PRE-FEASIBILITY REPORT

for

Proposed Expansion of existing Steel Plant by installation of Sponge Iron Plant with 2x200 TPD DRI Kilns, 4x15 T Induction Furnaces, 400 TPD Rolling Mill & 8 MW capacity WHRB based Captive Power Plant

at

Jamuria, Mouza Ikra, Jamuria Industrial Estate, Dist. Burdwan, West Bengal

Project Proponent

Calstar Sponge Limited

18, R. N. Mukherjee Road, Kolkata-700 001

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PRE-FEASIBILITY REPORT

1.0 INTRODUCTION

M/s Calstar Sponge Ltd., a private Company, was incorporated on 1st March, 2004, has its registered office at 18, R.N. Mukherjee Road, Kolkata – 700001, West Bengal.

The company's current activity involves production of Sponge Iron (72,000 TPA by installation of 2x100 TPD DRI Kiln) at Mouza – Ikra, Jamuria Industrial Estate, Dist. Burdwan, West Bengal.

The chronology of events and the various units for which Environmental Clearance (EC) / validity of EC extension / Consent to operate (CTO) was obtained by the Company for the same plant, has been given below.

Sr. No.	Application Date	Date of Issue	Certificate obtained	Reference Number	Name of Proposed Units	Obtained from
1	10-5-2006	21-2-2007	Consent to Establish (NOC)	Memo No. 1002-2N-175/2006(E) dated 21.02.2007	• 2 x 100 TPD Rotary Kilns - 6000 TPM Sponge Iron (Project Cost: Rs. 17.11 Crores)	West Bengal Pollution Control Board
2	3-6-2009	7-8-2009	Environmental Clearance (EC)	No. EN/2098/T-II-1/045/2009	• Induction Furnace (1x8 MT), • Continuous Casting Machine (24000 TPA) • Waste Heat based Captive Power Plant (4 MW)	State Level Environment Impact Assessment Authority (SEIAA), West Bengal

3	22-8-2009	3-2-2010	Environmental Clearance (EC)	EN/332/T-II-1/045/2009	5 MW Captive Power Plant (AFBC Boiler - 30 TPH)	State Level Environment Impact Assessment Authority (SEIAA), West Bengal
4	15-7-2017	18-8-2017	Extension of validity of Environmental Clearance dated 7-8-2009 & 3-2-2010	1782/EN/T-II-1/045/2009	As per Serial No. 2 & 3 of this Table	State Level Environment Impact Assessment Authority (SEIAA), West Bengal
5	9-9-2010	20-5-2011	Environmental Clearance (EC)	F. No. J-11011 / 655 / 2009- IA II (I) dated 20.05.2011	• DRI Kiln (2x100 TPD) – 60000 TPA Sponge Iron • 8 MW Captive Power Plant – WHRB 4 MW + AFBC 4 MW • Ferro Alloys (2x9 MVA) – 30000 TPA Ferro Alloys	**Ministry of Environment & Forests, Govt. of India**
6	27-03-2018	23-7-2018	Extension of validity of Environmental Clearance	F. No. J-11011 / 655 / 2009- IA II (I) dated 20.05.2011	• DRI Kiln (2x100 TPD) – 60000 TPA Sponge Iron • 8 MW Captive Power Plant – WHRB 4 MW + AFBC 4 MW • Ferro Alloys (2x9 MVA) – 30000 TPA Ferro	**Ministry of Environment & Forests, Govt. of India**

					Alloys	
7	-	30-11-2017	Valid Consent to Operate (CTO) – upto 31-7-2022	Memo No. 1974/WPBA/Red (Bwn)/ Cont (595)/08 (Part-II)	2 x 100 TPD Rotary Kilns - 6000 TPM Sponge Iron	West Bengal Pollution Control Board

Now, the company intends to expand its activity by setting up Sponge Iron Plant and Induction furnaces with matching LRF & CCM including WHRB based Captive Power Plant within the premises of the existing Steel Plant.

2.0 THE PROJECT

Encouraged by the anticipating better future market, the company has decided to install Sponge Iron Plant (2x200 TPD DRI Kilns) and Induction furnaces (4x15 TPH) with matching LRF & CCM, 400 TPD Rolling Mill and 8 MW capacity WHRB based Captive Power Plant at Jamuria, Mouza – Ikra, Jamuria Industrial Estate, Dist. Burdwan, West Bengal.

The proposed expansion project will be installed on 7.81 hectares (19.29 acres) of land within the existing plant premises. The land is generally flat and does not come under flood zone. There is no human settlement in the project site. Said plot of land has already been earmarked as an industrial land. So, setting up of the expansion project would not alter the current land use pattern. The existing unit as well as units to be implemented and proposed units are presented in **Table-1.0**.

TABLE-1.0
OVERALL PROJECT SCENARIO

Unit	Existing Unit under Operation	Units to be Implemented		Proposed Units Capacity	Product
		As per EC obtained from SEIAA, West Bengal	As per EC obtained from MoEF&CC, New Delhi		
Sponge Iron Plant	2x100 TPD (72,000 TPA)	-	2x100 TPD (60,000 TPA)	2x200 TPD (1,20,000 TPA)	Sponge Iron
SMS - Induction Furnaces (with matching LRF & CCM)	-	1x8 T (24,000 TPA)	-	4x15 T (1,80,000 TPA)	Liquid Steel
Rolling Mill	-	240 TPD (72,000 TPA)	-	400 TPD (1,20,000 TPA)	Rods, Bars, Light Structural
Ferro Alloy Plant	-	-	2 x 9 MVA Submerged Arc Furnaces (30,000 TPA)	-	Ferro Manganese & Silico Manganese
Captive Power Plant	-	9 MW (4 MW WHRB based & 5 MW AFBC based)	8 MW (4 MW WHRB based & 4 MW AFBC based)	8 MW (WHRB based)	Power

3.0 INDUSTRY SCENARIO

Indian steel industry plays a significant role in the country's economic growth. It now occupies the position of 4th largest steel producer at the global front and struggling to become the 2nd largest producer of crude steel in the world by 2015-16. India has taken over a central position on the global steel map with its giant steel mills, acquisition of global scale capacities by players, continuous modernization and up gradation of old plants, improving energy efficiency, and backward integration into global raw material sources. Global steel giants from across the world have shown interest in the industry due to its phenomenal performance in the recent years.

