SKY STEEL AND POWER PVT. LTD.

at

Kesda Village, Simga Tehsil, Balodabazar District, Chhattisgarh

For establishment of

[Establishment of Iron ore beneficiation plant (Benegiciated iron ore – 1.3 MTPA), Pellet plant (Pellets - 1.0 MTPA), DRI Kilns (Sponge iron - 3,30,000 TPA), Induction Furnace with LRF & CCM (Hot Billets / MS Billets / Ingots - 2,64,000 TPA), Rolling Mill (Rolled products - 2,97,000 TPA), Submerged Eletric Arc Furances (FeSi – 17,955 TPA / FeMn- 45,144 TPA / SiMn-23,940 TPA / FeCr-26,600 TPA), WHRB based Power Plant – 22 MW, CFBC based Power Plant - 16 MW & Brick Manufacturing unit (56,000 Bricks/day)].

Pre-Feasibility Report

for

Environmental Clearance

Submitted to

Ministry of Environment, Forests & Climate Change, New Delhi

Prepared by

PIONEER ENVIRO
LABORATORIES & CONSULTANTS PVT. LTD.

Accredited by NABET

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Chapter –1:EXECUTIVE SUMMARY

1.1 SALIENT FEATURES OF THE PROJECT

Sky Steel and Power Private Limited is proposed to establish a Steel Plant at Khasra Nos. in Khasra Nos. 219, 220/1, 220/2, 221, 222/1, 222/2, 223, 225, 296, 297, 298/1, 298/2, 299, 300, 305/1, 305/2, 306, 307 , 308, 316, 317, 318, 319, 322/2, 326/2, 328/2, 334, 335, 346, 347, 1713, 1718, 1719, 1720, 1721, 1722, 1725, 1726, 1727, 1728, 1748, 1749 & 268/1760 at Kesda Village, Simga Tehsil, Balodabazar District, Chhattisgarh. Following is Plant configuration and Production Capacity:

Table No. 1.1 :Plant configuration and production capacity

S.No.	Units (Products)		Plant Configuration	Production Capacity
1.	Iron ore Beneficiation (Beneficiated ore)		1 x 1.3 MTPA	1.3 MTPA (throughput)
2.	Pellet Plant (Pellet)		1 x 1.0 MTPA	1.0 MTPA
3.	DRI Kilns (Sponge Iron)		2 x 350 TPD 3 x 100 TPD	3,30,000 TPA
4.	Induction Furnace (Billets / Ingots / Hot Billets)		4 x 20 T	2,64,000 TPA
5.	Rolling Mill (Rolled products) (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO as fuel)		3 x 300 TPD	2,97,000 TPA
6.	Ferro Alloys Unit (FeSi / FeMn / SiMn / FeCr)		3 x 6 MVA	FeSi – 17,955 TPA / FeMn-45,144 TPA / SiMn-23,940 TPA / FeCr-26,600 TPA
7.	Brick Manufacturing Unit		56000 Brick/ day	1,84,80,000 Bricks/ Annum
8.	Power Plant (38 MW)	WHRB Power Plant (2 x 36 TPH & 3 X 9 TPH)	2 x 8 MW 3 x 2 MW	22 MW
		CFBC Power Plant (1 X 72 TPH)	1 x 16 MW	16 MW

Total land identified for the proposed project is **24.88 Ha. (61.48 Acres).** The land earmarked for the proposed project is agriculture land. The management have already entered into agreement with land owners for the entire land .

MoU has been entered between Govt. of Chhattisgarh & M/s. Sky Steel and Power Private Limited for establishment Steel plant and accordingly State Investment Promotion Board (SIPB), Govt. of Chhattisgarh has confirmed vide letter dt.22/03/2021, to facilitate expeditious grant of approvals for

proposed Steel plant at the Kesda Village, Simga Tehsil, Balodabazar District, Chhattisgarh. Same is enclosed as Annexure – 2

Estimated Project Cost for the proposed project is **Rs. 494 Crores.**

Water required for proposed project (for process and domestic) is **2697 KLD** & will be sourced from Shivanath river. Permission will be obtained from Water Resources Department, Government of Chhattisgarh.

Power required for the proposed project will be about 62.0 MW and same will be sourced from 38 MW Captive power Plant & remaining 24.0 MW from State Grid.

1.2 PROJECT PROPONENT

M/s. Sky Steel & Power Private Limited has been promoted by well established entrepreneur belonging to Raipur and is already having experience for installation/running of steel sector industry.

The company has been promoted by Directors Ravi Singhal and Sumit Kumar Agrawal proficient in their respective fields.

M/s. Sky Steel & Power Private Limited was incorporated in the year 2020 with the Registrar of Companies, Chhattisgarh having its registered office at, House No. 16, Opp. Chhattisgarh Gramin Bank, Recreation Road, Choubey Colony, Raipur CT, with an object to be a hall-mark of excellence in the steel-making scenario of India.

Now, the promoters' of the company have envisaged by setting up of Steel Plant.

Chapter – 2: INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

M/s. Sky Steel & Power Private Limited is a Private incorporated on 27 November 2020. It is classified as Non-govt company and is registered at Registrar of Companies, Chhattisgarh. Its authorized share capital is Rs. 1,500,000 and its paid up capital is Rs. 100,000. It is inolved in Manufacture of other fabricated metal products; metal working service activities. Directors of Sky Steel & Power Private Limited are Ravi Singhal and Sumit Kumar Agrawal.

M/s. Sky Steel & Power Private Limited's Corporate Identification Number is (CIN) U28999CT2020PTC010985 and its registration number is 10985. Its Email address is sspl.ryp@gmail.com and its registered address is House No. 16, Opp. Chhattisgarh Gramin Bank, Recreation Road, Choubey Colony, Raipur, Chhattisgarh.

2.2 BRIEF DESCRIPTION OF THE NATURE OF THE PROJECT

It is proposed to setup a Steel Plant with the following facilities:

- Estabishment of 1.3 MTPA Iron Ore beneficiation plant to manufacuture Beneficiated ore
- Establishment of 1.0 MTPA Pellet Plant to manufacture Pellets.
- Establishment of 2 x 350 TPD and 3 x 100 TPD DRI Kilns to manufacture 3,30,000 TPA of Sponge Iron.
- Establishment of 4 x 20 T of Induction Furnaces to manufacture 2,64,000 TPA of Billets / Ingots / Hot Billets.
- Establishment of 3 x 300 TPD of Rolling Mill to manufacture 2,97,000 TPA of Rolled products (85 % Hot charging with Hot Billets and remaining 15% through RHF with Gasifieras fuel).
- Establishment of Submerged Eletric Arc Furances by installing 3 x 6 MVA to manufacture FeSi – 17,955 TPA / FeMn-45,144 TPA / SiMn-23,940 TPA / FeCr-26,600 TPA.
- Establishment of Brick manufacturing unit to manufacture 55,000 Brick/Day.
- Estblishment of 2 x 36 TPH & 3 x 9 TPH Waste Heat Recovery Boilers to produce 22 MW Electricity.
- Establishment of 1 x 72 TPH Circulating Fluidized Bed Combustion (CFBC) Boiler to produce 16 MW Electricity.

2.3 NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY AND OR REGION

Steel is a basic commodity for economic growth of any country and the per capita consumption is a measure of prosperity of a country. The per capita steel consumption has risen from 38 kg in 2005-06 to 61 kg in 2017-18, compared to global average of 208 kg. The per capita steel consumption in rural sector is only 10 kg. The crude steel production capacity had increased from 22 million tons per annum (MTPA) in 1991-92 to 91 MTPA in 2015-16 (installed capacity is 122 MTPA) and 101 MTPA in 2016-17.The Indian steel industry is ranked 3rdin the world and has tremendous potential for growth. The government of India has set pragmatic target of achieving per capita steel consumption of 160kgs by 2030-31 requiring acrude steel production of 255MT and capacity of 300MT.

The proposed project will bridge the demand supply gap of steel in the country. The project will add revenue to the Government by way of direct and indirect taxes.

Importance of the Project to the Region: The project will contribute to government treasury by way of direct and indirect taxes. The project will employ direct employment of 350 persons during operation stage & indirect employment of 500 persons.. The local persons will be given preference in employment as per the qualification and technical competencies.

Considering the recent trend in production and consumption of steel globally and in India, the National Steel Policy, 2005 had projected 110 MTPA steelmaking capacity in India by 2019-2020 at 7.3% growth rate. It was noted subsequently in year 2006-07 that domestic production grew at 10.9% and domestic consumption by 11%. Ministry of Steel has revised the goal and projected a capacity of 180 MTPA by 2019-20. This creates huge opportunity for investment in steel industry with high returns.

2.4 DEMAND/SUPPLY GAP

As per the National Steel Policy (NSP) 2017, in order to achieve expected demand of 200MT and per capita consumption of 160 kg of finished steel by 2030-31, steel demand would need togrow at a CAGR of around 7-7.5% during the period against a CAGR of 3.5% ~ 4% over the last 5years. This would mean that capacity additions planned by most of the major players need tocome on stream in next few years.

As per NSP 2017, it is aimed to domestically produce value added steel special steel and alloysand focuses on palletization based on BF / DR-IF/EAF technology.

Major factors which carry the potential of raising the per capita steel consumption in thecountry are listed below:

a) Infrastructure improvement initiatives, such as “Smart Cities project”, “Housing for all by 2022”, “Atal Mission for Rejuvenation and urban Transformation (AMRUT)”,
b) Manufacturing growth driven by Make-in-India initiate,
c) Encouraging use of Made in India steel for various projects and levying of anti-dumping duties on certain steel products from Brazil, Russia, China, Korea, Japan and Indonesia,Imports & Indigenous Production.
d) National Mineral Development Corporation expected to increase the iron ore production favoring steel production and
e) Emergence of the rural market for steel buoyed by projects like MGNREGS, development of Urban Clusters under the Shyama Prasad Mukherjee Urban Mission, Pradhan MantriGram Sadak Yojana among others.

2.5 IMPORT VS INDIGENOUS PRODUCTION

Proposed steel plant will meet the Indigenous demand of quality steel and reduce the import requirement of steel.

2.6 EXPORT POSSIBILITY

India has enormous potential and necessary resources, capabilities to become a global supplier of quality steel. Also, there exists ample market opportunities in the neighboring regions of Asia, Africa and the Middle East. The policy framework while according top priority to meet domestic demand should also take into account the large export possibilities.

2.7 DOMESTIC/ EXPORT MARKETS

While the demand for steel will continue to grow in traditional sectors such as infrastructure, construction, housing automotive, steel tubes and pipes, consumer durables, packaging, and ground transportation, specialized steel will be increasingly used in hi-tech engineering industries such as power generation, petrochemicals, fertilizers, etc. The new airports and railway metro projects will require a large amount of steel. Hence the domestic and export markets for steel sector will rise.

2.6 EMPLOYMENT GENERATION (DIRECT AND INDIRECT) DUE TO THE PROJECT

The local areas will be benefited by way of generation of employment opportunities, increased demand for local products and services. There will be an overall improvement in the income level of the local people.

The proposed project will generate direct employment **350 nos.** which will be employed officials, staff, skilled, semi -skilled labour & **500 nos.** indirectly employed in contract works & transport.

Top priority will be given to locals for Semi-Skilled and Unskilled jobs. With the development of this Plant there will be lot of scope for more ancillary development, which in turn will benefit the nation.

Chapter – 3 : PROJECT DESCRIPTION

3.1 TYPE OF PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS

3.1.1. TYPE OF THE PROJECT

It is proposed to setup a Steel Plant with the following facilities:

- Estabishment of 1.3 MTPA Iron Ore beneficiation plant to manufacuture Beneficiated ore
- Establishment of 1.0 MTPA Pellet Plant to manufacture Pellets.
- Establishment of 2 x 350 TPD and 3 x 100 TPD DRI Kilns to manufacture 3,30,000 TPA of Sponge Iron.
- Establishment of 4 x 20 T of Induction Furnaces to manufacture 2,64,000 TPA of Billets / Ingots / Hot Billets.
- Establishment of 3 x 300 TPD of Rolling Mill to manufacture 2,97,000 TPA of Rolled products (85 % Hot charging with Hot Billets and remaining 15% through RHF with Gasifieras fuel).
- Establishment of Submerged Eletric Arc Furances by installing 3 x 6 MVA to manufacture FeSi – 17,955 TPA / FeMn-45,144 TPA / SiMn-23,940 TPA / FeCr-26,600 TPA.
- Establishment of Brick manufacturing unit to manufacture 55,000 Brick/Day.
- Estblishment of 2 x 36 TPH & 3 x 9 TPH Waste Heat Recovery Boilers to produce 22 MW Electricity.
- Establishment of 1 x 72 TPH Circulating Fluidized Bed Combustion (CFBC) Boiler to produce 16 MW Electricity.

Ministry of Environment, Forest & Climate Change (MoEF&CC) has made prior Environmental Clearance (EC) for certain developmental projects mandatory through its notification issued on 14thSeptember 2006 and its subsequent amendments.

As per the EIA notification dated 14thSeptember, 2006 & its subsequent amendments, all Primary metallurgical processing industries are listed under S.No. 3(a), under Category 'A'.

3.1.2. INTERLINKED PROJECT

No interlinked project is envisaged.

3.2 LOCATION OF THE PROJECT

The proposed project site is located at Kesda Village, Simga Tehsil, Balodabazar District, Chhattisgarh. Total land envisaged for the proposed project is **24.88 Ha. (61.48 Acres).** Khasra Nos. of total land are

219, 220/1, 220/2, 221, 222/1, 222/2, 223, 225, 296, 297, 298/1, 298/2, 299, 300, 305/1, 305/2, 306, 307 , 308, 316, 317, 318, 319, 322/2, 326/2, 328/2, 334, 335, 346, 347, 1713, 1718, 1719, 1720, 1721, 1722, 1725, 1726, 1727, 1728, 1748, 1749, 268/1760. The project site falls in Survey of India Topo sheet no. 64 G / 14.

