
12.	Steel Melting Shop # 2 (Electric Arc Furnace (EAF)) – 5,28,000 TPA				
i.	Sponge Iron	2,64,000	Own generation	---	Through Conveyors
ii.	Hot metal/Pig Iron	52,800	Own generation	---	Internal Transfer (piped conveyor) /covered trucks
iii.	Melting Scrap (end cuttings also)	79,703	Own generation, Odisha, Chhattisgarh, Jharkhand, WB & Imported	---/~ 500 Kms.	Internal transfer (Covered Trucks), By Rail & Road (Covered trucks) & Through vessel.
iv.	Slag Scrap	2,64,000	Own generation	---	Internal Transfer (Covered trucks)
v.	SiMn	7,895	Own generation	---	Internal Transfer (Covered trucks)
13.	Steel Melting Shop # 3 (BOF) – 26,40,000 TPA				
i.	Hot Metal	28,60,000	Own generation	---/~ 500 Kms	Piped conveyor
ii.	Lime	1,48,200	Odisha, Chhattisgarh, Jharkhand / Own Generation		By Rail & Road (Covered trucks) / Internal Transfer (Covered trucks)
iii.	Dolomite	67,300	M.P., Chhattisgarh & Imported from Bhutan/ Own Generation	~ 500 Kms./ ---	By Rail & Road (Covered trucks) /Internal Transfer (Covered trucks)

S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
iv.	SiMn	40,400	Own generation	---	Internal Transfer (Covered trucks)
14.	Steel Melting Shop #4 (AOD) – 5,01,600 TPA				
i.	Hot Metal	5,40,000	Own generation	---	Through Ladle
ii.	Lime	27,600	Odisha, Chhattisgarh, Jharkhand / Own Generation	~ 500 Kms./ ---	By Rail & Road (Covered trucks) / Internal Transfer (Covered trucks)
iii.	Dolomite	12,500	M.P., Chhattisgarh & Imported from Bhutan/ Own Generation	~ 500 Kms./ ---	By Rail & Road (Covered trucks) / Internal Transfer (Covered trucks)
iv.	SiMn	7,600	Own generation	---	Internal Transfer (Covered trucks)
15.	Rolling Mill #1 – 0.5 MTPA				
i.	MS Billet/ Ingots/ Bloom	5,20,000	Own generation	---	Roller Conveyors
16.	Coal Gasifier for Rolling Mill # 1 (4,500 Nm³/Hr) only for 15% through RHF				
i.	Coal (Indian)	13500	SECL Chhattisgarh / MCL Odisha	~ 150 Kms.	By Rail & Road (Covered trucks)
ii.	Coal (Imported)	8,500	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (Covered trucks)
17.	Rolling Mill # 2 – 1.0 MTPA				
i.	MS Billet/ Ingots/ Bloom	10,40,000	Own generation	---	Roller Conveyors
18.	Rolling Mill # 3 – 1.0 MTPA				
i.	MS Billet/ Ingots/ Bloom	10,40,000	Own generation	---	Roller Conveyors
19.	Rolling Mill # 4 – 0.5 MTPA				
i.	MS Billet/ Ingots/ Bloom	5,20,000	Own generation	---	Roller Conveyors
20.	Rolling Mill # 5 – 0.5 MTPA				
i.	MS Billet/ Ingots/ Bloom	5,20,000	Own generation	---	Roller Conveyors
21.	Rolling Mill # 6 – 0.5 MTPA				
i.	MS Billet/ Ingots/ Bloom	5,20,000	Own generation	---	Roller Conveyors



S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
22.	For Ferro Alloys: 8 x 24 MVA [SiMn (or) FeMn (or) FeCr (or) FeSi]				
i.	<i>For manufacturing Silico Manganese - 3,06,720 TPA</i>				
a.	Manganese Ore	613,440	Chhattisgarh / Odisha / Maharashtra and Imported	~ 150 Kms.	By Rail & Road (Covered trucks)
b.	FeMn Slag	138,024	Own Generation	---	Through Conveyor
c.	Coke	92,016	Chhattisgarh, Jharkhand	~ 300 Kms.	By Road (Covered trucks)
d.	Dolomite	92,016	Chhattisgarh, Jharkhand	~ 300 Kms.	By Road (Covered trucks)
e.	Electrode paste	6,134	Maharashtra/West Bengal	~ 300 Kms.	By Road (Covered trucks)
f.	Quartz	107,352	Chhattisgarh, Jharkhand	~ 300 Kms.	By Road (Covered trucks)
g.	Briquetted Bag filter dust	4,601	Own Generated plant	---	Internal Transfer (Covered trucks)
(OR)					
ii.	<i>For manufacturing Ferro Manganese – 5,36,760 TPA</i>				
a.	Manganese Ore	1,288,224	Chhattisgarh / Odisha / Maharashtra and Imported	~ 150 Kms.	By Rail & Road (Covered trucks)
b.	Coke	161,028	Chhattisgarh, Jharkhand	~ 300 Kms.	By Road (Covered trucks)
c.	MS scrap / Mill scales	107,352	Own generation /Chhattisgarh, Jharkhand	---/~ 300 Kms.	By Road (Covered trucks)
d.	Electrode paste	11,809	Maharashtra/West Bengal	---/~ 300 Kms.	By Road (Covered trucks)
(OR)					
iii.	<i>For manufacturing Fe-Si – 1,49,100 TPA</i>				
a.	Quartz	328,020	Chhattisgarh, Odisha, Jharkhand	~ 300 Kms.	By Rail & Road (Covered trucks)
b.	Mill Scale & M.S. Scrap	67,095	Chhattisgarh, Maharashtra/ Own generation	~ 300 Kms.	By Road (Covered trucks)
c.	Char coal /Coke	231,105	Andhra Pradesh	~ 500 Kms.	By Rail & Road (Covered trucks)
d.	Electrode paste	14,910	Maharashtra/West Bengal	~ 500 Kms.	By Road (Covered trucks)
e.	Briquetted Bag filter dust	10,437	Own generation	---	Covered trucks
(OR)					
iv.	<i>For manufacturing Ferro chrome – 3,19,500 TPA</i>				
a.	Chrome Ore	766,800	Odisha Import, South Africa	~ 150 Kms. ~ 600 Kms.	By road (Covered trucks)