Demand-Supply Gap

On a conservative estimate, the steel demand in India is expected to touch around 90 MTPA by 2015 and around 150 MTPA by 2020. Steel supply is, however, expected to reach only around 88 MTPA by 2015 and around 145 MTPA by 2020. While the demand for steel will continue to grow in traditional sectors, specialized steel is also increasingly being employed in various hi-tech engineering industries. Globally, a relation can be observed between steel consumption and the GDP growth rate. Overall, India, being in a high growth phase with huge planned infrastructure development, is bound to witness sustained growth in steel requirement in the years to come.

M/s Calstar Sponge Ltd. has drawn up a growth plan with the objective of increasing its market share in Indian steel industry. Keeping all these in mind, the Company has planned to set up the proposed expansion project in a more environment friendly way.

4.0 SITE LOCATION

The proposed project will be located at J.L. No. – 38, Jamuria, Mouza – Ikra, Jamuria Industrial Estate, P.S. – Jamuria, Dist. Burdwan, Pin – 713362 in West Bengal. Its geographical co-ordinates are Latitude 23°41'46.33"N and Longitude 87°6'24.82"E with mean sea level as 400 ft. Ikhra Railway Station is about around 0.7 km from the project site. National Highway-60 (NH-60) and National Highway-2 (NH-2) are around 5 and 6.5 km respectively, from the project site.

The proposed site area is well developed and has all necessary infrastructure facilities such as motorable road upto the plant site, close proximity to rail head, telephone facilities etc. The nearby industrially developed towns are Raniganj, Asansol and Durgapur which are around 9.5, 16 and 29 km respectively, from the project site.

Kolkata city is located at a distance of about 182 km from the project site. Distance from Howrah Railway station to the project site is about 174 km. The nearest airport is Andal (Durgapur) which is about 16 km from the project site and Netaji Subhash Chandra Bose International Airport, Kolkata is around 180 km from the project site. Kolkata Port is around 100 km away and Haldia Port is 209 km away from the project site.

River Ajay is passing approximately at a distance of 7.3 kms from the project site. There is no National Park & Reserve Forest within 10 km radius of the project site.

Location Map & Project site on Google Map is presented in **Figure – 1.0 & 2.0** respectively.

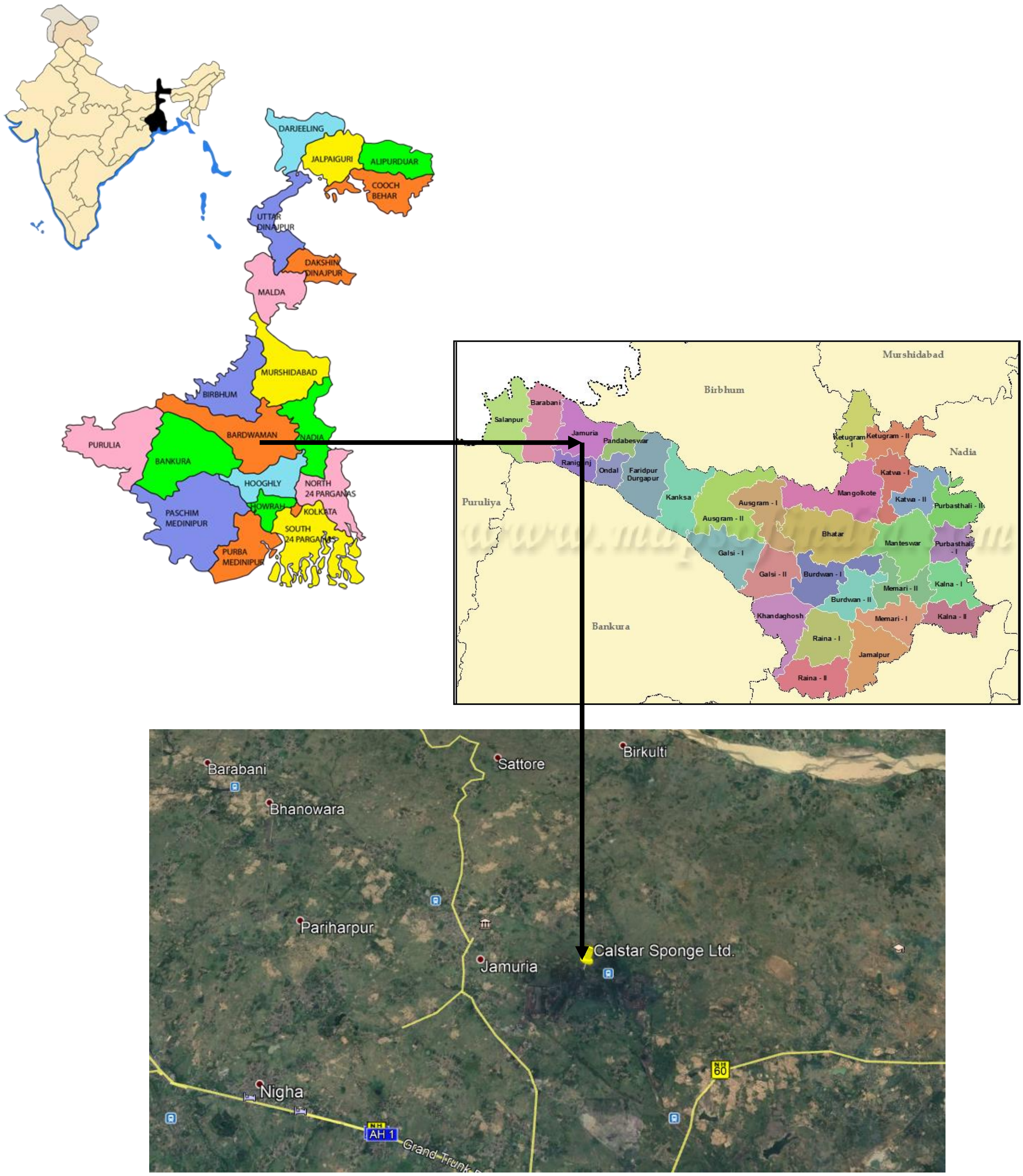


Figure – 1.0 : Location Map

J.L. No. – 38, Jamuria, Mouza – Ikra, Jamuria Industrial Estate, P.S. – Jamuria, Dist. Burdwan, West Bengal