Table No. 3.1 :Coordinates of the project site

S.No.	Point	Coordinates
1.	Point # 1	21°37'43.14"N, 81°47'45.77"E
2.	Point # 2	21°37'43.67"N, 81°47'44.38"E
3.	Point # 3	21°37'41.22"N, 81°47'43.23"E
4.	Point # 4	21°37'41.83"N, 81°47'40.36"E
5.	Point # 5	21°37'39.81"N, 81°47'39.25"E
6.	Point # 6	21°37'37.82"N, 81°47'42.37"E
7.	Point # 7	21°37'26.96"N, 81°47'40.24"E
8.	Point # 8	21°37'20.27"N, 81°47'40.81"E
9.	Point # 9	21°37'20.74"N, 81°47'38.28"E
10.	Point #10	21°37'15.50"N, 81°47'34.84"E
11.	Point # 11	21°37'19.12"N, 81°47'31.10"E
12.	Point # 12	21°37'20.06"N, 81°47'28.29"E
13.	Point # 13	21°37'18.04"N, 81°47'28.69"E
14.	Point # 14	21°37'17.26"N, 81°47'32.38"E
15.	Point # 15	21°37'13.49"N, 81°47'31.90"E
16.	Point # 16	21°37'05.83"N, 81°47'45.98"E
17.	Point # 17	21°37'05.06"N, 81°47'47.02"E
18.	Point # 18	21°37'17.04"N, 81°47'44.79"E
19.	Point # 19	21°37'20.16"N, 81°47'47.65"E
20.	Point # 20	21°37'25.21"N, 81°47'45.44"E
21.	Point # 21	21°37'38.31"N, 81°47'46.53"E
22.	Point # 22	21°37'41.07"N, 81°47'44.54"E
23.	Point # 23	21°37'41.31"N, 81°47'45.31"E
24.	Point # 24	21°37'42.81"N, 81°47'45.73"E

Figure : 3.1 – General Location of Project Site

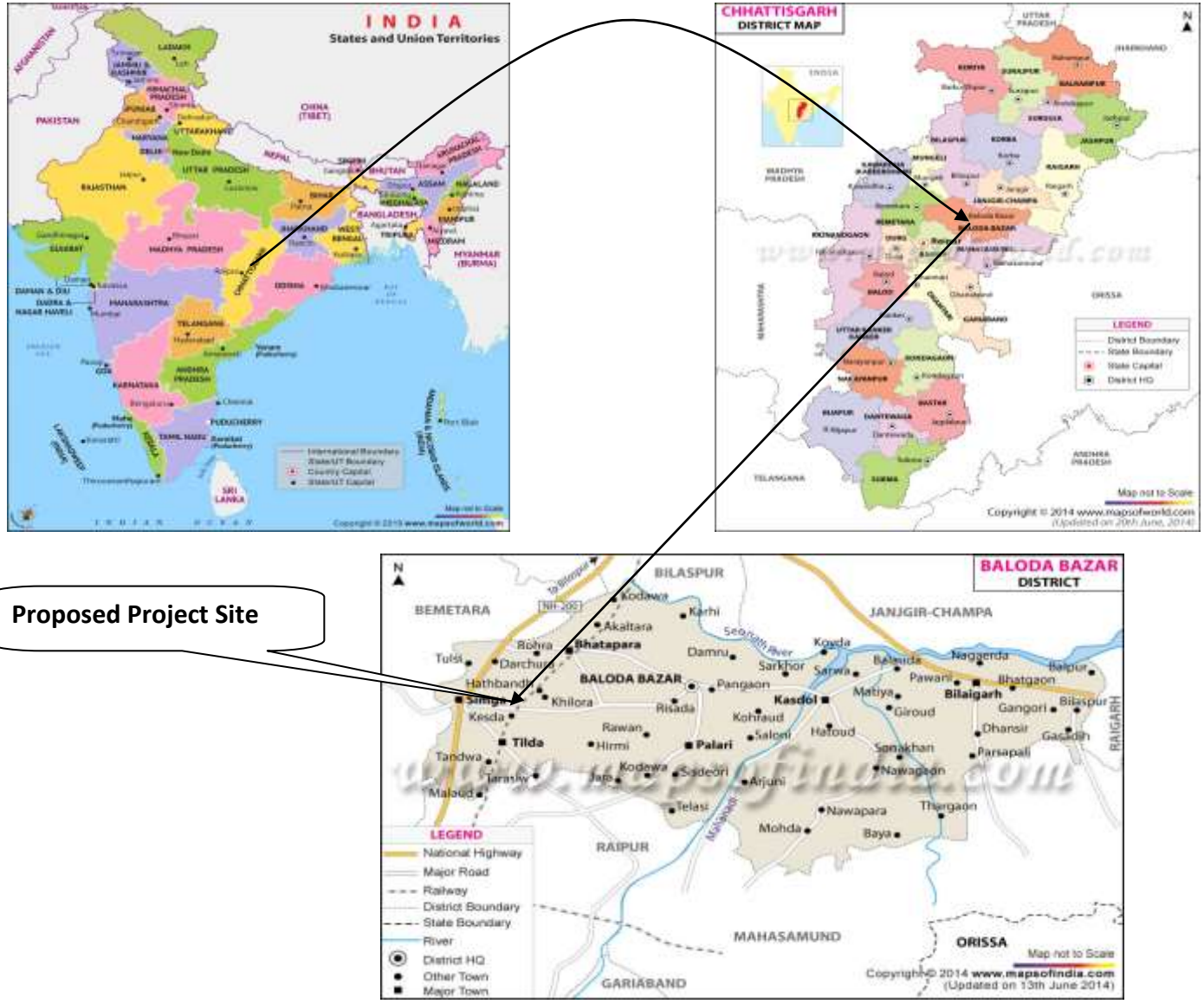
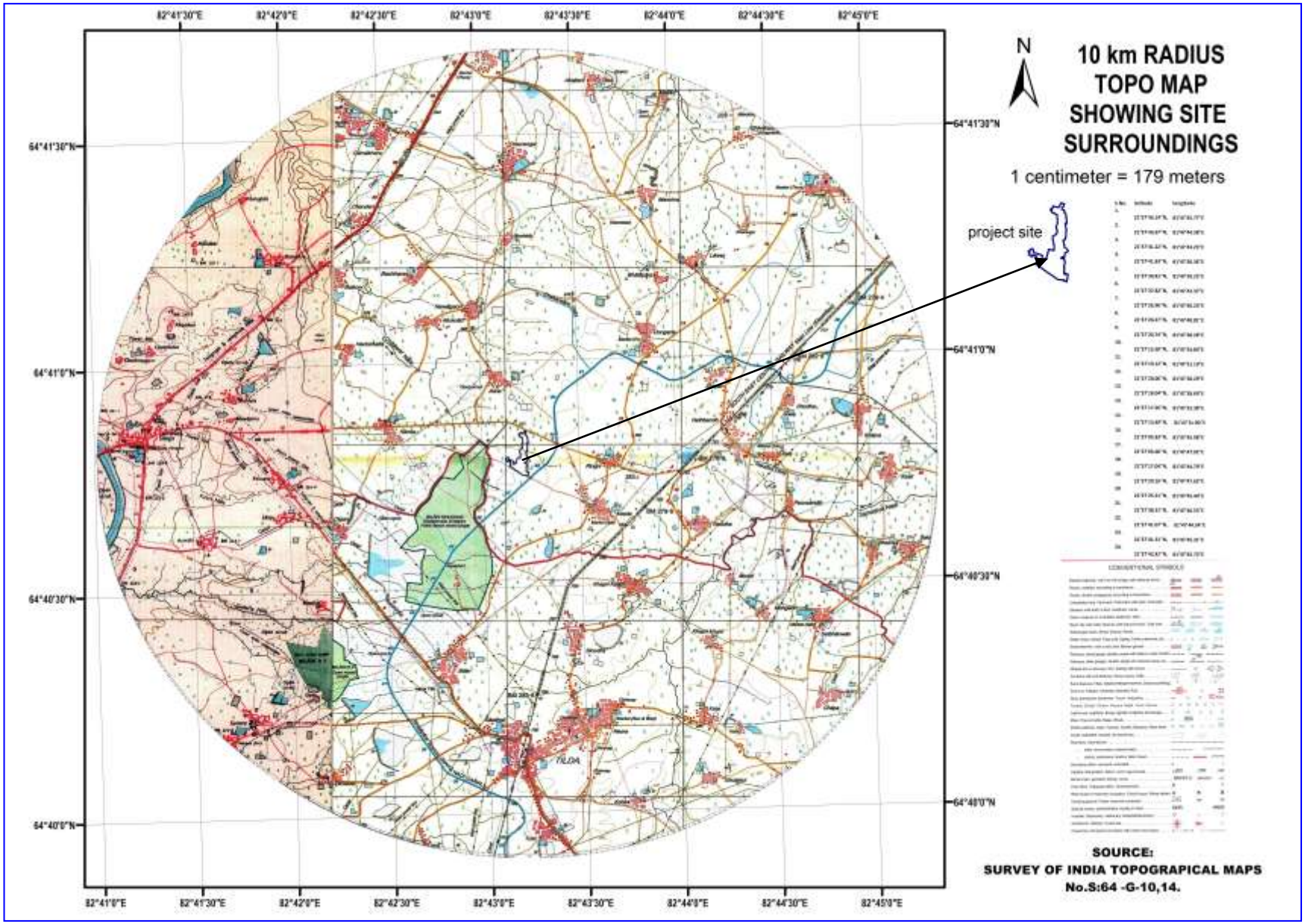


Figure : 3.2

Topo map (10 Kms.)



3.3 DETAILS OF THE ALTERNATE SITES

3 nos. of sites have been considered for the present proposal and following is analysis of the considered site.

Table No. 3.2 : Details of Alternate Site

S.No.	Parameters	SITE # 1	SITE # 2	SITE # 3
1.	Location of the Site	Karamal (V), Berla (T) Bemetara (D)	Amaldiha (V), Kasdol (T) Balodabazar (D)	Kesda (V), Simga (T) Balodabazar (D)
2.	Extent of land identified	27.7 Ha.	26.9 Ha.	24.88 Ha.
3.	Geographical Coordinates	21°32'35.04"N 81°28'13.76"E	21°34'57.71"N 82°21'29.68"E	21°37'17.39"N; 81°47'41.61"E
4.	Type of Land (Present land use)	Agriculture Land	Agricultural Land	Agricultural Land
5.	Areas falling under the critically polluted areas (within 10 Kms. Radius)	Nil	Nil	Nil
6.	National Parks / Wild life Sanctuaries / Bird Sanctuaries / Tiger reserve / Elephant corridors / Migratory routes for Birds (within 10 Kms. of the project site)	None within 10 Kms. radius	None within 10 Kms. radius	None within 10 Kms. radius
7.	Forests	Nil	Bharka R.F (0.4 Kms.)	Bilari Ghughua RF - 0.35 kms. Bilari RF – 6.2 Kms
8.	Water Bodies	Shivnath River (5.4 Kms) Canal -adjacent	Mahanadhi River (0.45Kms)	Mahanadhi bhatapara Canal - 0.15 km) Seasonal Nala is Passing through the site

S.No.	Parameters	SITE # 1	SITE # 2	SITE # 3
		Water pond - adjacent	Canal -adjacent Water pond – 0.24 Kms	
9.	Distance of nearest Habitation	Karamal Village (0.28 Km.)	Amaldiha Village (0.27 Kms.)	Kesda Village (1.25 Kms.)
10.	Road Connectivity	NH # 30 (17.6 Kms.)	SH # 200 (6.5 Kms.)	NH # 130 – 6.5 Kms.
11.	Rail Connectivity	Mandhar RS (29.0 Kms.)	Batapara RS (45.0 Kms.)	Hathband RS (5.2 Kms.)

Based on the above, **Site # 3** at Kesda Village, Simga Tehsil is selected for proposed project.

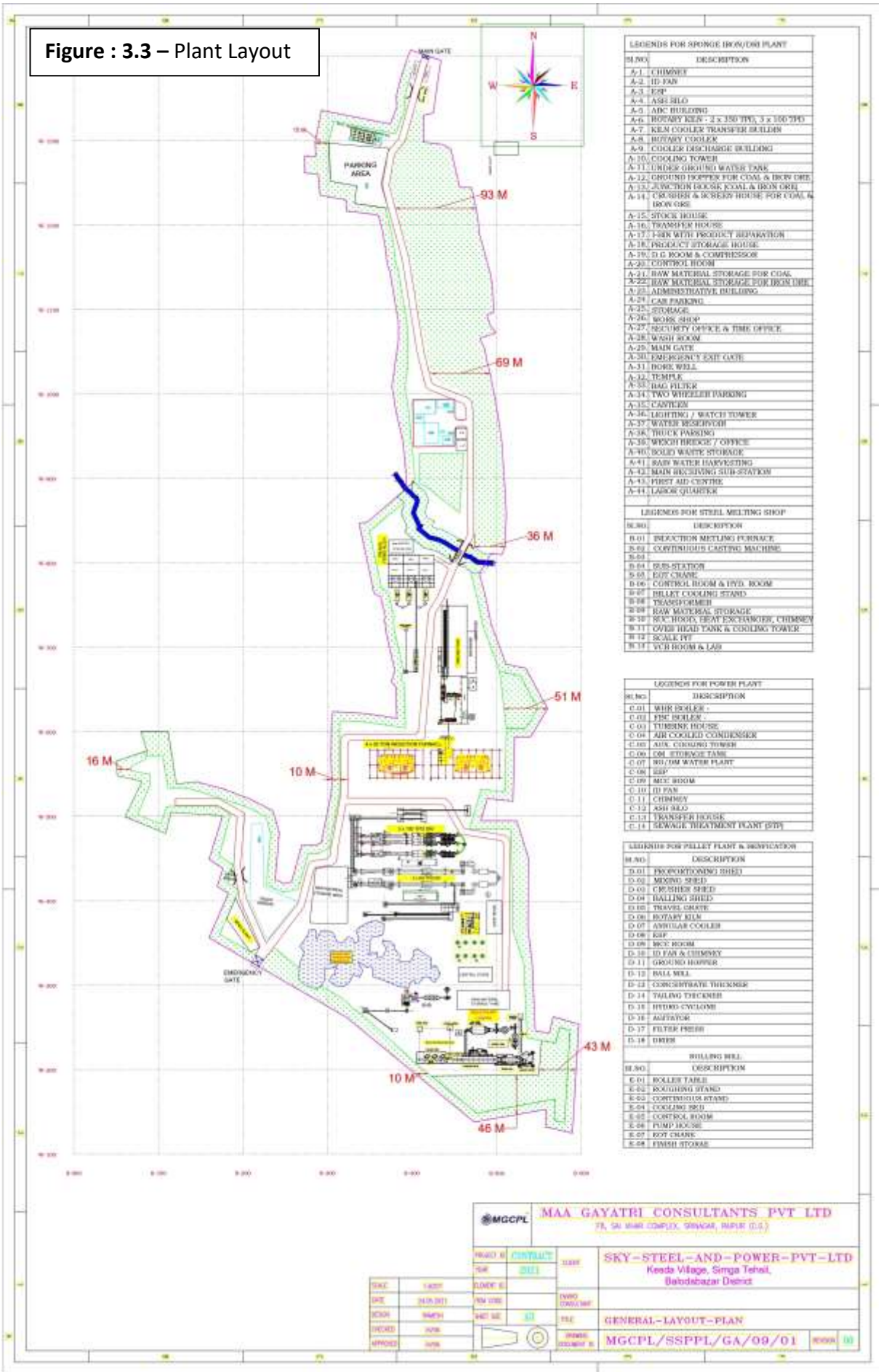
Table No. 3.3 : Proposed methodoloy for Alternate Site analysis