S.No.	Raw Material	Quantity (TPA)	Sources	Distance w.r.t. site (in Kms.)	Mode of Transport
				(from Vizag Port)	From Port By Road (Covered trucks)
b.	LAM Coke	159,750	Andhra Pradesh	~ 500 Kms.	By road (Covered trucks)
c.	Quartz	19,490	Chhattisgarh / Andhra Pradesh	~ 500 Kms.	By road (Covered trucks)
d.	MS scrap/Mill scales	47,925	Chhattisgarh / Maharashtra	~ 300 Kms.	By road (Covered trucks)
e.	Magnetite / Bauxite	47,925	Chhattisgarh / Maharashtra	~ 300 Kms.	By road (Covered trucks)
f.	Electrode paste	6,390	Maharashtra / West Bengal	~ 300 Kms.	By road (Covered trucks)
g.	Briquetted Bag filter dust	6,390	Own generation	---	---
23.	Composite Brick Plant- 330 Million Bricks/Year				
i.	IOB Tailing	4,97,829	Own generation	---	Covered trucks
ii.	Cement	1,03,714	Chhattisgarh	~ 200Kms.	By rail & road (Covered trucks)
iii.	Bed Material	83,160	Own Generation	---	In covered trucks
iv.	Fly Ash/ash	5,61,754	Own Generation	---	In covered trucks
v.	Slag Dust	3,51,464	Own Generation	---	In covered trucks
vi.	Wet scrapper sludge	53,961	Own Generation	---	In covered trucks
24.	Briquetting Plant - 2,100 Kg/hr.				
i.	Dust from Ferro Alloys plant	4,05,000	Own Generation	---	In covered trucks

1.4 MANUFACTURING PROCESS

1.4.1 Iron Ore Beneficiation

Beneficiation is a process which removes the gang particle like Alumina, Silica from the Iron Ore. Basically, it separates Fe_2O_3 or Fe_3O_4 from other impurities in the iron ore. In this process the Fe content is improve to maximum possible extent. The highest can be 70% i.e. purest form.

1.4.2 Pelletization

Iron ore fines will be grinded in Ball mills. The concentrate will be fed to thickener and subsequently to filtering unit. The filter cake will be sent to pellet plant comprising of Travelling grate kiln. Green pellets will be produced from this process. The flue gases from grate kiln will be treated in ESP and discharged through a stack.

1.4.3 Coal Gasification Plant/Producer Gas Plant

Gasification of coal is a conversion technology which converts coal into producer gas. It is a high temperature process. The temperature is optimized to produce a fuel gas with a minimum of liquid and solids. This process consists of heating the feed material coal in a vessel with or without the addition of oxygen (O₂). Carbon reacts with water in the form of steam and O₂ at relatively high pressure and produce producer gas. This producer gas will be used in kiln/furnace.

Tar and phenolic water is generated in coal gasification process. Tar is separated and sold. Tar sludge shall be mixed with coal and shall be recycled to coke ovens. The phenolic discharge of PGP will be utilized in ABC of DRI Kiln as per the Guidelines of CPCB. The ash will be utilized in brick manufacturing plant for bricks making.

1.4.4 Sponge Iron (DRI)

The proposal consists of 4x 600 TPD of DRI kilns to produce Sponge Iron with 4x 14MW WHRB facility. Refractory lined rotary kilns will be used for reduction of iron ore in solid state.

Refractory lined rotary kilns will be used for reduction of iron ore in solid state. A central Burner located at the discharge end will be used for initial heating of the kiln.

Iron ore will be continuously fed into the kiln along with coal which has dual role of fuel as well as reductant. Dolomite will be added to scavenge the sulphur from the coal. A number of air tubes will be provided along the length of the kiln. The desired temperature profile will be maintained by controlling the volume of the combustion air through these tubes. The Carbon monoxide generated due to the combustion of coal, reduces the iron ore and converts it into sponge iron. The rotary kiln is primarily divided into two zones viz. the pre heating zone and the reduction zone. The preheating zone extends over 30 to 50 % of the length of the kiln and in this the moisture in the charge will be driven off and the volatile matter in the coal will be burnt with the combustion air supplied through the air tubes. Heat

from the combustion raises the temperature of the lining and the bed surface. As the kiln rotates, the lining transfers the heat to the charge. Charge material, pre-heated to about 1000⁰C enters the reduction zone. Temperature of the order of 1050⁰C will be maintained in the reduction zone, which is the appropriate temperature for solid state reduction of iron oxide to metallic iron.

This hot material will be transferred to Heat exchanger. In Heat exchanger the material will be cooled to 160⁰C. The cooler discharge material consists of sponge iron lumps, sponge iron fines and char. Magnetic and non-magnetic material will be separated through magnetic separators and stored in separate bins. The hot flue gases will be taken to a Waste Heat Recovery Boilers and after heat recovery they will be treated in high efficiency ESP and discharged into the atmosphere through stack whose height will be in accordance with CPCB norms.

1.4.5 Steel Melting Shop

Induction Furnace:

An induction furnace constitutes a single larger primary coil made of water-cooled copper tube. The working voltage is impressed across the terminals of the coil. These furnaces have a great much application for melting of Iron, Steel and Nonferrous.

Electric Arc Furnace:

Manufacturing of Hot Billets / MS billets using Sponge Iron, Pig iron, Scrap, Lime & SiMn as raw materials through Electric Arc Furnace, In which primarily uses high-voltage electrified arcs to melt scrap steel for conversion into liquid steel without altering the electrochemical properties of the specific metal. There will be 1 x 100 T Electric Arc Furnace to manufacture Hot Billets/ MS Billets.