Latitude 23°41'46.33"N and Longitude 87°6'24.82"E with mean sea level as 400 ft. (122 m)

Figure – 2.0 : Project Site on Google Earth
J.L. No. – 38, Jamuria, Mouza – Ikra, Jamuria Industrial Estate, P.S. – Jamuria,
Dist. Burdwan, West Bengal
Latitude 23°41'46.33"N and Longitude 87°6'24.82"E with mean with mean sea level as 400 ft.

5.0 PROCESS OF MANUFACTURING

5.1 SPONGE IRON PLANT

The project proponent will install 2 nos. of Rotary Kilns having 200 TPD capacity with rated production of 1,20,000 TPA Sponge Iron (300 working days in a year). The process employs Rotary Kiln as the main reactor where the reduction of iron ore in the form of iron oxide is carried out with coal as reductant. The inner of steel frame shell kiln will be protected by refractory lining. The kiln will have a slope of 2.50 down towards the discharge end. Air blowers having dampers will be provided on the kiln shell in different heating zones for introducing air for combustion. Sized iron ore and coal shall be fed in to the kiln at the feeding end with the help of weigh feeders. Due to the slope and rotational movement of the kiln the charge will move towards the discharge end. Temperature measurement and control shall be done with the help of thermocouples provided in different heating zones of the kiln. Additional coal requirement shall be met by injecting fine coal through the discharge end of the kiln.

Kiln discharge consisting of mixture of sponge iron and dolochar, mixture of unreduced iron, uncalcinated limestone, gangue and semi burnt coal, will be passed on to a rotary cooler where water will be sprayed to cool the discharge mix to about 120°C. The cooler discharge will fall on to a hopper and taken through conveyers for screening of fines and coarse materials and subsequently subjected to magnetic separation where sponge iron will be separated from dolochar. The reducing gases generated from the combustion of the coal will flow in the counter current direction and emerge from the feed end of the kiln which will be maintained at a positive pressure of about +5 mm water column. The flue gases will then pass through a gravitational Dust Settling Chamber (DSC) and then to the After Burner Chamber (ABC) where CO will get converted to non-toxic CO_2. The flue gas at about 900°C to 1000°C, will be taken to the Waste Heat Recovery Boilers (WHRB) to utilize the waste heat content of flue gases.

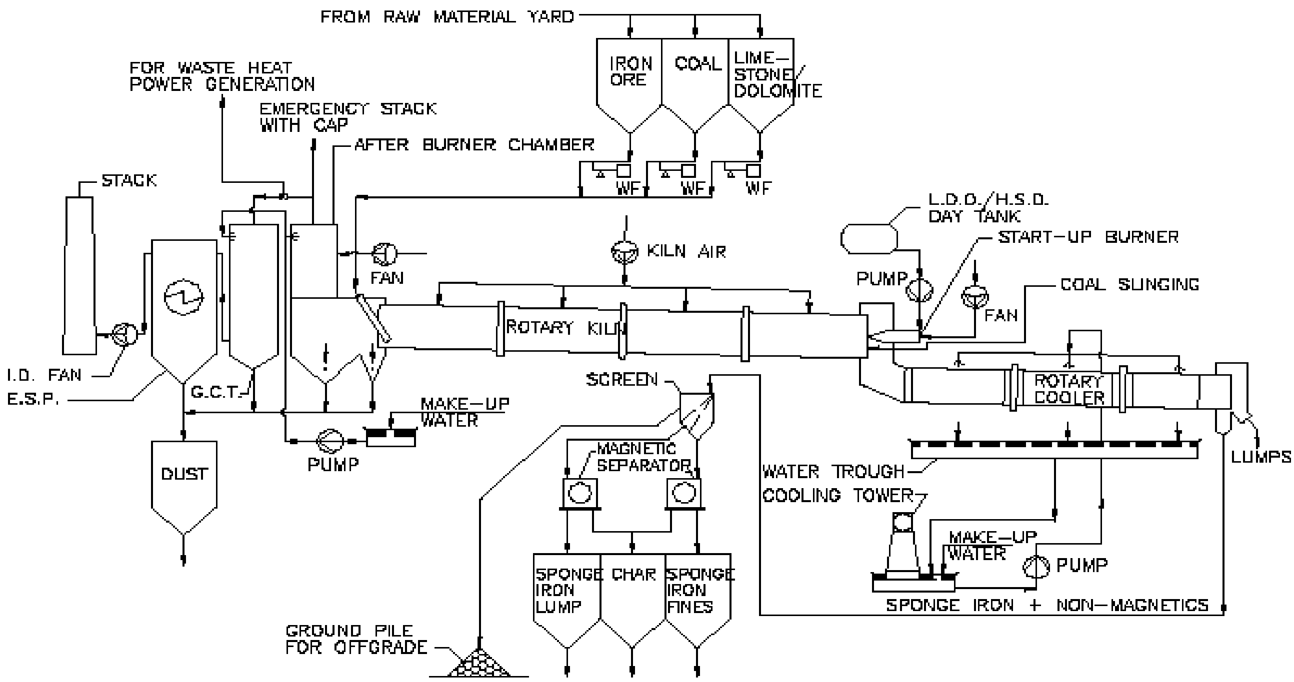
Material Balance for Sponge Iron Plant

An Indicative Material Balance showing input of raw materials and the resultant output for the Sponge Iron Plant are presented in **Table-2.0**.