S. No	Environmental Parameter	Maximum Weightage allocated	Site #1	Site # 2	Site # 3
1.	**Type of land**	**20**			
	• Barren land	20			
	• Unirrigated for 1>10 years	10			
	• Agriculture land				
	➢ Single crop	8	8	8	8
	➢ Double crop	4			
	• Govt. Land / Industrial Land	20			
	• Forest Land	4			
	• Wet Land / Mud Flap	0			

2.	**National Park/Sanctuary within 10 Km. radius**	**10**			
	• Nil	10	10	10	10
	• Exist	2			
3.	**Forest**	**5**			
	• No Forest within 1 km. radius	5	5	5	
	• Dense scrub within 1 km. radius	4			
	• PF within 1 km. radius	3			
	• RF within 1 km. radius	2			2
4.	**CPA / SPA**	**10**			
	• Nil within 10 Km. radius	10	10	10	10
	• Exist in 5-10 Km. radius	4			
	• Exist in 0 – 5 Km radius	2			
5.	**Water Bodies**	**10**			
	• Rivers	5			
	➢ No river within 0.5 Km. radius	5	5		5
	➢ River exist within 0.5 km. raidus	2		2	
	• Canals	2			
	➢ No Canal within 0.5 Km. radius	2			
	➢ Canal exist within 0.5 km. radius	1	1	1	1
	• Streams **/** Nallas passing through site	3			
	➢ No Streams /Nallas passing through site	3	3	3	
	➢ Streams/Nallas pass through the site	1			1
6.	**Source of water for project**	**10**			
	• Ground water	4			
	• Surface water	10	10	10	10
7.	**Distance of habitation**	10			
	• 0 - 0.50 Kms.	5	5	5	
	• 0.51 - 1.0 Kms.	7			

	• 1.01 – 1.50 kms.	9			9
	• Beyond 1.50 Kms.	10			
8.	Road connectivity	15			
	• Approach road	5			
	➢ Single lane	1	1		
	➢ 2-lane & above	5	0	5	5
	• Site abutting NH/SH	15			
	• Distance of NH/SH				
	➢ 0- 5 Kms.	15 to 10			
	➢ 5-10 Kms.	10 to 5		9	5
	➢ Beyond 10 Kms.	3	3		
9.	Railway facility	**10**			
	• Self Railway siding	10			
	• Distance of railway facility				
	➢ 1 - 5 Kms.	8			8
	➢ 5 – 10 Kms.	6			
	➢ 10 – 15 Kms.	4			
	➢ 15-20 Kms.	2			
	➢ Beyond 20 Kms.	1	1	1	
		100	**62**	**69**	**74**

Figure : 3.3 – Plant Layout



3.4 SIZE OR MAGNITUDE OF OPERATION

Following is the plant configuration and production capacity of proposed project:

Table No. 3.3 :Plant configuration and production capacity

S.No.	Units (Products)		Production Capacity
1.	Iron ore Beneficiation (Beneficiated ore)		1.3 MTPA (throughput)
2.	Pellet Plant (Pellet)		1.0 MTPA
3.	DRI Kilns (Sponge Iron)		3,30,000 TPA
4.	Induction Furnace (Billets / Ingots / Hot Billets)		2,64,000 TPA
5.	Rolling Mill (Rolled products) (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO as fuel)		2,97,000 TPA
6.	Ferro Alloys Unit (FeSi / FeMn / SiMn / FeCr)		FeSi – 17,955 TPA / FeMn-45,144 TPA / SiMn-23,940 TPA / FeCr-26,600 TPA
7.	Brick Manufacturing Unit		55,000 Brick/ day
8.	Power Plant (38 MW)	WHRB Power Plant (2 x 36 TPH & 3 X 9 TPH)	22 MW
		CFBC Power Plant (1 X 72 TPH)	16 MW

3.5 MANUFACTURING PROCESS

3.5.1 IRON ORE BENEFICIATION PLANT

Beneficiation process is a combination of crushing, screening, washing, grinding, classifying by gravity separation, magnetic separation, floatation processes. The final concentrate slurry is filter pressed to get a dry enriched ore quality with Fe > 65% and moisture ~10%. The water is recycled in the process. The tailings are processed in a thickener & Filter pressed and the excess water will be recovered and circulated in the process. The tailings filter cake is of low value with Fe <45% and moisture content ~10%. This Filter cake will be stored in storage yard earmarked within the plant premises.

Pollution Free Technology

- The process of beneficiation of iron ore can be rendered pollution free with no effluents being discharged.
- The fugitive emissions are arrested in the crushing and grinding zone by dust suppression systems. Further the emissions are low as these circuits are wet and does not allow high emissions.
- The process does not use any hazardous chemical.
- The quality of the iron ore concentrate is envisaged as follows:

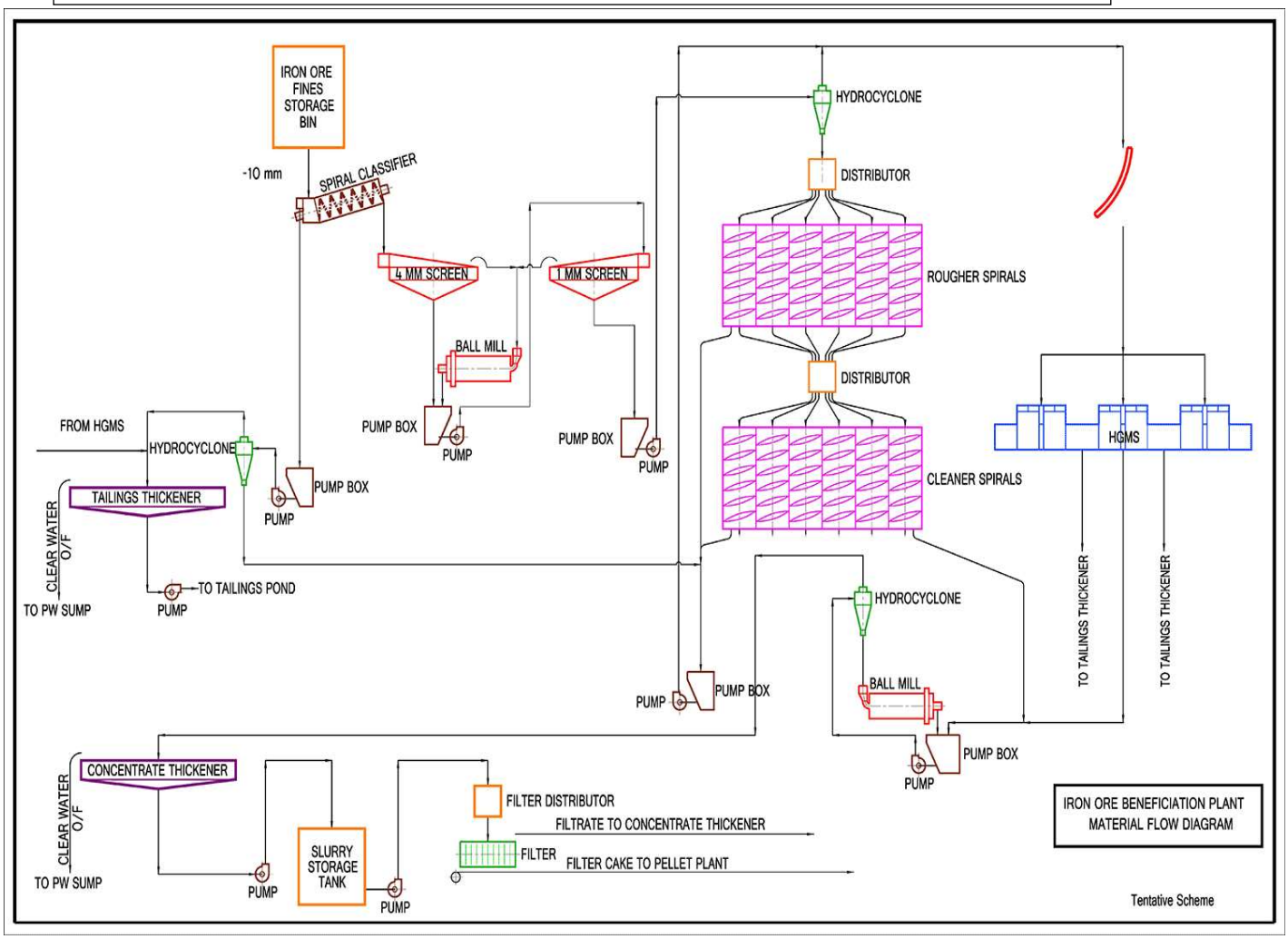
Fe ;>65%

SiO2 +Al_2O_3 ; 4-5%

LOI ; 3.5 – 4.5%

- Moisture content ; 10%
- The Beneficiation plant would produce concentrate to the tune of **1.3 MTPA** (throughput capacity) for feeding the Pellet Plant.

Figure 3.4 :Schematic Diagram showing Beneficiated I/O Manufacturing Process



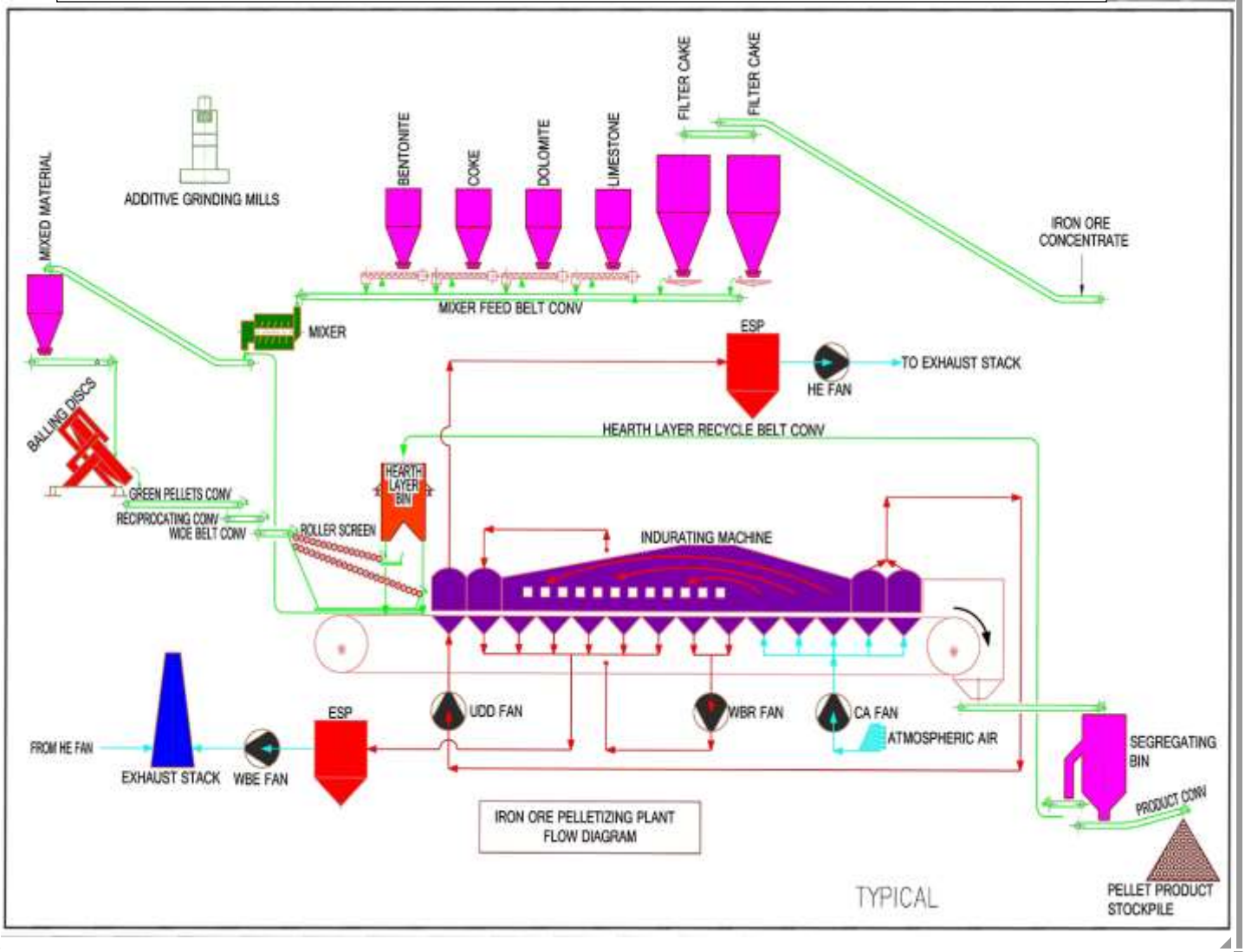
3.5.2 PELLETISATION PLANT

In this process all raw materials will be proportioned as per requirement of the product quality and intensely mixed to have homogenity in the quality. The mixed material will be processed in a battery of disc or a drum pelletiser for formation of green balls / pellets. The pellets are controlled for size as well as certain amount of green strength. The pellets are then classified in a roller screen to separate the undersize(-8 mm) and oversize(+18 mm). The rest of the sized pellets are charged onto the

travelling grate chain. The travelling grate is an endless chain where the pellets are subjected to controlled rate of heating with updraft, downdraft, and two stages of preheating to a temperature of ~1050deg. C. The recuperated heat from the process is utilised very effectively resulting in lower fuel consumption. In the preheating zone small amount of heavy oil may be used to stabilise the preheating zone temperature. At the end of the travelling grate the pellets would gain sufficient strength to be discharged into rotary kiln for induration. The hot pellets are discharged in a circular cooler which maintains a fixed bed depth and the cooling is done by updraft air from atmosphere. The pellets in the rotary kiln will be heated by a long flame single burner from the discharge end fired by anthracite coal powder. The rotary kiln moves slowly thereby indurating the pellets homogeneously at a temperature ~ 1300deg. C. The cooler is divided into three zones and the recuperated hot gas from each zone is utilized for process requirements. The pellets will be transported for processing where they are screened to sizes between 9 to 18 mm and sent to the storage yard. These pellets are very stable and do not degrade on storage or transportation.