Ladle Refining Furnace

Ladle refining of liquid metal is a proven technology to produce high quality steel. A Ladle Refining Furnace is used to raise the temperature and adjust the chemical composition of molten metal. Without LRF higher tap temperatures are normally required from steel making furnaces due to heat losses during refining with conventional ladles.

Basic Oxygen Furnace:

Basic Oxygen Furnace (BOF) is a steel making furnace, in which molten pig iron and Lime, Dolomite & SiMn convert into steel due to oxidizing action of oxygen blown into the melt under a basic slag.

1.4.6 Rolling Mill

The Hot Billets produced from Induction Furnaces will be directly sent to Rolling Mill to produce Structural Steel / TMT Bars (OR) Hot Billets will be cooled and stored will be sent to reheating furnaces for the heating and will be sent to Rolling Mill. Furnace will be heated with Producer Gas.

1.4.7 Sinter Plant

The proposed sinter plant complete will consist of 3 Nos. of sinter Machines each of 150m² grate area along with associated services facilities. The sinter plant is rated for a total production of 52,03,440 TPA of BF Sinter at a rated productivity of 1.3 t/m²/hr. Sintering is a process agglomeration of fines into solid blocks, in the process of sintering iron ore fines / flue dust / ESP Dust / Mill Scale / GCP Sludge etc. along with Dolomite, Coke fines and limestone are mixed and is fused at a temperature ranging between 900 to 950^o C. These fines get converted into blocks known as Sinter.

1.4.8 Blast Furnace

The blast furnace shop will comprise of 3 Nos. of furnaces each of 1590 m³ working volume. The blast furnace is envisaged to operate with sized lump iron ore, Sinter, coke, fluxes and additives. The liquid slag will be granulated at cast house granulation unit and sold to the cement plants for converting into slag cement. The BF top gas will be cleaned in dust catcher and gas cleaning system and distributed to the stoves, burners for runner drying and process steam supply. Part of this gas will be used for power generation. The excess gas will be flared through flare stack.

1.4.9 Coke Oven Plant

Metallurgical coke is a hard carbon material produced in the process of the 'destructive distillation' of various blends of bituminous coal. It is produced by carbonization of coal at high temperatures (around 1100^oC) in an oxygen deficient atmosphere in a coke oven. When the heat energy of flue gases is recovered in the form of steam then the non-recovery coke

ovens are known as heat recovery or energy recovery coke ovens. In this process, ovens are usually built in rows, one oven beside another with common walls between neighboring ovens. Such a row of ovens is termed a battery. A battery usually consists of many ovens in a row.

1.4.10 Coke Dry Quenching (CDQ) System

CDQ is a heat recovery system to cool the hot coke from coke ovens. It is one of the most renowned energy-efficient and environmentally-friendly facilities within steel production. CDQ is a system where hot coke removed from coke ovens at a temperature of approximately 1,000°C is cooled and kept dry with inert gas and the resulting steam produced in a waste heat recovery boiler is used to generate electricity. As the sensible heat recovered by heat transfer in the cooling chamber is utilized as a heat source for steam generation, electricity generated by CDQ is clean, environmentally-friendly energy. In addition, compared to the conventional wet quenching type, CDQ brings about advantages such as the reduction of dust emissions and improvement of coke quality.

1.4.11 Submerged Electric Arc Furnace

8 nos. of Submerged Electric Arc Furnace each of 24 MVA will be setup in the proposed plant. Ferro manganese, silicon-manganese will be produced using manganese ore as main raw material & Ferro Chrome will be produced using Chrome Ore as main raw material in a sub-merged arc furnace using reducer (Coke) under high voltage.

1.4.12 Power Generation

Through WHRB Boiler

Waste hot gases generated from Blast Furnace, coke oven and DRI plant. Captive power Plant of 281 MW capacity is proposed. 75 MW power will be generated from blast furnace gas, 150 MW power will be generated from coke Oven Flue gas using WHRB & 56 MW power will be generated from DRI kilns.

Through CFBC Boiler

Coal (Imported / Indian) along with dolochar will be used as fuel in CFBC Boilers to generate 500 MW (2 x 250 MW) of electricity. The flue-gases will be treated in high efficiency ESP and then discharged through a stack of adequate height into the atmosphere.

1.4.13 Coal Washery

It has been proposed to establish 2x 2.5 MTPA Wet type Heavy Media Cyclone type Coal Washery. The heavy media cyclone is an extremely efficient coal cleaning technology. Its a wet separation process comprising of crushing, screening, washing and handling. ROM coal is subjected to crushing & screening to Obtain (-) 50mm size fraction. Feed coal is processed in heavy media cyclone.

1.4.14 Lime Calcination

Active lime is an important auxiliary material in steel making industry. The using of active lime enhances the steel making industry quality and capacity, lower down the loss and cost, and stabilizes the operation.

1.4.15 Brick Manufacturing Plant (10,00,000 Bricks/day)

Raw material for bricks manufacturing are mainly Cement, tailings, fly ash, bed ash & non-magnetic slag dust. These materials are fed to the mixture through weighing and batching system.

1.4.16 Oxygen Plant

Compression of Atmospheric Air By Air Compressor Highly efficient dry-type suction filters are applied for the consuming of free saturated air from the atmosphere into the first stage of the horizontal balanced opposed, lubricated reciprocating air compressor. In the moisture separator from the compressed air the condensed moisture is separated which gets chilled at a temperature of 12° C in a chilling unit & is done prior to its entry into the Molecular Sieve Battery. It slowly becomes oil free when passed through an Oil Absorber before sending the air to Molecular Sieve Battery.

1.5 Water Requirement

- Water required for the proposed project will be **75,334 m³/day**.