Table 2.0 : Material Balance for 1.0 Tonne Sponge Iron Production

INPUT	QTY (T)	OUTPUT	QTY (T)
Iron ore	1.600	Sponge Iron	1.000
Coal	1.300	Char	0.371
Lime Stone	0.032	DSC	0.160
		Gasified	1.074
		Dust	0.032
		Back flow	0.021
		Handling	0.140
		Accretion	0.080
		Oversize	0.054
TOTAL	**2.932**	**TOTAL**	**2.932**

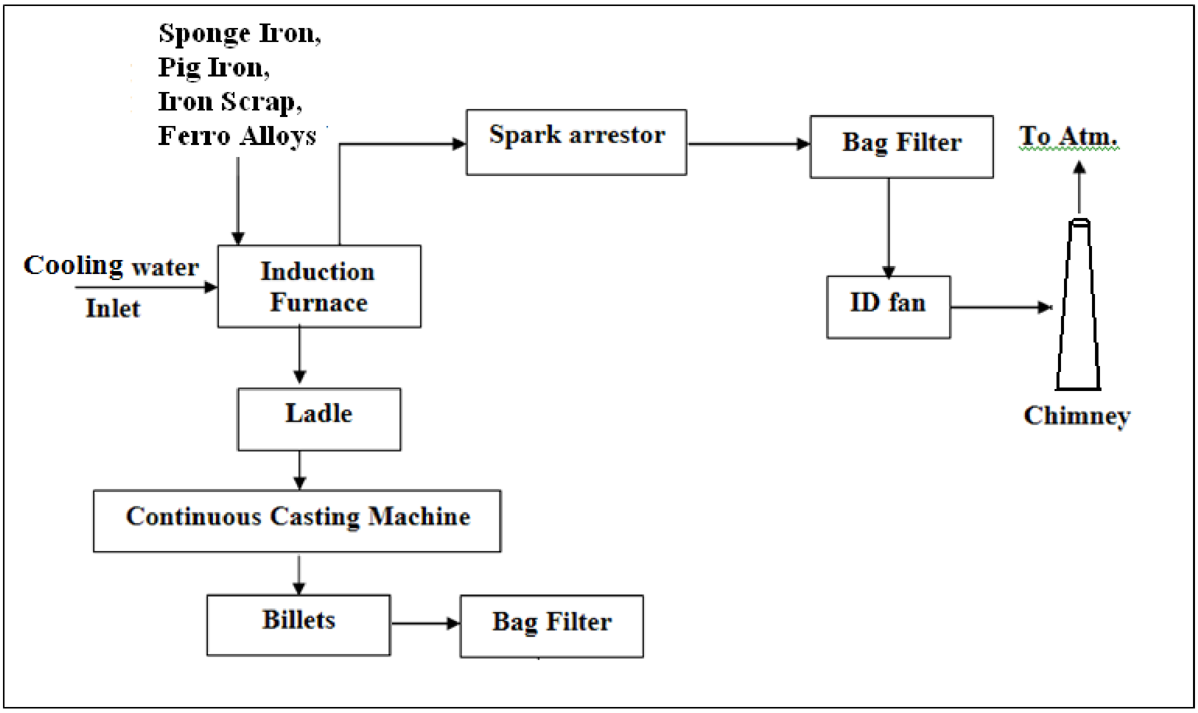
An Indicative coal based Sponge Iron Plant process flow diagram is presented below,



5.2 INDUCTION FURNACE

We are proposing to install 4 (four) numbers of 15 tonnes (each) Induction furnaces having production capacity of 1,80,000 TPA of liquid steel (300 working days in a year).

The plant will produce steel in the form of billets & TMT Bars through IF-CCM route. Steel making will be done using induction furnaces. A brief description of the processes is dealt with in the subsequent paragraphs and the process flow sheet is given below.



Steel Making by Induction Furnace

The greatest advantage of the Induction Furnace is its low capital cost compared to other types of Melting Units. Its installation is relatively easier and its operation simpler. Among other advantages, there is very little heat loss from the furnace as the bath is constantly covered and there is practically no loss during its operation. The molten metal in an Induction Furnace is circulated automatically by electromagnetic action so that when alloy additions are made, a homogeneous product is ensured in minimum time. The time between tap and charge, the charging time, power delays etc. are items of utmost importance in meeting the objective of maximum output in tones/hours at a low operational cost. The disadvantage of the induction furnace is that the melting process requires usually selected scrap because major refining is not possible.

The process for manufacturing of steel may be broadly divided into the following stages:

i) Melting the charge mixed of steel & Iron scrap
ii) Ladle teeming practice for Casting (OR)
iii) Direct teeming practice for billet casting unladdable teeming machine

When the furnace is switched on, the current starts flowing at a high rate and a comparatively low voltage through the induction coils of the furnace, producing an induced magnetic field inside the central space of the coils where the crucible is located. The induced magnetic fluxes thus generated throughout the packed charge in the crucible, is placed centrally inside the induction coil.

As the magnetic fluxes generated throughout the scraps complete the circuit, they generate an induced eddy current in the scrap. This induced eddy current, as it flows through the highly resistive bath of scrap, generates tremendous heat and melting starts. It is thus apparent that the melting rate depends primarily on two things (1) the density of magnetic fluxes and (2) compactness of the charge. The charge mixed arrangement has already been described. The magnetic fluxes can be controlled by varying input of power to the furnace, especially the current and frequency.