Pellet plant of capacity **1.0 MTPA** will be installed in the propsed project.

Figure 3.5 :Schematic Diagram showing Pellet Manufacturing Process



3.5.3 DRI KILN BASED SPONGE IRON PLANT

It is a coal-based plant for converting Iron Ore to Iron through direct reduction. The Oxide Ore Fe_2O_3 (Hematite) is reduced to 'Fe' by using Carbon *as* reductant. The process can take place at 900-1000°C. Coal provides the heat as well as reducing gases. Dolomite chips of size (-3 mm) are used as flux to Scavenge Sulphur content from coal and preventing the combining of this impurity with iron. The process is carried out in a Rotary Kiln.

The Direct Reduced Iron (DRI) plant will comprise of **2 x 350 TPD and 3 x 100 TPD kilns** and related accessories including Waste Heat Recovery power generating unit.

The major plant facilities for the Sponge Iron plant envisaged are as follows:

- Day bins
- Rotary Kiln & Cooler
- Central Control Room
- Product processing and product storage
- Off gas system including waste heat recovery power generation

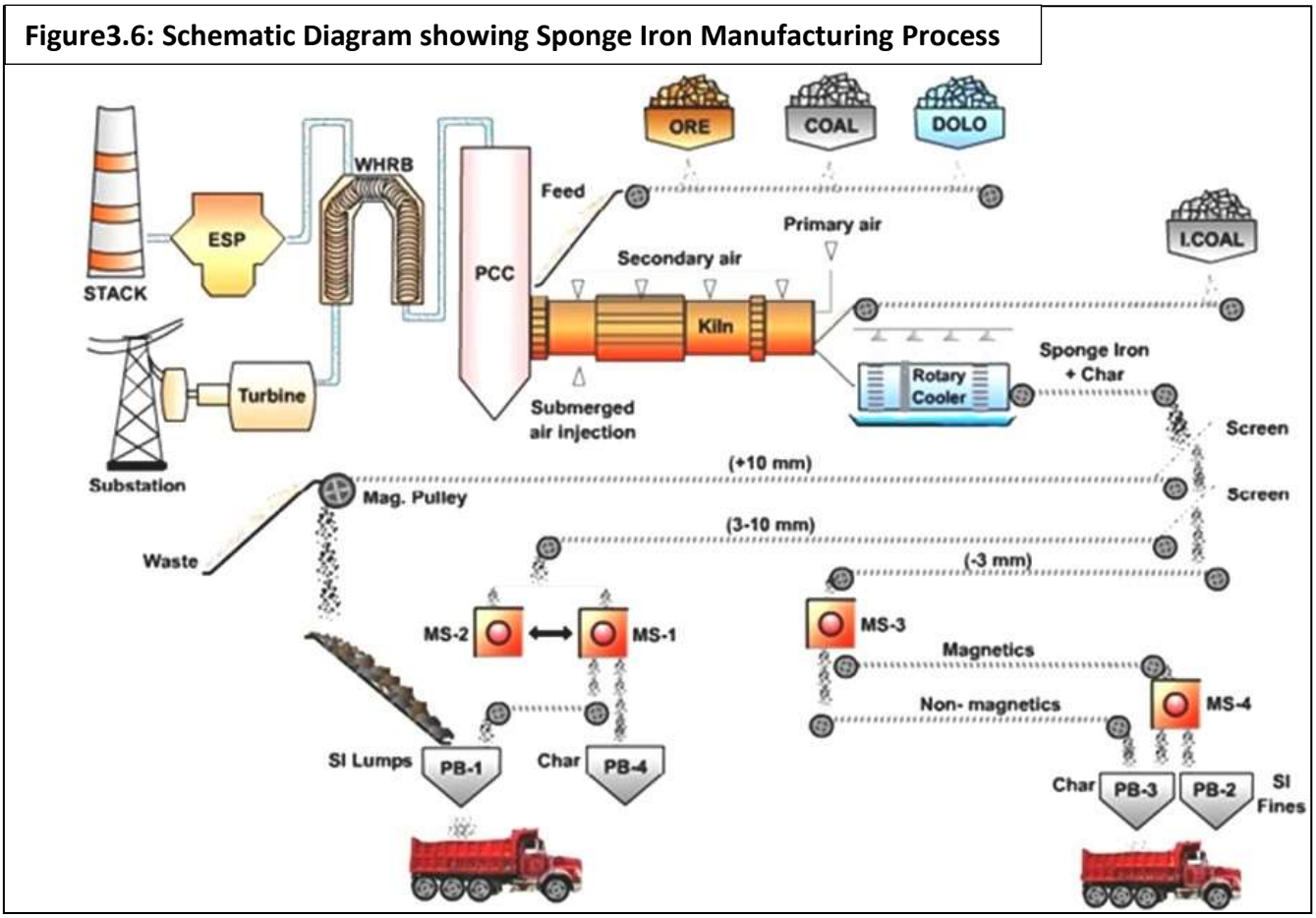
There will be one day bin building for kiln. The day bin building will have bins for meeting raw material required for kiln. This bin will have the storage facility for pellets, feed coal, dolomite etc.

A refractory lined rotary kiln 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. Ironn ore or Pellets 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 rises 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 1000^{o}C enters the reduction zone. Temperature of the order of 1050^{o}C 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 rotary cooler. In rotary cooler the material will cool from 1000°C to 100°C in cooler by spraying water. 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.

Figure3.6: Schematic Diagram showing Sponge Iron Manufacturing Process



3.5.4 STEEL MELTING SHOP (INDUCTION FURNACE – BILLETS / INGOTS / HOT BILLETS)

Electric Steel Making through Melting in Induction Furnace (IF), secondary refining in a Ladle Furnace (LF) and Slab Casting in a Continuous Casting Machine has been selected as the process route of converting the charge mix of Sponge Iron and Scrap to Slabs required for the Rolling Mill by Hot charging method.

Provision will be made in the Caster to produce billets also in case of market demand. The proposed process is well established and is most environment friendly and energy efficient. The Slabs from the Caster shall be hot charged to the Rolling Mill without reheating furnace to reduce fuel consumption. Provision has been made for reheating furnace with furnace oil which shall be used in case of emergency.

i) IF Melting:

a. The Charge-Mix shall comprise 80-85% Sponge Iron & balance Pig Iron and scrap.

b. The material shall be charged to the IF through a Vibro Feeder at desired rate matching the melting rate in crucible.

c. The Scrap is melted first to create a molten bath. Sponge Iron is then charged continuously through Vibro-Feeder. Slag formed is removed periodically.

d. After the completion of charging and melting, a sample will be drawn to determine the composition of the liquid steel. Adjustment in composition is made by adding right quality of scrap or petroleum coke for achieving the necessary carbon content in the bath.

e. After achieving the desired melt analysis, the temperature is raised to the required tapping temperature and the furnace is then tilted rapidly to discharge the liquid steel into a preheated refractory lined ladle.

Advantages of IF melting are:

- Better yield of liquid steel from charge as no oxygen is used.
- Better homogenization of temperature and composition due to stirring effect of eddy currents.
- Less fume generation.
- Low operating cost as expensive graphite electrodes are not used.

ii) Ladle Furnace

a. The Molten Steel Ladle shall be transferred to a Ladle Car for carrying out secondary refining in the Ladle Furnace.

b. The Ladle has a porous refractory plug at the bottom to purge Argon gas to keep the molten metal in vertical stirring movement.

c. The Ladle is covered by a water cooled roof which has openings for three graphite electrodes, a fume outlet connected to FES system and a door for charging fluxes & alloying elements. Electric heating is done by arcing under the reducing slag.

d. Lime is used as flux for refining the steel.

e. Ferro Alloys are added to achieve de-oxidation and required composition of steel.

Aims of LF Treatment are:

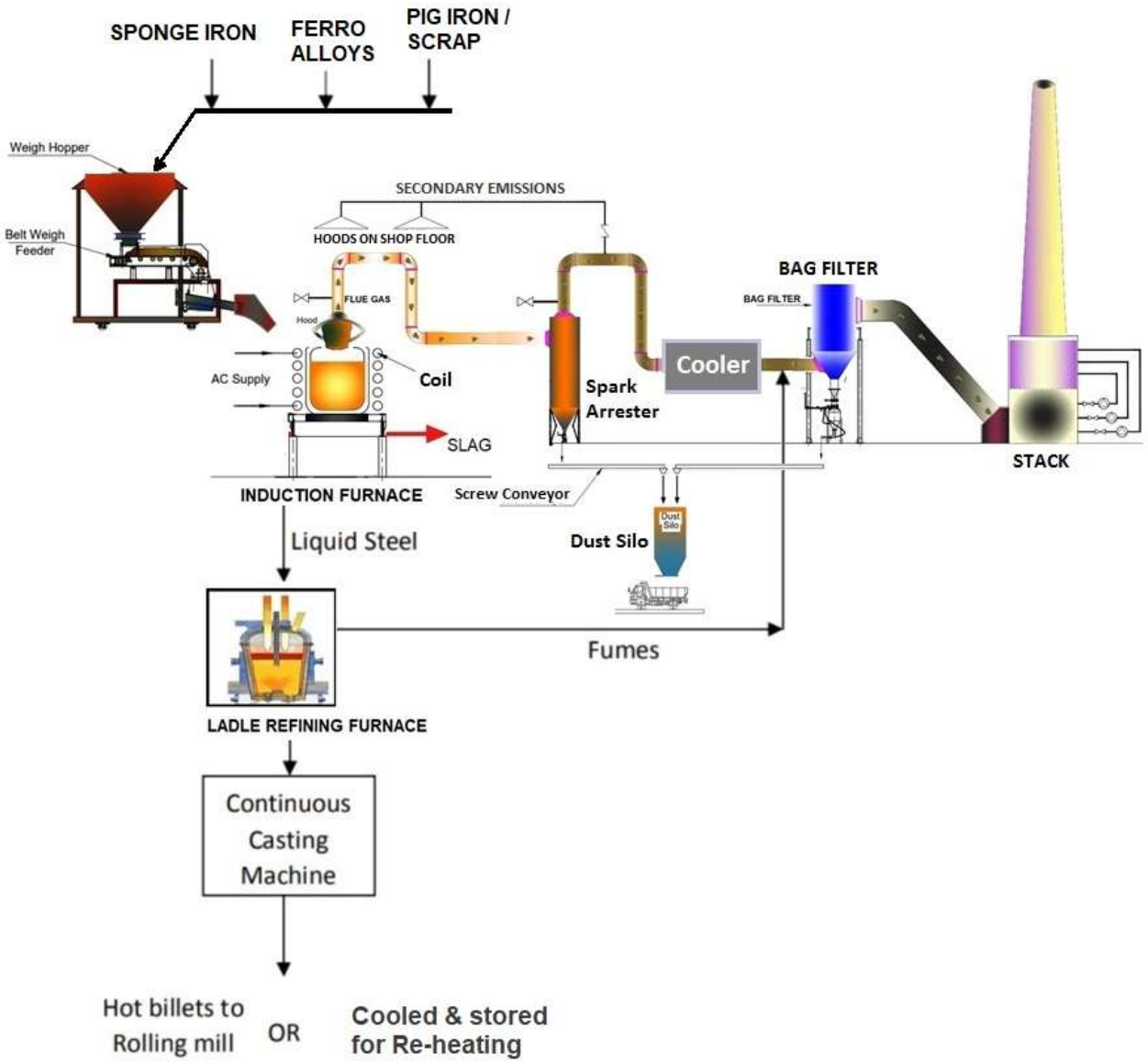
- De-sulfurization of steel
- De-oxidation of steel
- Inclusion removal to slag by floating through argon purging.
- Achieving right composition and temperature required for casting at CCM.
- Act as a buffer for achieving sequence casting.

Fumes generated during the process extracted through a collection hood. The IF fumes will be sucked through a cyclone-cum-spark arrestor & Cooler and LF fumes will be sucked through its roof outlet. These fumes then pass through a pulse-jet type bag filter to remove the dust particles. ID Fans installed after the bag filter are used for suction of fumes and discharge the clean gas into atmosphere through stacks. Particulate emission at Stack outlet will not exceed 30 mg/Nm^3. The complete machine shall have PLC controls.

- There will be 4 x 20 T Induction Furnaces. Ingot/Billet/Hot Billets will be produced in Continuous Casting Machine.

Process Flow for Ingot/Billet/Hot Billets Making is shown in figure 3.7.