- Water required for proposed project (for process and domestic) will be sourced from Kelo river (which is at a distance of 1.40 Km at E direction. from the project site). A dedicated pipeline will be laid from the river to the project site.
- Application has been submitted for Water drawl permission from Water Resources Department (WRD), Govt. of Chhattisgarh.
- Air cooled condensers will be provided to Power plant. The following is the breakup of water requirement.

Table No.11.1.5: Breakup of Water Requirement

S.No.	Unit	Make-up water required (in m ³ /day)	Make-up Waterrequired (in m ³ /Hr.)
1.	IronOreBeneficiationUnit	4,600	192
2.	IronOrePelletizationUnit	1,630	68
3.	Producer gas Plant	1,008	42
4.	CoalWasheryUnit	1,100	46
5.	CokeOven Unit	5,792	241
6.	LimeCalcinationUnit	80	3
7.	SinterUnit	5,400	225
8.	BlastFurnaceUnit	9,500	396
9.	SpongeIronUnit	2,500	104
10.	SMSUnits(IF,EAF,BOF,VD)	8,800	367
11.	RollingMills	14,000	583
12.	SubmergedElectricArcFurnaces	1,060	44
13.	OxygenPlant	240	10
14.	PowerPlant	18,744	781
15.	Brickmanufacturingplant	100	4
16.	Briquettingplant	80	3
17.	Domesticrequirement	700	30
	Total Make-up Water Requirement	75,334	3,139

1.6 Wastewater Generation

- Total wastewater generated from process will be 17,642 KLD, out of which 4,002 KLD will be recycled back into the process, hence net wastewater going for treatment will be **13,640 KLD**.
- Wastewater generated from I/O Beneficiation plant will be sent to Thickener and then to filter press, later dewatered tailing cake will be given to Ceramic industries and Cement plant.
- Wastewater generated from Pellet plant, Sinter Plant, Blast Furnace, SMS Units, Ferro Alloys Unit and Power Plant will be treated in ETP followed by RO plant and then treated

wastewater will be used in Slag granulation, Coke Quenching, dust suppression in CHP, Ash Conditioning, for roll cooling & Greenbelt development.

- Wastewater (Phenolic discharge) generated from Producer Gas plant will be used in After Burning Chamber (ABC) for quenching of DRI kilns.
- Wastewater generated from Rolling mill will be sent to settling tank followed by oil separator and water will be reused for cooling purpose.
- Wastewater generated from Coal washery will be sent to thickener, which will be pumped to Multi Roll Belt Press for reclamation of water. This clearer water will be reused in the process.
- Sanitary wastewater generated from proposed project will be treated in proposed STP and after treatment the treated sewage will be used for greenbelt development.
- Air cooled condenser will be provided in the power plant, which will reduce the water consumption significantly. Hence wastewater generation will be also be minimized.
- RO rejects will be utilised for Flushing in Toilets, Cleaning of Toilets, Floor washings, etc.
- Garland drains will be provided around all the raw material stacking areas.
- During monsoon the treated wastewater will be utilized as makeup water in Rolling Mill. Accordingly, the makeup water for Rolling mill also reduces during the rainy period.
- Zero Liquid Discharge (ZLD) practice will be maintained in the proposed project.

Table No.1.6: BreakupOfWastewater Generation

S.No.	Wastewater generated from	Wastewater generation (in m ³ /day)	Wastewater generation (in m ³ /hr.)	WastewaterManagement
1.	IronOreBeneficiationUnit	4,002 (Recycled into the process)	166	Wastewater generated will be taken to thickener and then to filter press. This water will be reused in the process again.
2.	IronOrePelletisationUnit	576	24	Wastewater generated will be treated in ETP after ensuring compliance with SPCB, it will be utilized for dust suppression, ash conditioning and for green belt development.
3.	Producer Gas	816	34	Will be reused in After Burning Chamber (ABC) for quenching of DRI Kilns
4.	CoalWasheryUnit	816	34	Wastewater generated will be sent to thickener, which will be pumped to Multi Roll Belt Press for reclamation of water. This clearer water will be reused in the process.

5.	CokeOven Unit	---	---	Nil
6.	LimeCalcinationUnit	---	---	Nil
7.	SinterUnit	432	18	Wastewater generated will be treated in ETP after ensuring compliance with SPCB, it will be utilized for dust suppression, ash conditioning and for green belt development.
8.	BlastFurnaceUnit	1,384	58	Wastewater generated will be sent to a settling tank and after treatment it will be partly recycled back into the process and partly used for slag granulation.
9.	DRISponge IronUnit	---	---	Nil
10.	SMSUnits	880	37	Wastewater generated will be treated in ETP and after ensuring compliance with SPCB, it will be utilized for slag granulation, Coke quenching, dust suppression, ash conditioning, and for green belt development.
11.	RollingMills	1000	42	Wastewater generated will be sent to settling tank followed by oil separator and water will be reused for cooling purpose.
12.	Ferro-AlloySAFUnit	72	3	Wastewater generated will be treated in ETP and after ensuring compliance with SPCB, it will be utilized for dust suppression, ash conditioning, and for green belt development.
13.	OxygenPlant	---	---	Nil
14.	PowerPlant	7104	296	Wastewater generated will be treated in ETP and after ensuring compliance with SPCB, it will be utilized for slag granulation, Coke quenching, dust suppression, ash conditioning, and for green belt development.
15.	Brickmanufacturingplant	---	---	Nil
16.	Briquettingplant	---	---	Nil
17.	Sanitary waste water	560	24	Wastewater generated will be treated in STP and after treatment, it will be used for Greenbelt development and for process.
	Total	17,642	736	

Note:

Total waste generation from the process = 17,642 m³/day

Wastewater recycled back to the process = 4,002 m³/day

Net Wastewater going for treatment = 13,640 m³/day



1.7 Wastewater Characteristics

The following are the Characteristics of wastewater.