In a medium frequency furnace, the frequency range normally varies between 150-10 K cycles/ second. This heat is developed mainly in the outer rim of the metal in the charge but is carried quickly to the center by conduction. Soon a pool of molten metal forms in the bottom causing the charging to sink. At this point any remaining charge mix is added gradually. The eddy current, which is generated in the charge, has other uses. It imparts a molten effect on the liquid steel, which is thereby stirred and mixed and heated more homogeneously. This stirring effect is inversely proportional to the frequency of the furnace and so the furnace frequency is selected in accordance with the purpose for which the furnace will be utilized.

The melting continues till all the charge is melted and the bath develops a convex surface. However, as the convex surface is not favorable for slag treatment, the power input is then naturally decreased to flatten the convexity and to reduce the circulation rate when refining under a reducing slag. The reduced flow of the liquid metal accelerates the purification reactions by constantly bringing new metal into close contact with the slag. Before the actual reduction of steel is done, the liquid steel which might contain some trapped oxygen is first treated with some suitable deoxidizer. When no purification is attempted, the chief metallurgical advantages of the process attributable to the stirring action are uniformity of the product, control over the super heat temperature and the opportunity afforded by the conditions of the melt to control de-oxidation through proper addition.

As soon as the charge has melted clear and de-oxidising ions have ceased, any objectionable slag is skimmed off and the necessary alloying elements are added. When these additives have melted and diffused throughout the bath, the power input may be increased to bring the temperature of metal up to the point most desirable for pouring. The current is then turned off and the furnace is tilted for pouring into a ladle. As soon as pouring has ceased, any slag adhering to the wall of the crucible is scrapped out and the furnace is readied for charging again.

As the furnace is equipped with a cover over the crucible very little oxidation occurs during melting. Such a cover also serves to prevent cooling by radiation from the surface heat loss and protecting the metal. Another advantage of the induction furnace is that there is hardly any melting loss compared to the arc furnace.

CONTINUOUS CASTING MACHINE

The molten steel from the IF is cast in a continuous casting machine to produce billets. In some processes, the cast shape is torch cut to length and the hot metal is transported to the rolling mill for further processing. Other steel mills have reheat furnaces. Steel billets are allowed to cool, and then be reheated in a furnace prior to rolling the billets into bars or other shapes.

The process is continuous because liquid steel is continuously poured into a 'bottomless' mould at the same rate as a continuous steel casting is extracted.

1) Before casting begins a dummy bar is used to close the bottom of the mould.
2) A ladle of molten steel is lifted above the casting machine and a hole in the bottom of the ladle is opened, allowing the liquid steel to pour into the mould to form the required shape.
3) As the steel's outer surface solidifies in the mould, the dummy bar is slowly withdrawn through the machine, pulling the steel with it.
4) Water is sprayed along the machine to cool/solidify the steel.
5) At the end of the machine, the steel is cut to the required length by gas torches.

5.3 ROLLING MILL

The company has planned to set up a rolling mill for production of 1,20,000 TPA (400 TPD) TMT Bars as a finished product.

Hot rolling process

Re-Heating Furnace is fired daily 4 hours before start up time of Rolling Mill. Billets, when in the heating zone, a temperature of 650°C is achieved, which is measured through Thermo Couples. In soaking zone a temperature of 1250°C is achieved. Some sized samples of approximately 1.5 m to 2 m length are put in & fed in every mill. This is already in running condition with all water circuitry on, to check the sizes on every pass. If some minute adjustment is required it is made & again samples are fed to confirm the size of pass in Rolls. Then 1st piece of billet is passed through. Leader & tail ends are cut in line Rotary Shears to final size. It is then put on cool bed manually & again size is reconfirmed.

In the meantime charging grate helpers manually put the cold billet, which was stacked on charging grate by (EOT) Electromagnetic Crane from stock yard, on conveyor table. The conveyor table brings the piece in front of the pusher present on the back side of re-heating furnace. From here on getting the signal from ejector operator the pusher operator pushes the piece into the furnace. In front the roughing pull pot operator gives an electric operated signal to ejector operator for pushing next piece and rolling of second piece starts. If rolling is going on without hindrance which is observed upto 10 (approx.) pieces, the process becomes continuous. On an average when 8 MM size is being rolled & 3 Meter billet is used. Approximately 65-70 pieces come in one hour. Production increases for high sized sections (10 MM & above). On cooling bed, when the quantity is collected, one piece of 48 M length is pushed manually/ automatically on pieces conveyor. When it passes through cold shear, it is cut into 12 M length. Workers make bundles of these & stack these size wise for checking & dispatching.

5.4 CAPTIVE POWER PLANT

The company intends to set up a Captive Power Plant of 8 MW capacity, based on WHR Boiler, utilizing waste heat from the proposed 2x200 TPD DRI Kilns.

Waste Heat Recovery Boiler will be installed behind the After burning chamber (ABC) of proposed DRI kilns in bypass configuration. The flue gases after ABC will be taken to uni-fired furnace chamber and then flow over banks of super heater, convective evaporator and economizer before being discharged to atmosphere through ESP, ID fan and stack. The flue gases will pass over various heat transfer surfaces to ESP and then finally discharged into chimney by ID fan. Condensate extraction pumps will pump the condensate after condenser of STG to a common deaerator. Feed water from the deaerator will be pumped to the waste heat recovery boiler by boiler feed pump. The steam generated from the Waste Heat Recovery boiler will drive the steam turbine.