Figure 3.7 : Schematic Diagram showing MS Ingots / Billets Manufacturing Process



3.5.5 ROLLING MILL

The Rolled products will be manufactured using the following methods:

i. Direct Hot Rolling / Hot Charging

ii. Rolling Mill With Re-Heating Furnace / Conventional Rolling Mill

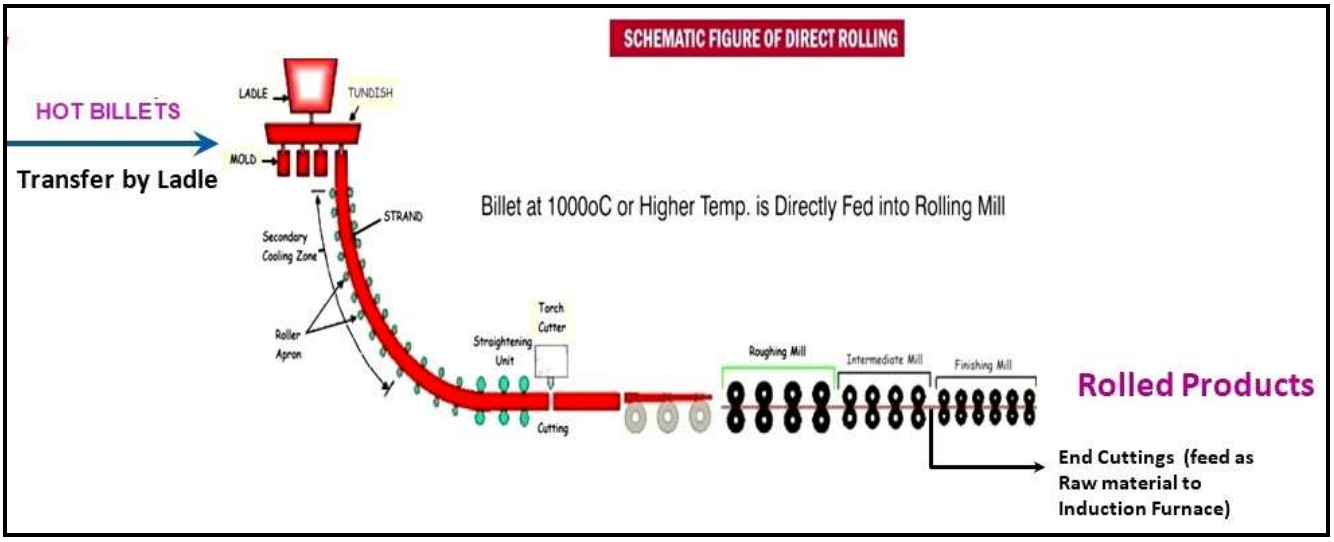
Direct Hot Rolling / Hot Charging

Raw Material i.e. Hot Billets from Ladle in red hot condition is cut by automatic hot metal Shearing Machine. In the proposed plant automatic hot metal shear machines are going to be installed with

each strand. The gas cutting facility will be maintained as a backup to the hot metal shearing machine.

After the Hot Metal is cut into required length, then pushed out to rolling stands for re-rolling. Steel Pieces are rolled through all stands in order to get required shape of finished goods i.e.Rolled products. Process flow chart of Direct Rolling is shown below:

Figure 3.8 :Schematic Diagram showing Hot Charging Manufacturing Process



Rolling Mill With Re-Heating Furnace / Conventional Rolling Mill

A pusher type furnace has been envisaged for the heating of Ingots / Billets. The furnace will be end charging and side discharging. It will have single row as well as double row charging facility. The furnace will be heated with LDO. The furnace combustion system will comprise of air blowers, LDO storage, supply and preheating system and other associated facilities. The product of combustion will leave the furnace at charging end and exhausted through underground flue tunnel and passed through a metallic tubular recuperator before finally let off to a self-supporting steel chimney of sufficient height. A set of instrument will be used for smooth operation of the furnace.

Bar and Round mill

A cross country type mill has been envisaged for the plant. The stands have been grouped into roughing, intermediate and finishing groups.Roughing group will have 4 (four) stands, intermediate group will have 8 (eight) stands and finishing mill will have 8 (eight) stands. Roughing group of stands will be driven by one motor. 4 nos. of intermediate stands will be driven by two motors and balance 4 nos. will be driven by a separate motor. Each stand of finishing group will be driven by single motor. Necessary guides and troughs will be provided at entry and exit of mill stands.

One wire rod outlet has been provided in the mill. The wire rod line will have 4 stand blocks driven by a single motor through gear box. Coil forming and handling of coil is provided.

Automated tilting, drop type tilter and feeding arrangement will be provided in roughing group of stands. Repeaters have been provided in roughing / intermediate stands as necessary.

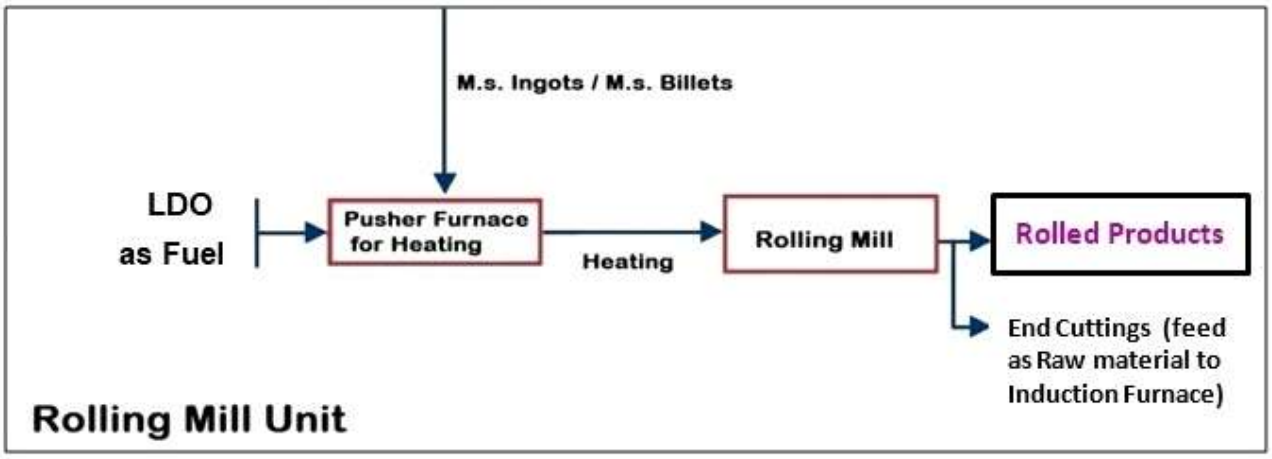
Design provision has been made for introduction of slit rolling facility in future to roll 5.5 mm to 32 mm rebars in two strands. The rebars discharged from the mill will pass through a water cooling system comprising cooling pipes with high pressure water nozzles for rapid water quenching. At the cooling pipes the bar skin temperature will be reduced to about 600oC. The core of the bar still remains hot. This entrapped heat tempers the bar. This thermo-mechanical treatment of the bars increases tensile strength without adversely effecting weldability and elongation properties.This process eliminates requirement of cold twisting of bars for production of rebars.

A dividing shear, to cut the products to cooling bed length, will be located immediately after the water cooling system. This shear will divide all products to cooling bed lengths. Rake type cooling beds have been envisaged to receive the rolled product. Cooling bed will be provided with incoming and outgoing roller tables. One cold shear has been provided to cut the bars coming out of cooling bed into commercial length of 6 to 12 m. The bar products will be formed into bundles and will be strapped by strapping machine manually.

The finished products will be removed by overhead EOT crane and stored in the storage area or dispatched through road vehicles.

Process flow chart of Conventional Rolling is shown as Fig.3.9.

Figure 3.9 :Schematic Diagram showing Rolled Product Manufacturing Process



3.5.6 POWER PLANT

Its is proposed to install 22 MW WHRB & 16 MW CFBC based power plant in the proposed project to meet the power requirement for various processes of integrated plant including auxillaries of power plant.

WHRB Power Plant

Production of sponge iron in DRI kilns generates huge quantities of hot flue gases carrying considerable sensible heat. The energy content of these gases can effectively be used to generate electric power as well as steam for meeting various process requirements. Thus a WHRB (Waste Heat Recovery Boiler) power plant would be an ideally suited proposition to effectively make use of this waste gas. This WHRB Power plant would not only make the plant independent of external source of electric power to some extent but would also result in energy conservation and environment protection.

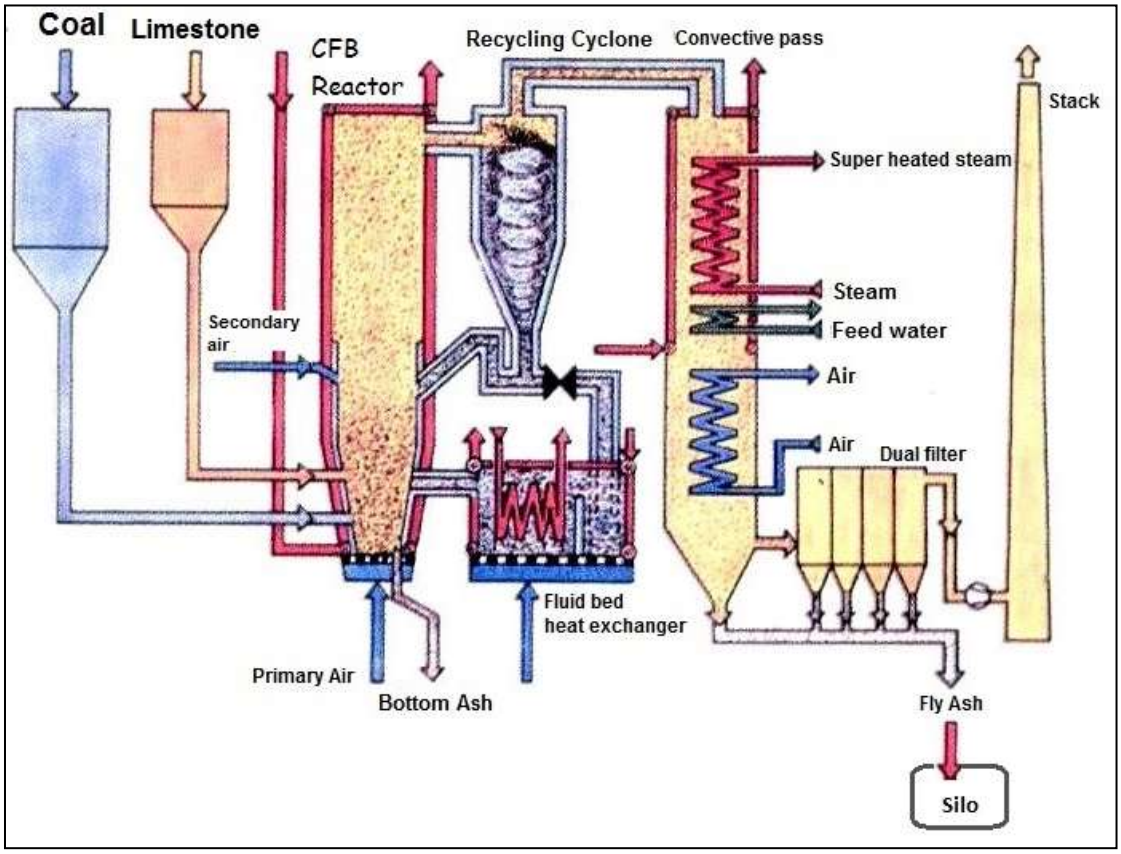
Steam Turbo-generators (STGs) envisaged for the Power plant will be single cylinder, multistage, extraction – cum – condensing type complete with condenser, air evacuation system, 2 x 100% condensate extraction pumps, electronic governing system, lubricating oil system, regenerative feed heating system etc. The turbine will be fed with steam generated from HRSG in DR kiln. The STGs will be located in the machine hall of the power plant.

2 x 36 TPH & 3 x 9 TPH Boilers will be installed to 2 x 350 TPD & 3 x 100 DRI Kilns to generate 22 MW Power.

CFBC Power Plant

The unit will have CFBC boiler (1 x 72 TPH Capacity) to generate 16 MW Power. The boiler will be designed for continuous operation at Turbine Maximum Continuous Rating (TMCR). A margin of 10% over TMCR shall be taken into account to arrive at Boiler rated capacity. The boiler will be natural circulation, circulating fluidized bed combustion, two pass, non reheat, single drum, balanced draft, semi-outdoor type. The boiler will have continuous evaporation rating of approx. 360 tonnes/hr. (BMCR shall not be less than 110% of TMCR) with steam parameters at super heater outlet as 66 kg/cm^2 and 490^0C . The feed water temperature at MCR at inlet to economizer is expected to be around 120^0C. Steam parameter are to be fine tuned at Boiler outlet based on actual plant layout and piping arrangement. The boiler will be complete with ash /solid separator, economizer, air heater, ducting, FD fans, ID fans and PA fans. Air cooled condensers envisaged for Power plant to conserve water.

Figure 3.10:Schematic Diagram showing Power Generation Process



3.5.7 FERRO ALLOYS PLANT

Ferro Alloys will be smelted at about 1350 – 1500^{0}C. This will be achieved by a conventional, Closed Submerged Electric Arc Furnace. The three carbon Electrodes, partially submerged in the charge, are supported on hydraulic cylinders for upward and down ward movements to maintain the desired electrical conditions.

The body of the furnace is cylindrical in shape, and is lined with firebricks, silicon carbide bricks and carbon tamping paste. Three tap – holes are provided at 120 degree apart for drawing out both the molten alloy and Slag. During the repair works one of the tap – holes the other will function as stand by.

The weighed raw materials will be thoroughly mixed in the proper proportion before charging into the furnace, through Skip, Telfer hoist and charging chutes. The charge will be pushed near to electrodes on Furnace top by a Charging Stoker.

As the charge enters the smelting zone, the alloy formed by chemical reactions of the oxides and the reductants, will be heavy, gradually settles at the bottom. At regular intervals the furnace will be tapped. The tap hole will be opened by Oxygen lacing pipe and after tapping is completed, it will be closed by clay plugs. The liquid Silico manganese and Slag will be collected in a Ladle and Slag will be over flowed to sand beds. The metal being retained in the ladle having a Nozzle at bottom which

allows metal flows on to C.I. Pans. After solidification the cakes will be broken manually to required lump size.

SILICO MANGANESE & FERRO MANGANESE PROCESS

Manganese ore is in the form of MnO, SiO_2, FeO, Al_2O_3, MgO and other Oxides. MnO is reduced to Mn and FeO is reduced to Fe taking Carbon from Coke / Coal and the product is produced as Si Mn/Fe Mn. The other oxides are simultaneously removed as Slag along with metal. The Slag and Metal are separated by virtue of its self-differential gravities after collecting in the ladle. The ladle will have a nozzle in the bottom portion through which the metal flows in to C.I. Pans.

Chemical Composition of Si Mn

S.No.	Constituent	Percentage
1.	Mn	60 – 65%
2.	Si	+ 15%
3.	C	2%
4.	S & P	0.03% Max

Chemical Composition of Fe Mn

S.No.	Constituent	Percentage
1.	Mn	70 - 75%
2.	Si	+ 1.5%
3.	C	7 - 8 %
4.	S	0.05% Max
5.	P	0.4 %

FERRO SILICON PROCESS

Ferro Silicon is a Slagless process. Quartz is the main raw material which contains 99%of SiO_2. Charcoal and a small percentage of Coal is used as reductants. Mill Scale / Iron Ore is added to obtain Ferro Silicon. FeO is reduced to Fe and SiO_2 is reduced to Si Combining with Carbon and produced as Fe Si.