Table No.1.7: Characteristics of Effluent

PARAMETER	CONCENTRATION			
	Cooling Tower blowdown	DM Plant Regeneration	Boiler Blowdown	Sanitary waste water
pH	7.0 – 8.0	5.0 – 10.0	9.5 – 10.5	7.0 – 8.5
BOD (mg/l)	--	--	--	200 – 250
COD (mg/l)	--	--	--	300 – 400
TDS (mg/l)	1000	5000 – 6000	1000 mg/l	800 – 900
Oil & Grease (mg/l)	--	10	--	5 - 10
TSS (mg/l)	--	--	--	150-200

2.0 DESCRIPTION OF ENVIRONMENT

Base line data has been collected on ambient air quality, water quality, noise levels, flora and fauna and socio-economic details of people within 10 km radius of the plant.

2.1 Ambient air quality

Ambient air quality was monitored for PM_{2.5}, PM₁₀, SO₂, NO_x, CO, O₃, Arsenic, Nickel, Lead, Ammonia, Benzene & BaP at 12 stations including project site during **1st March 2023 to 31st May 2023**. The following are the concentrations of various parameters at the monitoring stations:

Table No.2.1: AAQ Data Summary

S.No.	Parameter	Concentration (in µg/m ³)	Standard as per NAAQS (in µg/m ³)
1.	PM _{2.5}	22.3 to 47.8	60
2.	PM ₁₀	37.2 to 79.7	100
3.	SO ₂	7.3 to 22.5	80
4.	NO _x	8.2 to 34.5	80
5.	CO	361 to 1349	2000
Other Parameters such as O ₃ , Arsenic, Nickel, Lead, Ammonia, Benzene, BaP was found BDL			

2.2 Water Quality

2.2.1 Surface Water Quality

Three samples (60m Upstream and 60m Downstream) from Kelo River and one sample from Gerwani nallah have been collected and analyzed for various parameters. The analysis of samples shows that all the parameters are in accordance with BIS-2296 specifications.

2.2.2 Ground Water Quality

12 Nos. of ground water samples from open wells / bore wells were collected from the nearby villages to assess ground water quality impacts and analyzed for various Physico-Chemical parameters. The analysis of samples shows that all the parameters are in accordance with BIS: 10500 specifications.

2.3 Noise Levels

Noise levels were measured at 12 locations during daytime&Nighttime. The equivalent **day-night** noise levels in the study zone are ranging from **48.05 dBA to 55.37 dBA**.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

3.1 Prediction of impacts on air quality

The likely emissions from the proposed project are PM_{2.5}, PM₁₀, SO₂, NO_x& CO. The predictions of Ground level concentrations have been carried out using Industrial Source Complex (ISC-3) model. Meteorological data such as wind direction, wind speed, max. and min. temperatures collected at the site have been used as input data to run the model.

The predicted max. Incremental PM_{2.5} concentrations (24 hourly) due to the proposed project will be **1.86 µg/M³** at a distance of **1600 m** from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in PM_{2.5} concentration due to the Vehicular emission will be **1.98 µg/m³**.

Hence the total predicted incremental rise in PM_{2.5} concentration due to the emission from proposed project and due the vehicular emissions will be **1.86µg/m³ + 1.98µg/m³ = 3.84 µg/m³**.

The predicted max. Incremental PM₁₀ concentrations (24 hourly) due to the proposed project will be **2.81 µg/M³** at a distance of **1600 m** from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in PM₁₀ concentration due to the Vehicular emission will be **3.31 µg/m³**.

Hence the total predicted incremental rise in PM₁₀ concentration due to the emission from proposed project and due the vehicular emissions will be $2.81 \mu\text{g}/\text{m}^3 + 3.31\mu\text{g}/\text{m}^3 = 6.12 \mu\text{g}/\text{m}^3$.

The predicted max incremental SO₂ concentrations (24 hourly) due to the emissions from operation of proposed project will be $25.52 \mu\text{g}/\text{m}^3$ at a distance of **1300 m** from the stack in the down wind direction over the baseline concentrations.

The predicted max incremental NO₂ concentrations (24 hourly) due to the proposed project will be $13.42 \mu\text{g}/\text{m}^3$ at a distance of **1600 m** from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in NO_x concentration due to the Vehicular emission will be $9.83 \mu\text{g}/\text{m}^3$.

Hence the total predicted incremental rise in NO_x concentration due to the emission from project and due the vehicular emission will be $13.42\mu\text{g}/\text{m}^3 + 9.83 \mu\text{g}/\text{m}^3 = 23.25 \mu\text{g}/\text{m}^3$

The predicted max incremental CO concentrations (24 hourly) due to the proposed project will be $1.18 \mu\text{g}/\text{m}^3$ at a distance of **2025 m** from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in CO concentration due to the Vehicular emissions will be $11.16 \mu\text{g}/\text{m}^3$.

Hence the total predicted incremental rise in CO concentration due to the emission from project and due the vehicular emission will be $1.18\mu\text{g}/\text{m}^3 + 11.16 \mu\text{g}/\text{m}^3 = 12.34 \mu\text{g}/\text{m}^3$

The net resultant concentrations (Maximum baseline conc. + predicted incremental rise in conc.) of PM, SO₂ and NO_x shown in Table No. 4.2.4, by considering the emissions from other industries in the area will be well within the National Ambient Air Quality Standards (NAAQS) when the plant will commence the operation. Hence there will not be any adverse impact on air environment due to the proposed activities.

Table No.3.1: NET RESULTANT MAXIMUM CONCENTRATIONS DURING THE OPERATION OF THE PROPOSED PROJECT (APCS WORKING SCENARIO)

Item	PM _{2.5} (µg/m ³)	PM ₁₀ (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (µg/m ³)
Maximum baseline conc. in the study area	47.80	79.70	22.50	34.50	1349.00
Maximum predicted incremental rise in concentration due to proposed project (Point Sources)	1837.56	2813.47	25.52	13.42	1.18
Maximum predicted incremental rise in concentration due to proposed project (Vehicular emissions)	1.98	3.31	---	9.83	11.16
Net resultant concentrations during operation of the proposed project	1,887.34	2896.48	48.02	57.75	1361.34
National Ambient Air Quality Standards	60	100	80	80	2000

The net resultant Ground level concentrations during operation of the proposed project are within the NAAQS. Hence, there will not be any adverse impact on air environment due to the proposed project.