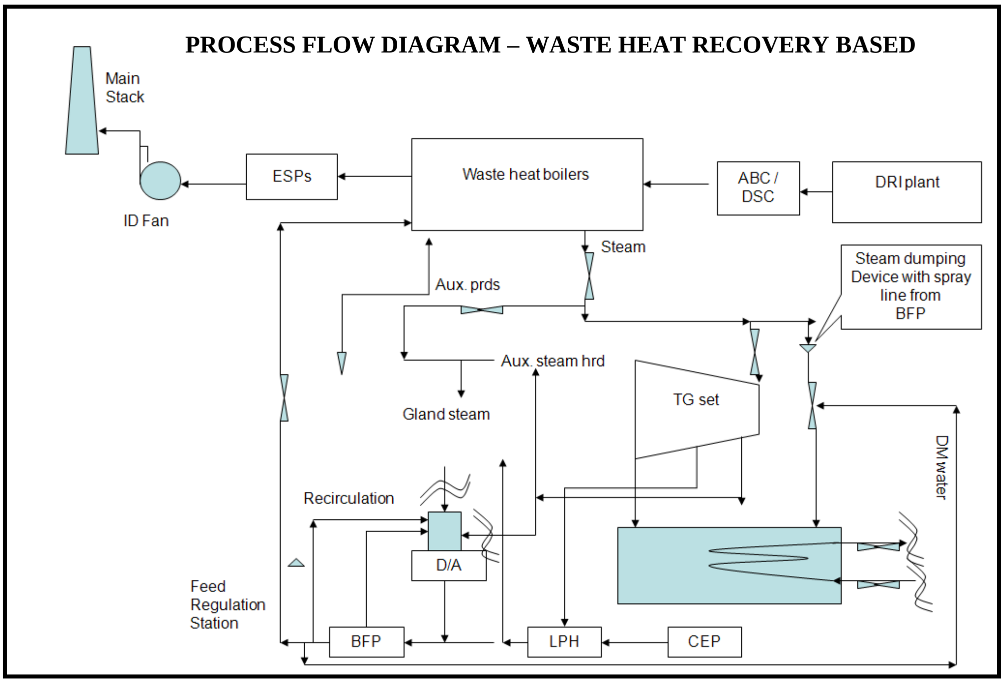
After burning chamber (ABC) and Dust settling chamber (DSC) will be located at the exit of DRI Plant Kilns. Part of the dust carried by the waste gases will settle down at DSC. The DSC and ABC assembly will be connected to the DRI Plant Kilns through refractory lined duct.

The combustibles in the waste gases are burnt in the After Burning Chamber which will raise the waste gas temperature thus making the waste gases free from carbon mono-oxide. Provision for spraying water will be made to control the temperature if required. From ABC outlet the WHRB will be connected through a refractory lined duct. An emergency stack cap on top of ABC will be provided for diverting the waste gases to atmosphere when WHRB is under shutdown or break down.

The boiler will be complete with evaporator steam drum, mud drum, bank of super heaters, economizer, attemperator, air fans, ESP, internal piping etc. Soot blowing and super heater attemperation system will also be provided. Boiler will be provided with blow down tanks (IBD, CBD etc), sample cooler.

Steam Turbine generator:
There shall be one TG of 8 MW capacity. The board description of the steam turbine generator envisaged is indicated below:

Indicative process flow diagram of WHRB based captive power plant are presented below.



6.0 RAW MATERIALS & UTILITIES

6.1 RAW MATERIAL

The major raw material, which will be handled consists of Sponge Iron, Pig Iron, dolomite, Ferro Alloys, Imported coal etc. The annual requirement of major raw materials, which will be required additionally for the proposed project, is presented in **Table-3.0**.

Table-3.0
List of Raw Materials

SL. NO.	RAW MATERIALS	ANNUAL REQUIREMENT (IN TPA)	SOURCE
SPONGE IRON PLANT (2x200 TPD)			
1.	IRON ORE	2,30,000	ORISSA
2.	IMPORTED COAL	1,87,200	SOUTH AFRICA
3.	LIME STONE	4,608	MARKET
INDUCTION FURNACES (4x15 T)			
1.	SPONGE IRON	1,60,000	IN HOUSE DRI PLANT
2.	SCRAPS	26,000	IN HOUSE PLANT & MARKET
3.	PIG IRON	30,000	MARKET
4.	FERRO ALLOYS	1550	IN HOUSE PLANT

Raw materials will be received at plant site by rail/road. All the trucks for raw material and finished product transportation shall comply with the applicable environmental norms.

6.2 FUEL

For meeting the requirement of Furnace oil and Light Diesel Oil of various producing modules of the plant, adequate infrastructure in terms of tanks, pumps, pipe lines and dispensing units have been set up which shall be further augmented to meet the requirements of the proposed project. The required fuel is being sourced locally from Indian Oil Corporation.

6.3 RAW WATER DEMAND

As per an initial estimate water to the tune of 215 m^3/day will be needed for the proposed project. In addition, water around 10 m^3/day will be needed for in-plant domestic use. Thus, total 225 m^3/day make up water will be required for the proposed project.

Water will be sourced from River Ajay has been obtained.

The estimated unit wise make up water requirement for the proposed project are given below:

Sl. No.	Description	Daily water Demand (in cum/day)
1.	Sponge Iron Plant (2x200 TPD)	50
2.	Steel Melting Shop (Induction Furnaces (4x15 T + Ladle Furnaces + Continuous Billet Caster)	45
3.	400 TPD Rolling Mill	20
4.	Captive Power Plant	100
5.	Domestic	10
TOTAL		**225**

6.4 POWER

The estimated power requirement of the proposed unit is around 31.5 MW. The power requirement will be met from proposed captive power plant and the rest from nearby grid of State. Unit wise power breakup for the proposed project is as follows.

SL. No.	UNIT	POWER CONSUMPTION (IN MW)
1.	Sponge Iron Plant (2x200 TPD)	2.5
2.	Steel Melting Shop (Induction Furnaces (4x15T) + Ladle Furnaces + Continuous Billet Caster)	24.0
3.	8 MW capacity Captive Power Plant	1.0
4.	400 TPD Rolling Mill	3.0
4.	Auxiliary & other loads	1.0
TOTAL		**31.5**

7.0 ENVIRONMENTAL ASPECTS

This chapter covers the genesis of pollution, principal sources of pollution, nature of pollution and proposed measures required for meeting the prevailing statutory requirements of gaseous emissions, waste water characteristics, noise level etc. for environmental management purpose in connection with the proposed expansion project.