Chemical Composition of Fe Si

S.No.	Constituent	Percentage
1.	Si	70 - 75%
2.	C	7 – 8 %
3.	S	0.05 %
4.	P	0.4% Max

FERRO CHROME PROCESS

Chrome Ore is in the form of Cr2 O3, Fe2O3, SiO2, Al2O3, CaO and MgO. These oxides react with carbon in the coke and reduced to Fe, Cr, Si, C etc. Other oxides i.e Al2O3, SiO2, CaO, MgO are removed in the form of Slag.

Chemical Composition of Fe Cr

S.No.	Constituent	Percentage
1.	Cr	60 – 65 %
2.	C	1 - 8 %
3.	Si	1 - 3 %
4.	S	0.04 %
5.	P	0.04%
6.	Cu	0.5 %

THE PROCESS:

Ferro Alloys will be smelted at about 1350 – 1500^{0}C temperature. This will be achieved by a conventional, Closed Submerged Electric Arc Furnace. The three carbon Electrodes, partially submerged in the charge, are supported on hydraulic cylinders for upward and down ward movements to maintain the desired electrical conditions.

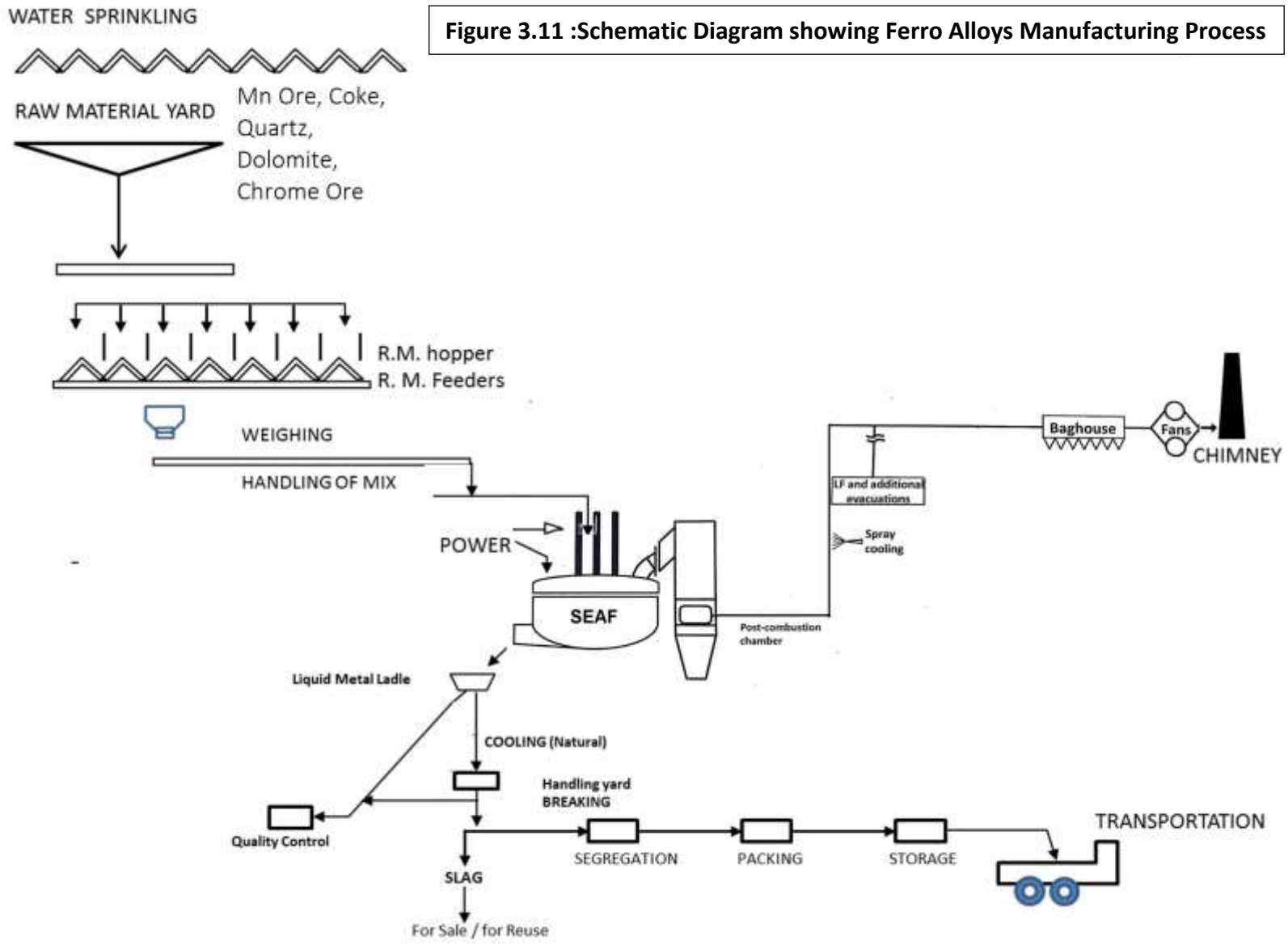
The body of the furnace is cylindrical in shape, and is lined with firebricks, silicon carbide bricks and carbon tamping paste. Three tap – holes are provided at 120 degree apart for drawing out both the molten alloy and Slag. During the repair works one of the tap – holes the other will function as stand by.

The weighed raw materials will be thoroughly mixed in the proper proportion before charging into the furnace, through Skip, Telfer hoist and charging chutes. The charge will be pushed near to electrodes on Furnace top by a Charging Stoker.

As the charge enters the smelting zone, the alloy formed by chemical reactions of the oxides and the reductants, will be heavy, gradually settles at the bottom. At regular intervals, the furnace will be tapped. The tap hole will be opened by Oxygen lacing pipe and after tapping is completed, it will be closed by clay plugs.

The liquid Silico manganese and Slag will be collected in a Ladle and Slag will be over flowed to sand beds. The metal being retained in the ladle having a Nozzle at bottom which allows metal flows on to C.I. Pans. After solidification, the cakes will be broken manually to required lump size.

Figure 3.11 :Schematic Diagram showing Ferro Alloys Manufacturing Process



PROCESS OF FERRO CHROME RECOVERY (ZIGGING PLANT)

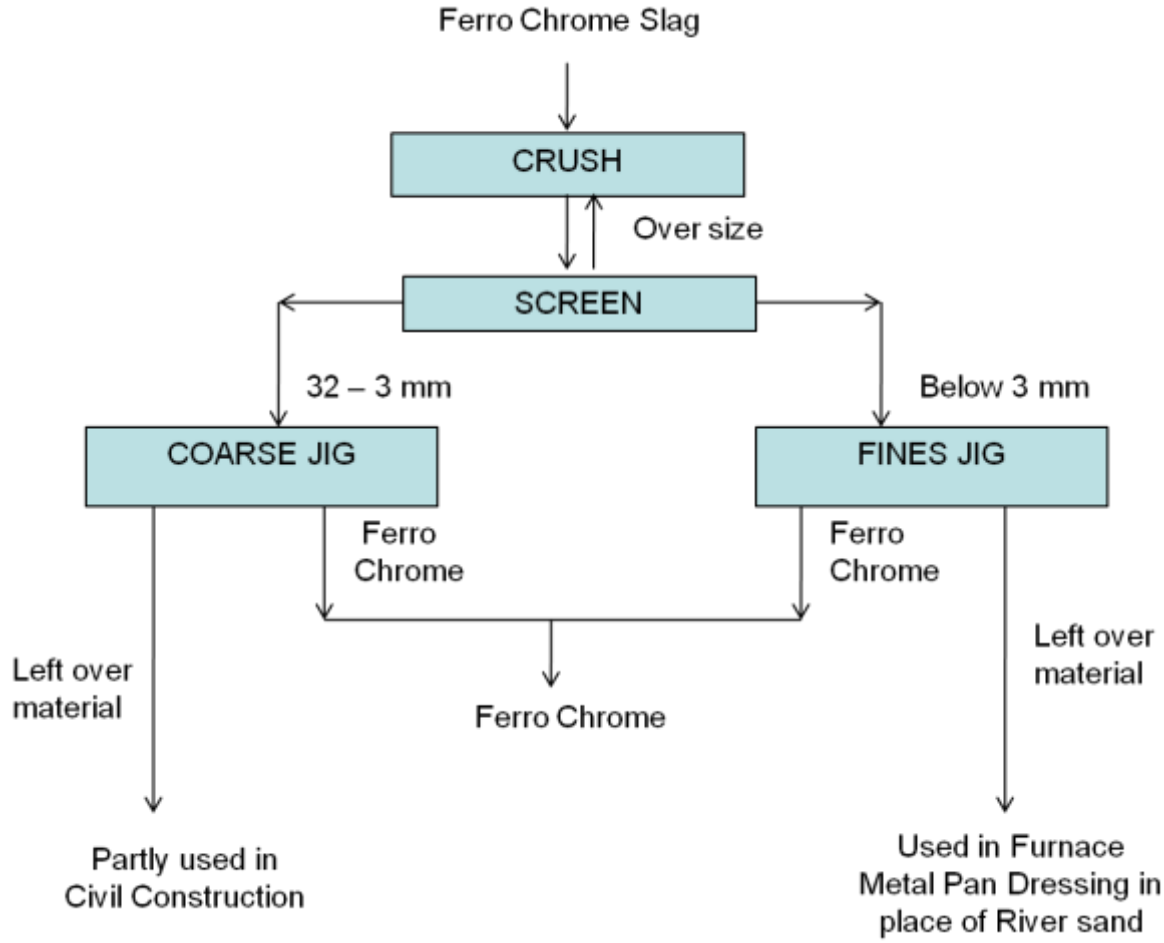
Ferro chrome recovery process involves the following steps

i. Crushing & screening: In this slag is crushed to smaller size particles as close as possible

ii. Coarse jigging: In this particles having coarse fraction (approximately -32 to -3mm) is separated through two stage air pulsated jig for recovery of metal.

iii. Fine jigging: In this particles of fine fraction (-3mm) is separated through diaphragm pulsed (through the bed' jigs for recovery of metal.)

iv. The recovered metal will be reused in the process.



3.5.8 PROCESS OF FLY ASH BRICK MANUFACTURING

It is proposed to establish Fly Ash / Slag brick making unit of 56,000 bricks/day capacity. Fly ash (70%), Gypsum (5%), cement (10%) and Slag, Stone dust etc. (15%) are manually feed into a pan mixer where water is added to the required proportion for homogeneous mixing. The proportion of raw material may vary depending upon quality of raw materials. After mixing, the mixture is allowed to belt conveyor through feed in to automatic block making machine where the blocks are pressed automatically. Then the blocks/ blocks are placed on wooden pallets and kept as it is for two days there-after transported to open area where they are water cured for 10 -15 days. The blocks are sorted and tested before dispatch.

3.6 RAW MATERIAL REQUIREMENT

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

Table No. 3.3 : Raw Material Requirement, Source & Mode of Transport

S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.	Mode of Transport
1.	**For Iron Ore Beneficiation Plant (13, 00,000 TPA)**				
a)	Iron ore fines	13,00,000	Chhattisgarh / Orissa	~ 600 Kms.	By rail & road (through covered trucks)
2.	**For Pellet Plant (Pellets) –10,00,000 TPA**				
a)	Iron Ore Concentrate	10,40,000	Own generation	---	Through covered conveyers
b)	Bentonite	8,000	Gujarat	~ 600 Kms.	By rail & road (through covered trucks)
c)	Lime powder	15,000	Chhattisgarh	~ 100 Kms.	By road (through covered trucks)
d)	Anthracite Coal	44,000	SECL Chhattisgarh / MCL Odisha	~ 500 Kms.	By rail & road (through covered trucks)
	OR				
	(OR) LDL /LSHS	13,300 KL/Annum	Chhattisgarh	~ 100 Kms.	By road (through tanker)
3.	**For DRI Kilns (Sponge Iron) – 3,30,000 TPA**				
a)	Pellets (100 %)	4,95,000	Own generation	---	Through covered conveyers
	or				
	Iron ore (100%)	5,28,000	Barbil, Orissa NMDC, Chhattisgarh	~ 500 Kms.	By rail & road (through covered trucks)

b)	Coal	Indian	4,29,000	SECL Chhattisgarh / MCL Odisha	~ 500 Kms.	By rail & road (through covered trucks)
		(or)				
		Imported	2,74,560	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (through covered trucks)
c)	Dolomite		16,500	Chhattisgarh	~ 100 Kms.	By road (through covered trucks)
4.	**For Steel Melting Shop (Billets/ Ingots/Hot Billets) – 2,64,000 TPA**					
a)	Sponge Iron		2,67,000	Inhouse Generation	---	Through covered conveyers
b)	MS Scrap / Pig Iron		40,000	Chhattisgarh	~ 100 Kms.	By road (through covered trucks)
c)	Ferro alloys		13,000	Inhouse Generation	---	By road (through covered trucks)
5.	**For Rolling Mill through Hot charging (Rolled Products) – 2,52,450 TPA**					
a)	Hot Billets		2,61,361	Inhouse Generation	---	---
6.	**For Rolling Mill through Reheating Furance (Rolled Products) – 44,550 TPA**					
b)	M.S. Billets (External Purchase)		49,000	Chhattisgarh	~ 100 Kms.	By road (through covered trucks)
c)	LDO / LSHS		218 KL/annum	Nearby IOCL Depot	~ 100 Kms.	By road (through Tankers)
7.	**For CFBC Boiler [Power Generation 16 MW]**					
a)	Dolochar + Indian Coal	Dolochar	66,000	Inhouse Generation	---	through covered conveyors
		Indian Coal	73,920	SECL Chhattisgarh / MCL Odisha	~ 500 Kms.	By rail & road (through covered trucks)
	OR					
b)	Dolochar + Imported Coal	Dolochar	66,000	Inhouse Generation	---	through covered conveyors
		Imported Coal	35,536	Indonesia / South Africa / Australia	~ 600 Kms. (from Vizag Port)	Through sea route, rail route & by road (through covered trucks)
8.	**For Ferro Alloys (3 x 6 MVA)**					
7 (i)	*For Ferro Silicon - 17,955 TPA*					
a)	Quartz		27,292	Chhattisgarh / Andhra Pradesh	~ 500 Kms.	By road (through covered