3.2 Prediction of impacts on Noise quality

The major sources of noise generation in the proposed project will be STG, boilers, compressors, DG set, etc. Acoustic enclosures will be provided to the STG. The ambient noise levels will be within the standards prescribed by MoEF vide notification dated 14-02-2000 under the Noise Pollution (Regulation & Control), Rules 2000 i.e. the noise levels will be less than 75 dBA during day time and less than 70 dBA during night time. **99.07 Ha.** of extensive greenbelt will be developed to further attenuate the noise levels. Hence there will not be any adverse impact due to noise on population in surrounding areas due to the proposed project.

3.3 Prediction of impacts on Water Environment

- Wastewater generated from I/O Beneficiation plant will be sent to Thickener and then to filter press, later dewatered tailing cake will be given to Ceramic industries and Cement plant.
- Wastewater generated from Pellet plant, Sinter Plant, Blast Furnace, SMS Units, Ferro Alloys Unit and Power Plant will be treated in ETP followed by RO plant and then treated

wastewater will be used in Slag granulation, Coke Quenching, dust suppression in CHP, Ash Conditioning, for roll cooling & Greenbelt development.

- Wastewater (Phenolic discharge) generated from Producer Gas plant will be used in After Burning Chamber (ABC) for quenching of DRI kilns.
- Wastewater generated from Rolling mill will be sent to settling tank followed by oil separator and water will be reused for cooling purpose.
- Wastewater generated from Coal washery will be sent to thickener, which will be pumped to Multi Roll Belt Press for reclamation of water. This clearer water will be reused in the process.
- Sanitary wastewater generated from proposed project will be treated in proposed STP and after treatment the treated sewage will be used for greenbelt development.
- Air cooled condenser will be provided in the power plant, which will reduce the water consumption significantly. Hence wastewater generation will be also be minimized.
- RO rejects will be utilised for Flushing in Toilets, Cleaning of Toilets, Floor washings, etc.
- Garland drains will be provided around all the raw material stacking areas.
- During monsoon the treated wastewater will be utilized as makeup water in Rolling Mill. Accordingly, the makeup water for Rolling mill also reduces during the rainy period.
- Zero Liquid Discharge (ZLD) practice will be maintained in the proposed project.

Hence there will not be any adverse impact on environment due to the proposed project.

3.4 Prediction of Impacts on Land Environment

The effluent will be treated to achieve SPCB standards. Zero effluent discharge will be adopted. All the required air pollution control systems will be provided to comply with CPCB / SPCB norms. All solid wastes will be disposed / utilized as per CPCB / SPCB norms. **99.07 Ha.** of extensive greenbelt will be developed as per guidelines. Hence, there will not be any adverse impact on land environment due to the proposed project.

3.5 Socio - Economic Environment

There will be certain upliftment in Socio Economic status of the people in the area & development of the area due to the proposed project. Due to this the economic conditions, the educational and medical standards of the people living in the study area will certainly

move upwards which will result in overall economic development, improvement in general aesthetic environment and increase in business opportunities.

4.0 ENVIRONMENTAL MONITORING PROGRAMME

Post project monitoring will be conducted as per the guidelines of SPCB and MoEF&CC are tabulated below:

TABLE NO.4.1: MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

S.No.	Particulars	Frequency of Monitoring	Duration of sampling	Parameters required to be monitored
1. Water & Wastewater quality				
A.	Water quality in the area	Once in a month except for heavy metals which will be monitored on quarterly basis	Grab sampling	As per IS: 10500
B.	Effluent at the outlet of the ETP	Once in a month	Composite sampling (24 hourly)	As per EPA Rules, 1996
C.	STP Inlet & Outlet	Once in a month	Composite sampling (24 hourly)	As per EPA Rules 1996
2. Air Quality				
A.	Stack Monitoring	Online monitors (all stacks)	Continuous	PM, SO ₂ , NO _x & CO
		Quarterly Once	----	PM, SO ₂ , NO _x & CO
B.	Ambient Air quality (CAAQMS)	Continuous	Continuous	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x CO & O ₃
		Quarterly Once	24 hours	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x CO & O ₃
C.	Fugitive emissions	Quarterly Once	8 hours	PM
3. Meteorological Data				
A.	Meteorological data to be monitored at the plant.	Daily	Continuous monitoring	Temperature, Relative Humidity, rainfall, wind direction & wind speed.
4. Noise level monitoring				
A.	Ambient Noise levels	Once in a month (hourly)	Continuous for 24 hours with 1 hour interval	Noise levels
5. Soil Quality monitoring				
A.	Soil Quality	Half yearly once	Core drilling sample	pH, SAR, texture, N,P,K, etc.

5.0 ADDITIONAL STUDIES

No Rehabilitation and Resettlement is involved in the proposed project as there are no habitations in the project site.

6.0 PROJECT BENEFITS

With the establishment of the proposed project employment potential will increase. Land prices in the area will increase. The economic status of the people in the area will improve due to the proposed project. Periodic medical checkups will be carried out. Top priority will be given to locals in employment.

The proposed project creates direct employment to about 5,000 persons (skilled, semiskilled & unskilled) and indirect employment of about 7500 persons.