Pollution prevention and control measures are enumerated as below:

Genesis of Pollution:
The genesis of industrial pollution can be assessed from the project concept described in earlier paragraphs. The specific aspects, which need to be looked into for assessing the pollution potential, are:

(i) Physical-chemical characteristics of raw materials,
(ii) Manufacturing technology involving a set of physical and chemical conversions of raw materials and lastly,
(iii) The generation of all types of wastes, namely, gaseous, liquid and solid having specific characteristics.

The pollutants in the form of solids, liquids and gases that are expected to be generated from various Units of the proposed Sponge Iron Plant, Steel Melting Shop, etc. Release of such pollutants without proper care may affect the environment adversely. Pollution of the environment not only adversely affects the human beings, flora and fauna but also shortens the life of the machinery and equipment. This vital aspect, therefore, has been taken into account while planning the plant and equipment and adequate measures have been proposed to limit the emission of pollutants within the stipulations of statutory norms. However, the proposed units by and large are less polluting in nature.

7.1 AIR POLLUTION CONTROL

Sources of air pollution can be broadly divided into two groups – process and non-process. Process emissions would be those which would be emitted during production/operation of the plant, while non-process emissions would be due to different material handling facilities. The main air pollutants from process emissions would be SO_2, NO_x and to some extent PM while for non-process emission the main pollutant would be PM.

A number of systems have been proposed for air pollution control which will provide safe environmental conditions in the working area and will ensure acceptable air quality in the surrounding area of the steel plant. Different air pollution control facilities / equipments that would be considered include dry fog dust suppression systems, dust extraction systems, bag filters, ESP etc. Cleaned waste gases would be discharged through tall stacks to ensure adequate dispersion and dilution of pollutants.

Particulate emission from the stack would be governed according to the Central Pollution Control Board Emission Regulation. Electrostatic precipitators having efficiency of 99.89% or better will achieve the limit of particulate emission below 30 mg/Nm^3. As far as coal dust suppression is concerned, water spraying arrangement will be provided at suitable locations.

7.2 WATER POLLUTION CONTROL

Waste water generated from the different areas of the plant will be treated to the desired extent in suitable treatment facilities and recycled back to the process, as far as practicable, facilitating adequate reuse of water in the respective recirculating systems and economizing on the make-up water requirement. Sewage generated from toilet blocks etc. shall be treated in septic tank-soak pit system. The water thus collected shall be used for dust suppression at raw material handling system, ash handling, landscaping etc. Thus, Water system will be designed for "Zero Discharge" wherein all discharges will be treated and reused in the plant.

The Boiler blowdown will be controlled to maintain system solids loading within normal limits for proper water chemistry. The effluent will have less than 100 ppm suspended solids and will be led into the station sump mix with other station effluents to reduce temperature and utilized for disposal of ash in slurry form.

Surface run-off will be settled in a settling basin prior to reuse/ disposal.

7.3 SOLID WASTE MANAGEMENT

Solid wastes that will be generated from IF are slag and dust. The hot slag generated from IF will be transferred to slag yard after cooling. IF slag will be used for road construction and land filling purposes.

Dolochar from the existing & proposed Sponge Iron Plans will be used in AFBC boiler.

Solid wastes that will be generated from caster are the scales. The scales will be collected from the drain and transferred to IF for reuse.

7.4 NOISE POLLUTION CONTROL

Noise generation will be considered while selecting equipment. Equipment would not generate noise more than 85 dB (A) at 1 m distance. Wherever required noisy equipment will be placed on vibration isolators or housed in a separate enclosure or surrounded by baffles covered with noise absorbing material. As the operator would be stationed in the control room, there will be minimum chance of exposure to high noise levels. However personnel working in high noise zones will be provided with personal noise protection equipments (e.g. ear muffs, ear plugs) and their duty hours will be regulated to control noise exposure levels.

8.0 FIRE PROTECTION SYSTEM

In addition to the yard fire hydrant system, the fire protection systems envisaged for the plant are as follows:

- Internal fire hydrant for storied buildings to be tapped-off from the outdoor fire water header.
- Fire detection and alarm system for electrical rooms, cable basements/cellars, cable tunnels, selected oil/hydraulic cellars.
- Portable fire extinguishers such as CO_2, foam and dry chemical powder in all areas of the plant with fire hazard.

9.0 LAND

The proposed expansion project will be installed on 7.81 hectares (19.29 acres) of land within the existing plant premises. The plant layout of the proposed project is presented in **Figure-3.0**.

10.0 GREEN BELT DEVELOPMENT OBJECTIVE

To capture the fugitive emission, if any, from the plant and to attenuate the noise generated from the plant machinery and to improve the aesthetics of the plant site, a green belt will be developed within the plant area.

The green belt is a set of rows of trees planted in such a way that they form an effective barrier between the plant and the surrounding areas. Prevalent wind directions shall be taken into consideration to ensure adequate capturing of the air pollutants around the plant.

Open spaces, where tree plantation is not possible shall be covered with shrubs and grass. The plantations shall match with the general landscape of the area and be aesthetically pleasant. Adequate attention will be paid to planting of trees and their maintenance and protection. Out of the total plant area of 7.81 hectares (19.29 acres), 2.58 hectares (6.36 acres) (33% of the total area) shall be covered under Green Belt.

11.0 RAIN WATER HARVESTING

It is proposed to achieve proper utilization of rain water by harvesting through rain-water harvesting mechanism in the plant area. Rain water harvesting will be done following the guidelines of the concerned Authority.

12.0 MANPOWER REQUIREMENT

Operation and maintenance of the proposed expansion project requires human resources in different categories like managers, engineers of different discipline like metallurgical, mechanical, electrical, electronics, computer, civil, structural, chemical, etc., highly skilled, skilled and semi-skilled work force in different disciplines, commercial, accountants and financial managers, unskilled labour force, clerical, security personal, etc.