					trucks)
b)	LAM coke	4,219	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
c)	Mill scales	628	Inhouse Generation	---	By road (through covered trucks)
d)	MS Scrap	10,055	Chhattisgarh	~ 100 Kms.	By road (through covered trucks)
e)	Electrode paste	359	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
f)	Bagfilter dust	682	Inhouse Generation	---	---
7 (ii)	*For Ferro Manganese – 45,144 TPA*				
a)	Manganese Ore	1,02,703	MOIL / OMC	~ 500 Kms.	By Rail & Road (through covered trucks)
b)	LAM coke	16,478	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
c)	Dolomite	7,674	Chhattisgarh / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	MS Scrap / Mill scales	6,772	Inhouse Generation	---	By road (through covered trucks)
e)	Electrode Paste	587	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
f)	Bagfilter dust	2,257	In house generation	---	---
7 (iii)	*For Silico Manganese – 23,940 TPA*				
a)	Manganese Ore	39,022	MOIL / OMC	~ 500 Kms.	By Rail & Road (through covered trucks)
b)	FeMn Slag	20,349	In house generation	---	----
c)	LAM Coke	8,978	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	Dolomite	5,387	Chhattisgarh / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
e)	Electrode paste	479	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered

					trucks)
f)	Quartz	5,746	Chhattisgarh / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
g)	Bag filter dust	359	In house generation	---	---
7 (iv)	*For Ferro Chrome – 26,600 TPA*				
a)	Chrome Ore	53,200	Sukinda, Odisha Import, South Africa	~ 500 Kms. ~ 600 Kms. (from Vizag Port)	By road (through covered trucks) From Port By Road (through covered Trucks)
b)	LAM Coke	8,778	Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
c)	Quartz	4,655	Chhattisgarh / Andhra Pradesh	~ 500 Kms.	By road (through covered trucks)
d)	MS Scrap / Mill Scale	3,990	Inhouse Generation	---	By road (through covered trucks)
e)	Magnetite / Bauxite	4,495	Chhattisgarh / Maharashtra	~ 500 Kms.	By road (through covered trucks)
f)	Electrode Paste	798	Maharashtra / West Bengal	~ 300 Kms.	By road (through covered trucks)
g)	Bagfilter dust	1,702	Own generation	---	---

3.6.1 MODE OF TRANSPORT OF RAW MATERIAL AND FINISHED PRODUCTS

- Major raw materials will be transported through railway rakes up to the nearest railway station (i.e. Hathband Railway – 6.5 kms – By road.) and then to the site through road by covered trucks.
- All the trucks used for the transport of raw materials, products and wastes will be completely covered with tarpaulin and ensured no spillage during transportation.
- No. of trucks required for proposed project will be 279 trucks /day.
- Internal roads in the proposed project will be made pucca.
- All the raw material required for the proposed steel plant will be stored on pucca platform above ground level.

- All the raw material yards are equipped with water sprinkling system, so as to avoid fugitive emission during the material handling.

3.6.2 MARKET OF FINAL PRODUCTS

Final product i.e. Rolled products (2,97,000 TPA), will be sold local market & may also be exported.

3.7 WATER REQUIREMENT AND ITS SOURCE

- Water required for the proposed project will be **2697 KLD**. This includes make up water for I/O Benefication, Pellet Plant, DRI Kiln, Induction Furnace, Rolling Mill, Ferro Alloys & Domestic.
- Air cooled condensers will be provided Power plant.
- Water required for proposed project will be sourced from Shivnath River (which is at a distance of 9.5 Kms. from the project site). Dedicated pipeline will be laid upto the site.
- Water drawl permission from Water Resource Department, Chhattisgarh will be obtained after receipt of TOR letter for proposed project.

Table No. 3.4 :WATER REQUIREMENT BREAKUP

S.No.	Unit	Quantity in KLD
1.	Make-up water for I/O beneficiation unit	520
2.	Make-up water for Pellet Plant	400
3.	Make-up water for DRI plant	330
4.	Make-up water for SMS plant	185
5.	Make-up water for Rolling mill	270
6.	Make-up water for Ferro Alloy plant	60
7.	Captive Power Plant	
	• Cooling Tower Make-up	320
	• Boiler make-up	455
	• D.M. plant regeneration water	137
8.	Domestic	20
	Total	**2697**

3.7.1 WATER BALANCE DIAGRAM

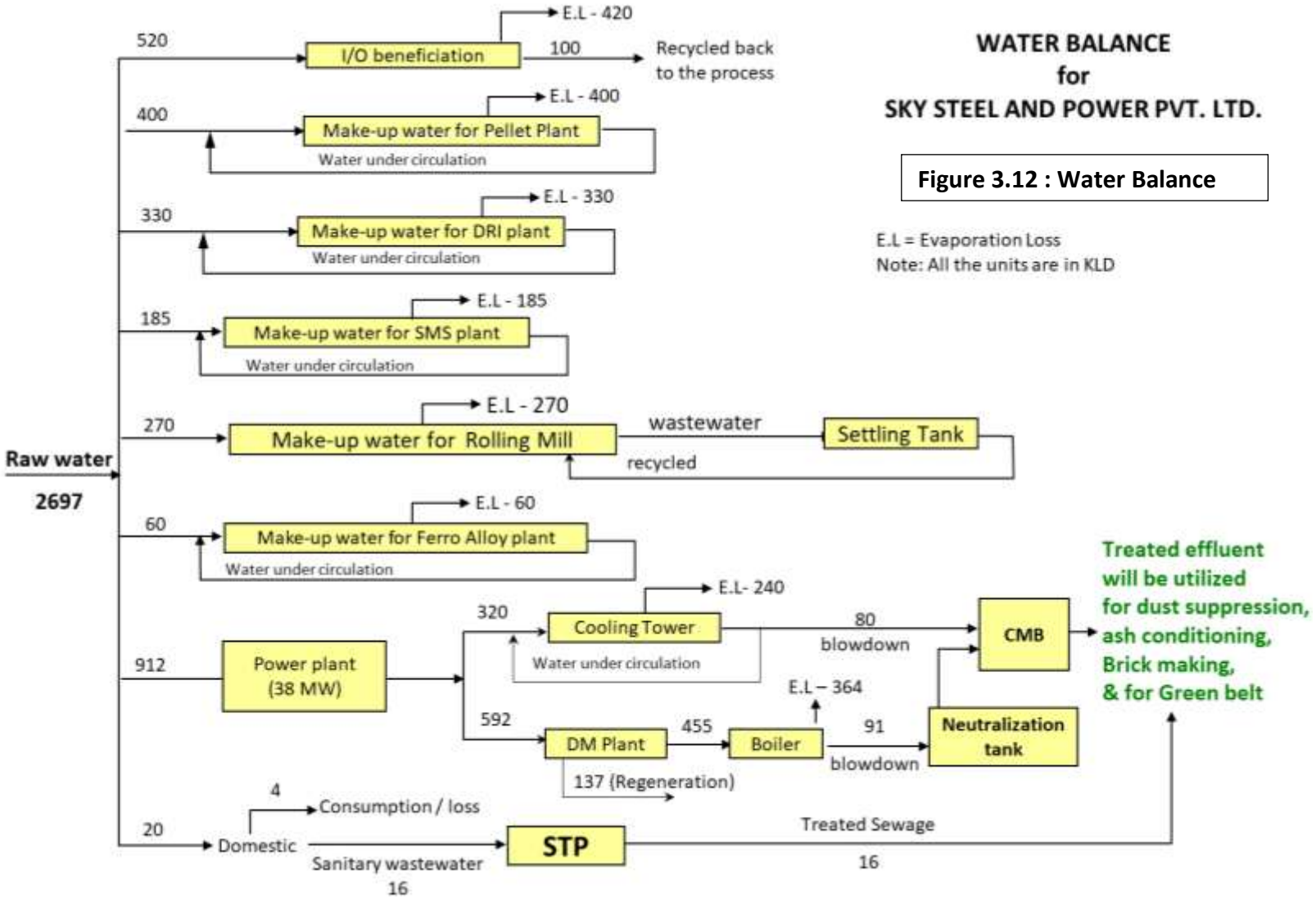


Figure 3.12 : Water Balance

3.8 WASTEWATER GENERATION & ITS MANAGEMENT

- There will be no effluent discharge in the Sponge Iron, Induction Furnace, Ferro Alloys unit as closed circuit cooling system will be adopted.
- Air Cooled condensers will be provided in the power plant, which will be reduce the water consumption significantly. Hence wastewater generation will also be minimized.
- Thickener over flow from I/ O beneficiation process will be recycled along with with makeup water after treatement in settling tank. Thickener under flow will be taken to filter press an after dewatering the filter cake will be stored in the storage yard.
- Effluent from Rolling Mill will be sent to settling tank & oil seperator will be recycled through closed circuit cooling system.
- Effluent from power plant will be treated in ETP and after ensuring compliance with SPCB norms, it will be utilized for dust suppression, ash conditioning, brick making and for greenbelt development.
- Sanitary waste water will be treated in STP.
- Garland drains will be provided around all the raw material stacking areas.

Table No. 3.5 :WASTEWATERGENERATION AND ITS BREAKUP

S.No.	Source	Generation (KLD)
1.	Power Plant	
	a) Cooling Tower blowdown	80
	b) Boilers blowdown	91
	c) D.M. plant regeneration water	137
2.	Sanitary Wastewater	16
	Total	**324**

EFFLUENT TREATMENT PLANT

pH of the boiler blowdown will be between 9.5 to 10.5. Hence a neutralization tank will be constructed for neutralizing the boiler blow down. DM plant regeneration water will be neutralized in a neutralization tank. After neutralization, these two effluent streams will be mixed with Cooling Tower blowdown in a Central Monitoring Basin (CMB). Service water will be treated in an oil separator and after treatment it will be taken to CMB. The treated effluent will be utilized for dust suppression, ash conditioning and for Green belt development. No effluent will be let out of the plant premises. Hence Zero discharge concept will be implemented.

3.8.2 TREATED EFFLUENT DISPOSAL

Net Effluent generation after recycling : 324 KLD

Effluent quantity to be used for ash conditioning	:	94 KLD
Effluent to be used for dust suppression in CHP	:	130 KLD
Effluent to be used for Fly ash brick making	:	10 KLD
Effluent to be used for Greenbelt development	:	90 KLD

8.3 Ha (20.5 Acres) 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.

3.9 POWER REQUIREMENT AND ITS SOURCE

Power required for the proposed project will be **62 MW** and same will be sourced from **38 MW** Captive Power Plant & remaining **24 MW** is from State Grid.

Table No. 3.6 :POWER REQUIREMENT AND ITS BREAKUP

S.No.	Plant	Power Consumption	Power Requirement (in MW)
1.	Iron Ore Beneficiation / Pelletization Plant	70 Kwh/ton	11.5
2.	DRI	85 Kwh/ton	3.5
3.	SMS	700Kwh/ton	23.3
4.	Rolling Mill	150Kwh/ton	2.8
5.	Ferro Alloys	3000 -8,000 Kwh/ton	17.1
6.	Power Plant – WHRB	Aux. Consumption @ 10%	2.2
7.	Power plant – CFBC	Aux. Consumption @ 10%	1.6
Total			**62.0**

3.10 SOLID WASTE GENERATION & ITS MANAGEMENT

Following solid waste / by product will be generated from plant:

Table No. 3.7: SOLID WASTE GENERATION AND IT BREAK UP

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
1.	Tailings from I/O beneficiation	2,60,000	Will be taken to filter press & recovered the water. Cake of tailing will be stored in tailing yard & it will given to nearby Ceramic Unit.
2.	Ash / dust from Pellet plant	30,000	Will be utilized in the proposed Brick Manufacturing Unit
3.	Ash from DRI	46,200	Will be utilized in the proposed Brick Manufacturing Unit
4.	Dolochar	66,000	Will be used in proposes CFBC power plant as fuel.
5.	Kiln Accretion Slag	2,970	Will be utilized in the proposed Brick Manufacturing

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
			Unit
6.	Wet scrapper sludge	15,180	Will be utilized in the proposed Brick Manufacturing Unit
7.	SMS Slag	26,400	Slag from SMS will be crushed and iron will be recovered & then remaining non -magnetic material being inert by nature will be used in proposed Brick Manufacturing Unit
8.	End Cuttings from Rolling Mill	8,911	Will be reused in the SMS
9.	Mill scales from Rolling Mill	891	Mill scales will be recycled to Ferro alloys unit.
10.	Ash from Power Plant	72,864	Will be utilized in the proposed Brick Manufacturing Unit
11.	Bagfilter Dust	2,300	Will be utilized in the proposed Brick Manufacturing Unit
12.	Slag from FeMn	27,294	Will be reused in manufacture of SiMn as it contains high SiO_2 and Silicon.
	(or)		
13.	Slag from FeSi	4,320	Will be given to Cast iron foundries
	(or)		
14.	Slag from SiMn	20,080	will be used for Road construction / will be given to slag cement manufacturing
	(or)		
15.	Slag from FeCr	15,450	Will be processed in Zigging 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 utilised for Road laying /brick manufacturing. If Chrome content exceeds the permissible limits, it will be sent to nearest TSDF.

3.11 SCHEMATIC REPRESENTATION OF THE FEASIBILITY DRAWINGS WHICH GIVE INFORMATION OF EIA PURPOSE

As per the Ministry of Environment, Forest & Climate Change (MoEF&CC), New Delhi, EIA notification dated 14th September, 2006 & its subsequent amendments, all Primary metallurgical processing industries (Sponge Iron > 200 TPD & Ferro Alloys) are falling under Sl. No. 3 (a), classified as Category 'A' for the grant of Environmental Clearance at Central Level.

As per the provision of the EIA notification 2006 & it subsequent amendment, it is necessary to get Environmental Clearance by applying to MoEF&CC along with the Environmental Impacts Assessment Study Report for the proposed project prior to commissioning of the project

activities. Therefore the EIA is required to conduct to comply with provisions of EIA notification 2006 & it subsequent amendment made for Sl. No. 3 (a) "A" of schedule –I of the notification.