As per MoEF&CC Office Memorandum vide F.No.22-65/2017-IA.III dt. 30th September 2020, the budgetary allocation for commitment made by Project Proponent to address the concern raised during public hearing & based on Social Impact Assessment (SIA). Hence A separate budget will be allocated for Social welfare measures after completion of Public Hearing

7.0 ENVIRONMENT MANAGEMENT PLAN

7.1 Air Environment

The following are air emission control systems proposed in the proposed project:

Table No.7.1: Air Emission Control Systems Proposed

S.No.	Source	Control Equipment	Air Emission at Outlet
1.	Iron ore Beneficiation	Bag filters	PM < 30mg/Nm ³
2.	Pellet Plant	Electro Static Precipitators (ESP)	PM < 30mg/Nm ³
3.	DRI kilns with WHRB	Electro Static Precipitators (ESP)	PM < 30mg/Nm ³
4.	Induction Furnace with LRF, BOF, AOD & VOD converters	Fume Extraction system with bagFilters	PM < 30mg/Nm ³
5.	Electric Arc Furnaces	4 th Hole Fume Extraction system with bagFilters	PM < 30mg/Nm ³
6.	Submerged Electric Arc Furnaces	4 th Hole Fume Extraction system with bag filters	PM < 30mg/Nm ³
7.	Re-heatingfurnacesattached to Rolling Mills	Stack	PM < 30mg/Nm ³
8.	Coke Oven Plant	Electro Static Precipitator (ESP)	PM < 30mg/Nm ³

S.No.	Source	Control Equipment	Air Emission at Outlet
9.	Sinter Plant	Electro Static Precipitators (ESP), Sinter cooler heat recovery	PM < 30mg/Nm ³
10.	Blast Furnaces	Gas Cleaning Plant (dry type) Stove waste heat Recovery to preheat the Blast air is included.	PM < 5mg/Nm ³
11.	Blast Furnace (Stock house)	Stock House dedusting System with Bag House	PM < 30mg/Nm ³
12.	Blast Furnace (Cast house)	Dust Extraction system with bag filters	PM < 30mg/Nm ³
13.	Lime calcining plant	DustExtractionssystemwithBagfilters	PM < 30mg/Nm ³
14.	Coal washery	Fume Extraction system with bagFilters	PM < 30mg/Nm ³
15.	CFBC Boilers	Electro Static Precipitators	PM < 30mg/Nm ³
		Automatic Lime dosing system	SOx < 100mg/Nm ³
		Combustion temperature will be around 800-850 ⁰ C, which is not conducive for thermal NOx formation. Low NOx burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided.	NOx < 100 mg/Nm ³

Apart from the above the following air emission control systems/ measures are proposed in the Plant:

- All conveyors will be completely covered with G.I. sheets to control fugitive dust.
- All bins will be totally packed and covered so that there will not be any chance for dust leakage.
- All the dust prone points material handling systems will be connected with de-dusting system with bag filters.
- All discharge points and feed points, wherever the possibility of dust generation is there a de-dusting suction point will be provided to collect the dust.

7.2 Water Environment

- Wastewater generated from I/O Beneficiation plant will be sent to Thickener and then to filter press, later dewatered tailing cake will be given to Ceramic industries and Cement plant.
- Wastewater generated from Pellet plant, Sinter Plant, Blast Furnace, SMS Units, Ferro Alloys Unit and Power Plant will be treated in ETP followed by RO plant and then treated

wastewater will be used in Slag granulation, Coke Quenching, dust suppression in CHP, Ash Conditioning, for roll cooling & Greenbelt development.

- Wastewater (Phenolic discharge) generated from Producer Gas plant will be used in After Burning Chamber (ABC) for quenching of DRI kilns.
- Wastewater generated from Rolling mill will be sent to settling tank followed by oil separator and water will be reused for cooling purpose.
- Wastewater generated from Coal washery will be sent to thickener, which will be pumped to Multi Roll Belt Press for reclamation of water. This clearer water will be reused in the process.
- Sanitary wastewater generated from proposed project will be treated in proposed STP and after treatment the treated sewage will be used for greenbelt development.
- Air cooled condenser will be provided in the power plant, which will reduce the water consumption significantly. Hence wastewater generation will be also be minimized.
- RO rejects will be utilised for Flushing in Toilets, Cleaning of Toilets, Floor washings, etc.
- Garland drains will be provided around all the raw material stacking areas.
- During monsoon the treated wastewater will be utilized as makeup water in Rolling Mill. Accordingly, the makeup water for Rolling mill also reduces during the rainy period.
- Zero Liquid Discharge (ZLD) practice will be maintained in the proposed project.

TREATED EFFLUENT DISPOSAL

Effluent quantity recycled to I/O beneficiation process	4002 KLD
Effluent quantity utilized in ABC chamber of DRI kilns	816 KLD
Effluent quantity recycled back to coal washery process	816 KLD
Effluent quantity to be used for slag granulation	450 KLD
Effluent quantity to be reused to Blast Furnace	934 KLD
Effluent quantity to be used for ash conditioning	2832 KLD
Effluent to be used for dust suppression in CHP	4464 KLD
RO reject used for floor washing toilet cleaning and flushing	2208 KLD
Effluent to be used for Greenbelt development	2472 KLD

99.07 Ha. of greenbelt will be developed within the plant premises by using the treated effluent. A dedicated pipe distribution network will be provided for using the treated effluent for greenbelt development.

7.3 Noise Environment

The major sources of noise generation in the proposed project will be STG, boilers, compressors, DG set, etc. Acoustic enclosure will be provided. All the machinery will be manufactured in accordance with MoEF&CC norms on Noise levels. The employees working near the noise generating sources will be provided with earplugs. The extensive greenbelt development proposed within the plant premises will help in attenuating the noise levels further. Noise barriers in the form of trees are recommended to be grown around administrative block and other utility units.

7.4 Land Environment

The wastewater generated from the proposed project will be treated in the Effluent Treatment Plant to comply with the SPCB standards and will be used for dust suppression, ash conditioning and for greenbelt development. All the required Air emission control systems will be installed and operated to comply with SPCB norms. Solid wastes will be disposed off as per norms. Extensive greenbelt will be developed in the plant premises. Desirable beautification and landscaping practices will be followed. Hence there will not be any impact due to the proposed project.