Factory human resources

In order to operate and maintain the plant facilities, including its technical and general administration needs, the manpower requirement for the proposed project has been estimated to be 220 persons.

The above estimate covers the top management, middle and junior level executives and other supporting staff.

13.0 PROJECT PERIOD

The installation of several production units along with utilities and services require co-operation for procurement of equipment, equipment foundations, awarding of all contracts and supervision of all construction jobs at plant site. The factors which are responsible for timely implementation of the project are :

i) Arrangement of proper finance for the project.
ii) Finalization of layout of the proposed plant.
iii) Designing of utilities and services.
iv) Placement of orders for plant and machinery.
v) Arrangements for Govt. sanctions and supply of power.
vi) Recruitment of personnel.

As per an initial estimate around 36 months will be needed for implementation of the project.

14.0 ESTIMATED COST

As per initial estimate, the cost of the project works out to around Rs. 90 Crores.

15.0 COMMERCIAL & FINANCIAL FEASIBILITY EVALUATION

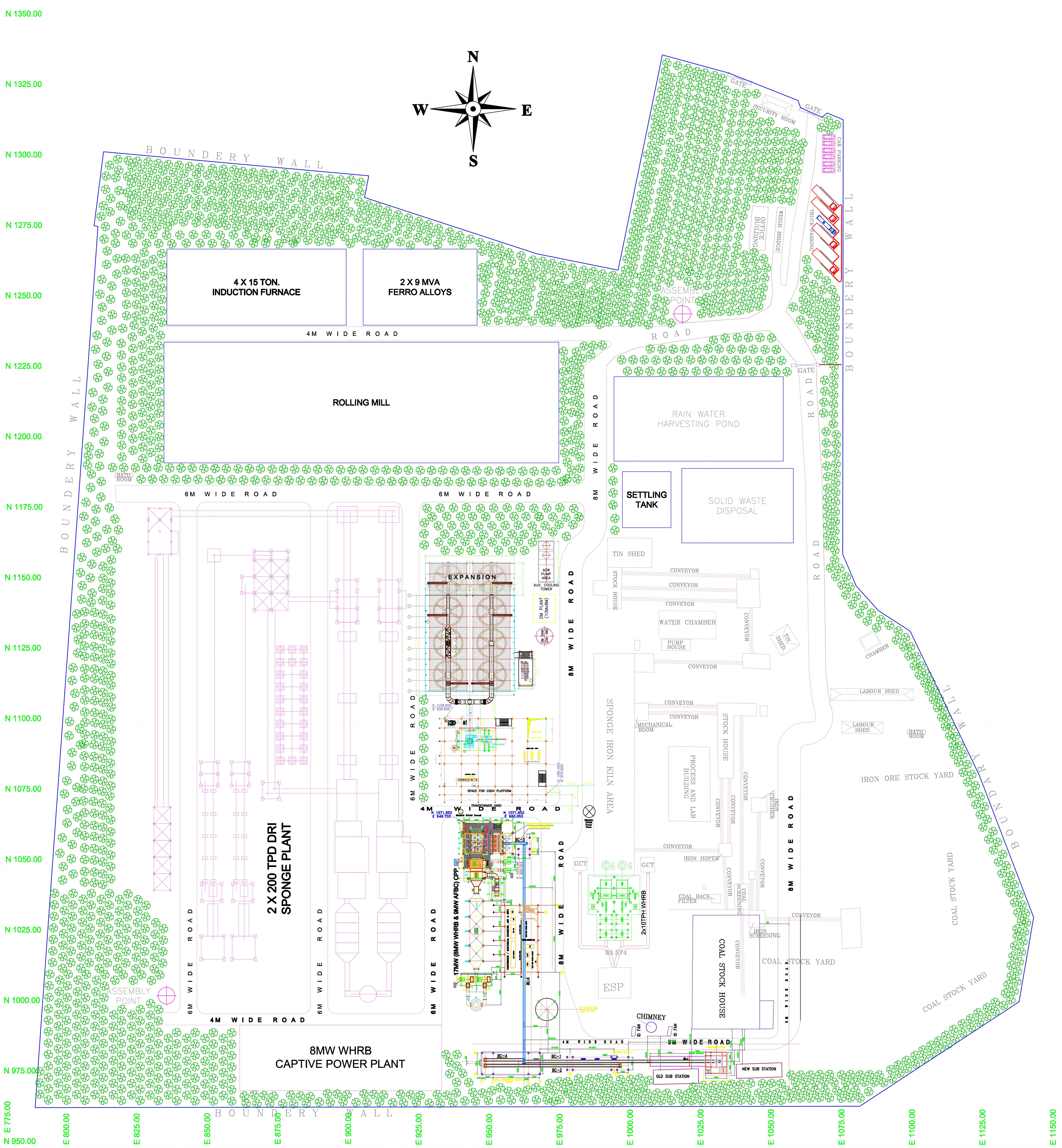
The focus of proposed expansion project is cost reduction by producing quality material as per the required specification. There will be complete integration right from the beginning to finished products (viz. TMT bars). The estimated cost of the project is expected to be around Rs. 90 Crores. There will be substantial savings due to the said project as company will also be eligible for various incentives. The company has a good track record of implementing and commissioning capital for the proposed project as per schedules. The total project is expected to be commissioned over a period of 36 months in phased manner. The benefit from the project planned will begin to be acquired from year one only.

16.0 CONCLUSION

Here we have examined the feasibility of the expansion project from 3 angles, which is the backbone of any project to succeed -

- Environmental feasibility
- Commercial and financial feasibility and
- Pre and post project scenario in which company will operate.

The outcome shows that results are positive which indicate a positive feasibility.



CALSTAR SPONGE LIMITED

JAMURIA, WEST BENGAL

PROPOSED GENERAL LAYOUT
(2X200 TPD SPONGE IRON)

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