Chapter – 4 : SITE ANALYSIS

4.1 CONNECTIVITY

The proposed site is well connected with Road network. The following table gives brief regarding connectivity of the proposed site:

Component		Description
Road	:	Site is connected to NH # 30 (Raipur - Simga) – 9.5 Kms. (by Road)
Rail	:	Nearest station –Hathband Railway Station – 6.5 Kms. (by Road) & Railway iding is at distance of 3.2 Kms(By road)
Air	:	Swamy Vivekananda International Airport - 72 Kms. (by Road)

4.2 LAND FORM, LAND USE & LAND OWNERSHIP

24.88 Ha. (61.48 Acres). of land is envisaged for the proposed project and present use of land is Agricultural and the management have already entered agreement with land owners for the total land.

4.3 TOPOGRAPHY

Proposed land is more or less flat without many undulations. The site is slightly slope towards North East side. Due to the proposed project, there will be some topographical change will occur due the excavations, construction activities pertaining to project. The Topographical map is shown Figure No.3.2.

4.4 EXISTING LAND USE PATTERN

4.4.1 Land use pattern of the Project site

Total extent of land area identified for the proposed project is **24.88 Ha. (61.48 Acres).** The land earmarked for the present proposal is Agricultural land.

A seasonal nala is passing through the proposed project site. No forest land is involved. There are no National Park, Wildlife Sanctuary, Eco-sensitive areas within 10 km of the Project site.

4.4.2 Environmental Setting of the Project Site:

Below mentioned table gives brief regarding environmental setting of the plant:

S.No	Particulars		Aerial Distance from the site
1.	Nearest Village	:	Kesda – 1.25 kms.
2.	Water bodies	:	Seasonal Nala is Passing through the site to the Eastern direction. Mahanadhi bhatapara Canal - 0.15 km (SE) Shivnath River – 9.5 Kms (SW) Jamuniya stream – 5.1 Kms. (SE) Otgan Pond – 3.3 Kms (SW) Hatbandh Pond – 3.8 Kms.(E) Khilora Pond – 7.6 Kms (NEE) Parsada Pond – 7.4 Kms. (SSW)
3.	Reserve Forest / Protected Forest	:	Bilari Ghughua RF - 0.35 kms. (W) Bilari RF – 6.2 Kms (SSW)
4.	Industrial areas / cluster (MoEF&CC Office Memorandum dated 13th January 2010) & its subsequent amendments	:	Nil and also the project site area does not fall in the areas given in Hon'ble NGT order issued vide dated 10th July 2019.
5.	National Park/ Wild life sanctuary / Biosphere reserve / Tiger Reserve / Elephant Corridor / migratory route for Birds	:	There are no notified National Park/ Wild life sanctuary/Biosphere reserve/Tiger Reserve/ migratory routes for Birds with in 10 Km. radius of the project site.
6.	Costal Regulation Zone [CRZ]	:	Nil with in 10 Km. Radius.
7.	Industrial Area	:	Nil with in 10 Km. Radius.
8.	Nearest Highway (NH / SH)	:	NH # 130 – 6.5 Kms. (NWW)
9.	Nearest Interstate Boundary	:	Nil with in 10 Km. Radius.
10.	Nearest Railway Station	:	Hathband R.S. – 5.1 Kms.
11.	Nearest Port facility	:	Nil with in 10 Km. Radius.
12.	Nearest Airport	:	None within 10 Kms.

4.5 EXISTING INFRASTRUCTURE

Infrastructure like Internal Roads, Storage area, Parking areas etc. will be provided in the proposed project. For establishment and successful operation of plant, it is imperative to ensure availability of the following infrastructure:

- Availability of coal & iron ore and its proximity to the plant to reduce cost of transportation.
- Road/Rail head connection so that the raw materials and products can be easily and economically transported.
- Availability of water.
- Permanent and reliable source of power.
- Adequate land for the plant, storage of raw material and products & disposal of waste material.

Chapter – 5 : PLANNING BRIEF

5.1 PLANNING CONCEPT

M/s. Sky Steel & Power Private Limited is proposed to establish a Steel Plant in Khasra Nos. 219, 220/1, 220/2, 221, 222/1, 222/2, 223, 225, 296, 297, 298/1, 298/2, 299, 300, 305/1, 305/2, 306, 307 , 308, 316, 317, 318, 319, 322/2, 326/2, 328/2, 334, 335, 346, 347, 1713, 1718, 1719, 1720, 1721, 1722, 1725, 1726, 1727, 1728, 1748, 1749, 268/1760 at, Kesda Village, Simga Tehsil, Baloda Bazar District, Chhattisgarh. Following is Plant configuration and Production Capacity:

Table No. 5.1 :Plant configuration and production capacity

S.No.	Units (Products)		Production Capacity
1.	Iron ore Beneficiation (Beneficiated ore)		1.3 MTPA (throughput)
2.	Pellet Plant (Pellet)		1.0 MTPA
3.	DRI Kilns (Sponge Iron)		3,30,000 TPA
4.	Induction Furnace (Billets / Ingots / Hot Billets)		2,64,000 TPA
5.	Rolling Mill (Rolled Products) (85 % Hot charging with Hot Billets and remaining 15% through RHF with LDO as fuel)		2,97,000 TPA
6.	Ferro Alloys Unit (FeSi / FeMn / SiMn / FeCr)		FeSi – 17,955 TPA / FeMn-45,144 TPA / SiMn-23,940 TPA / FeCr-26,600 TPA
7.	Brick Manufacturing Unit		56,000 Brick/ day
8.	Power Plant (38 MW)	WHRB Power Plant (2 x 36 TPH &3 X 9 TPH)	22 MW
		CFBC Power Plant (1 X 72 TPH)	16 MW

5.2 POPULATION PROJECTION

According to the 2011 census, Balodabazar – Bhatapara district has a population of 13,05,343. The district has a population density of 349.60 inhabitants per square kilometer . Its population growth rate over the decade 2001-2011 was 49.87%. Balodabazar – Bhatapara district has a sex ratio of 1004 females for every 1000 males, and a literacy rate of 70.63%.

Most of the employment will be generated from the local areas only. There will not be much population projection due to the proposed project.

5.3 LAND USE PLANNING

24.88 Ha. (61.48 Acres) of land is envisaged for the proposed project. The following is land use planning/statement of the plant area:

Table No. 5.2 :LAND USE STATEMENT

Item	Area (in Ha.)
Builtup area for Proposed Facilities	9.70
Raw material, solidwaste and product storage areas	1.20
Internal roads	1.20
Greenbelt	8.3
Switch Yard	0.30
Truck Parking	0.70
Rainwater harvesting reservoir	0.70
Miscalleneous & others	2.78
Total	**24.88**

5.4 ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL)

Infrastructure like Toilets, Rest Rooms, Car and Truck parking, Time & security, Fire Fighting facilities etc. will be provided in the proposed project. The Compnay will assess the demand of infrastructure (Physical & Social) in the nearby area of the project site and development activities will be carried out uner corporate social responsibilities program from time to time.

5.5 AMENITIES / FACILITIES

Facilities like canteen, rest room will be provided as basic facilities to workers. No other additional facilities are proposed.

Chapter – 6 : PROPOSED INFRASTRUCTURE

6.1 INDUSTRIAL AREA (PROCESSING AREA)

The main plant area comprises of Pellet plant, DRI Kilns, Induction Furnaces with matching LRF & CCM, Rolling Mills with Hot Charging, Ferro Alloy Unit, WHRB based Power Plant, CFBC based Power Plant, raw material storage and product storage etc.

6.2 RESIDENTIAL AREA (NON PROCESSING AREA)

No Township / Colony is proposed, however facilities like Admin building, canteen, rest room and indoor games facilities will be provided in the proposed project.

6.3 GREEN BELT

Out of total **24.88 Ha. (61.48 Acres)** of land, **8.3 Ha. (20.5 Acres)** i.e.1/3rd of land is envisaged for greenbelt.

6.4 SOCIAL INFRASTRUCTURE

Proposed project will result in growth of the surrounding areas by increasing direct and indirect employment opportunities, which in turn will be develop their livelihood. Social infrastructure will be developed as per the local needs funds as fixed by the statutory authorities as per the per MoEF&CC notification.

6.5 CONNECTIVITY

The proposed site is well connected with Road network. The following table gives brief regarding connectivity of the proposed site:

Component		Description
Road	:	Site is connected to NH # 30 (Raipur - Simga) – 9.5 Kms. (by Road)
Rail	:	Nearest station –Hathband Railway Station – 6.5 Kms. (by Road) & Railway iding is at distance of 3.2 Kms(By road)
Air	:	Swamy Vivekananda International Airport - 72 Kms. (by Road)

6.6 DRINKING WATER MANAGEMENT

Proposed domestic water requirement is 20 KLD and same will be sourced from surface water.

6.7 SEWARAGE SYSTEM

Toilet facilities will be provided. Domestic effluent collected through toilet blocks will be sent to proposed STP. In the proposed project, STP (will be designed for 20 KLD) will be established to treate Domestic waste water.

6.8 INDUSTRIAL WASTEWATER MANAGEMENT

- There will be no effluent discharge in the Sponge Iron, Induction Furnace, Ferro Alloys unit as closed circuit cooling system will be adopted.
- Air Cooled condensers will be provided in the power plant, which will be reduce the water consumption significantly. Hence wastewater generation will also be minimized.
- Thickener over flow from I/ O beneficiation process will be recycled along with with makeup water after treatement in settling tank. Thickener under flow will be taken to filter press an after dewatering the filter cake will be stored in the storage yard.
- Effluent from Rolling Mill will be sent to settling tank & will be recycled through closed circuit cooling system.
- Effluent from power plant will be treated in ETP and after ensuring compliance with SPCB norms, it will be utilized for dust suppression, ash conditioning, brick making and for greenbelt development.
- Sanitary waste water will be treated in STP.
- Garland drains will be provided around all the raw material stacking areas.

6.9 SOLID WASTE MANAGEMENT

Following solid waste / by product will be generated from proposed project:

Table No. 6.1: SOLID WASTE GENERATION AND ITS MANAGEMENT

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
1.	Tailings from I/O beneficiation	2,60,000	Will be taken to filter press & recovered the water. Cake of tailing will be stored in tailing yard & it will given to nearby Ceramic Unit.
2.	Ash / dust from Pellet plant	30,000	Will be utilized in the proposed Brick Manufacturing Unit
3.	Ash from DRI	46,200	Will be utilized in the proposed Brick Manufacturing Unit
4.	Dolochar	66,000	Will be used in proposes CFBC power plant as fuel.
5.	Kiln Accretion Slag	2,970	Will be utilized in the proposed Brick Manufacturing Unit
6.	Wet scrapper sludge	15,180	Will be utilized in the proposed Brick Manufacturing

S.No.	Waste	Quantity (TPA)	Proposed method of disposal
			Unit
7.	SMS Slag	26,400	Slag from SMS will be crushed and iron will be recovered & then remaining non -magnetic material being inert by nature will be used in proposed Brick Manufacturing Unit
8.	End Cuttings from Rolling Mill	8,911	Will be reused in the SMS
9.	Mill scales from Rolling Mill	891	Mill scales will be recycled to Ferro alloys unit.
10.	Ash from Power Plant	72,864	Will be utilized in the proposed Brick Manufacturing Unit
11.	Bagfilter Dust	2,300	Will be utilized in the proposed Brick Manufacturing Unit
12.	Slag from FeMn	27,294	Will be reused in manufacture of SiMn as it contains high SiO_2 and Silicon.
	(or)		
13.	Slag from FeSi	4,320	Will be given to Cast iron foundries
	(or)		
14.	Slag from SiMn	20,080	will be used for Road construction / will be given to slag cement manufacturing
	(or)		
15.	Slag from FeCr	15,450	Will be processed in Zigging 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 utilised for Road laying /brick manufacturing. If Chrome content exceeds the permissible limits, it will be sent to nearest TSDF.

6.10 POWER REQUIREMENT & SUPPLY / SOURCE

Power required for the proposed project will be **62 MW** and same will be sourced from **38 MW** Captive Power Plant & remaining **24 MW** is from State Grid.

Chapter – 7: REHABILITATION & RESETTLEMENT (R & R) PLAN

No rehabilitation and resettlementis required as the proposed project site is not having any habitations.

Chapter – 8 : PROJECT SCHEDULE & COST ESTIMATES

8.1 PROJECT SCHEDULE

Proposed project will be implemented in 6 to 7 Years from the date of receipt of Environmental Clearance from the MoEF&CC, New Delhi & Consent from CECB.

8.2 ESTIMATED PROJECT COST

The estimated cost for the proposed project will be **Rs. 494 Crores.**

S.No.	Units (Product)	Estimated Cost (in Crores)
1.	I/O Beneficiation Plant (1.3 mtpa)	78.00
2.	Pelletization Plant (1.0 mtpa)	110.00
3.	DRI Kilns (2 x 350 TPD + 3 x 100 TPD)	120.00
4.	Induction Furnaces [(4 x 20 T)+ LRF+CCM]	20.00
5.	Rolling Mills (3 x 300 TPD)	20.00
6.	Submerged Eletric Arc Furnaces (3 x 6 MVA)	27.00
7.	Power Plant WHRB (2 x 8 MW + 3 x 2 MW)	66.00
8.	Power Plant CFBC (1x 16 MW)	50.00
9.	For Fire Protection, Occupational Health & Risk Assessment	3.00
	Total	**494.00**

Chapter – 9 : ANALYSIS OF PROPOSAL

9.1 FINANCIAL AND SOCIAL BENEFITS

With the implementation of the proposed project, the socio-economic status of the local people will improve substantially. The land rates in the area will improve in the nearby areas due to the proposed activity. This will help in upliftment of the social status of the people in the area. Educational institutions will also come-up and will lead to improvement of educational status of the people in the area. Primary health centre will also be developed by us and the medical facilities will certainly improve due to the proposed project.

9.2 SOCIO-ECONOMIC DEVELOPMENTAL ACTIVITIES

Sky Steel And Power Private Limited will actively contribute to improve the Socio-economic conditions of the area by providing assistance for local persons preferable from the nearby villages. The continuing commitment by business to behave ethically and contribute to economic development while improve the quality of life of workforce and their families as well as that of the local community and society at large.

As per MoEF&CC Office Memorandum vide F.No.22-65/2017-IA.III dt. 30thSeptember 2020, budgetary allocation for commitment made by Project Proponent to address the concern raised during public hearing, issues raised from Social Impact Assessment (SIA), which is part of Environment Management Plan (EMP) will be made.