Table No.7.2: Solid Waste Generation and Disposal

S.No.	Waste/Byproduct	Quantity (TPA)	Proposed method of disposal
1.	Tailings from I/O Beneficiation	13,00,000	Tailings will be taken to Thickener and then to filter press for dewatering. Dewatered cake of tailing will be given to cement plants. Other uses will also be explored.
2.	Ash/dust from Pellet plant	76,000	Will be utilized in the proposed Brick Manufacturing Unit within the premises.
3.	Ash from PGP	1,22,500	Will be utilized in the proposed Brick Manufacturing Unit within the premises.
4.	Tar from PGP	5,600	Will be utilized in proposed pellet plant
5.	Ash from DRI	1,42,560	Will be utilized in the proposed Brick Manufacturing Unit within the premises.
6.	Dolochar from DRI	1,58,400	Will be used in proposed CFBC power plant as fuel.
7.	Kiln Accretion Slag	9,476	Will be utilized in the proposed Brick Manufacturing Unit within the premises.
8.	Wet scrapper Sludge	57,231	Will be utilized in the proposed Brick Manufacturing Plant
9.	Ash from Power Plant	10,67,000	Will be utilized in the proposed Brick Manufacturing Unit within the premises.
10.	Bed material from Power Plant	4,50,000	Will be utilized in the proposed Brick Manufacturing Unit within the premises.

S.No.	Waste/Byproduct	Quantity (TPA)	Proposed method of disposal
11.	SMS Slag (EAF)	1,05,600	Slag from IF will be crushed and iron will be recovered & then remaining non-magnetic material being inert by nature will be utilized in the proposed Brick Manufacturing Plant
12.	SMS Slag (BOF)	2,64,000	Slag from BOF will be crushed and iron will be recovered & then remaining non-magnetic material being inert by nature will be utilized in the proposed Brick Manufacturing Plant.
13.	Dust from SMS	1,20,000	Will be utilized in the proposed Sinter Plant.
14.	End Cuttings from Rolling Mill	80,000	Will be reused in the SMS
15.	Mill scales from Rolling Mill	1,20,000	Will be reused in the sinter plant
16.	Miss Roll from Rolling Mill	40,000	To be sold to local market
17.	Slag from BlastFurnace	14,10,000	Will be given to Cement Plants
18.	Dust from Blast Furnace	2,40,000	Will be reused in the Sinter Plant
19.	Dust from Coke Oven Plant	1,12,500	Will be reused in the Sinter Plant
20.	Fines from Sinter Plant	9,44,000	Will be reused in the Sinter Plant
21.	Rejects from Coal washery	1,25,000	Will be used in the proposed FBC Power plant.
22.	Slag from FeMn	5,36,760	Will be reused in manufacture of SiMn as it contains high SiO ₂ and Silicon.
	Slag from SiMn	3,06,720	Will be given to Road Contractor for Road laying / will be given to slag cement manufacturer
	Slag from FeCr	2,87,550	Will be processed in jigging plant for Chrome recovery. After Chrome recovery, the left-over slag will be analysed for Chrome content through TCLP test, if the Chrome content in the slag is within the permissible limits, then it Will be given to Road Contractor for Road laying /brick manufacturing. If Chrome content exceeds the permissible limits, it will be sent to nearest TSDF.
	Slag from FeSi	2,08,74	Will be given to Cast Iron foundries
23.	Slag dust from Slag Recycling Plant	3,52,625	Will be utilized in the proposed Brick Manufacturing Unit

7.5 Greenbelt Development

- **99.07 Ha.** (33% of total land) of land is earmarked for Greenbelt development in the proposed project.
- Total of 2,49,000 nos. (@2500 nos. per Ha.) of plant will be planted in the proposed project.

- Greenbelt of width ranging from 21 m to 102 m will be maintained all around the peripheral boundary of the project site.
- Shivpuri village is adjacent to the project site, hence a greenbelt of width ranging from 40 m to 92 m will be maintained towards the Shivpuri Village in all directions.
- Taraimal RF is adjacent to the project site in the North direction, hence a greenbelt of width 70 m will be maintained towards Taraimal RF.
- The tree species to be selected for the plantation are pollutant tolerant, fast growing, wind firm, deep rooted. A three-tier plantation is proposed comprising of an outer most belt of taller trees which will act as barrier, middle core acting as air cleaner and the innermost core which may be termed as absorptive layer consisting of trees which are known to be particularly tolerant to pollutants.
- Local DFO will be consulted in developing the green belt.
- Letter has been issued DFO, Raigarh vide letter no. Tech./12/2023 dt. 03.01.2024 stating distance of Forest surrounding the Project site and confirming that no Forest land is involved in the project site.
- Total no. of plants will be 2,49,000 nos. The following will be the greenbelt development plan.

S.No.	No. of Years	No. of plant to be planted
1.	1 st Year	62500
2.	2 nd Year	49800
3.	3 rd Year	37100
4.	4 th Year	24900
5.	5 th Year	24900
6.	6 th Year	24900
7.	7 th Year	24900
	Total	249000

7.6 Cost for Environment Protection

Capital Cost for Environment Protection for proposed plant : Rs. 506.6 Crores

Recurring Cost per annum for Environmental protection : Rs. 80.0 Crores/annum

7.7 Implementation of CREP Recommendations

All the CREP recommendations will be implemented & followed strictly.

- Continuous stack monitoring system is proposed for stack attached to all the Stacks.

- Online Ambient Air Quality Monitoring Stations will be established in consultation with SPCB during operation of the plant.
- Fugitive emission monitoring will be carried out as per CPCB norms.
- Energy meters will be installed for all the pollution control systems.
 - Rain water harvesting pits will be constructed in consultation with CGWB.