# EXECUTIVE SUMMARY

## EXPANSION OF INTEGRATED STEEL PLANT (1.2 MILLION TPA TO 2.0 MILLION TPA WITH 270 MW CAPTIVE POWER PLANT)

FOR

## *M/s Rashmi Alloys Steel Pvt. Ltd.*

*(Currently M/s Orissa ALLOY STEEL PVT. LTD)*

**Mouza – Nandarchalk ,Bargai, Shyamraipur & Kanjarichak, Village – Gokulpur, P.O – Shyamraipur, P.S – Kharagpur (L), Dist. Paschim Medinipur , West Bengal**

**May 2021**


**Centre for Envotech and Management Consultancy Pvt. Ltd.**

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# EXECUTIVE SUMMARY

## 1.0 INTRODUCTION

### 1.1 General background

M/s Orissa Metaliks Private Limited (OMPL) received an Environment clearance from MOEFCC vide File No.- J-11011/169/2017-IA-II(I) dated 03.04.2019 which was transferred to M/s Rashmi Alloy Steel Private Limited (RASPL) vide File No.- J-11011/169/2017-IA-II(I) dated 28.01.2020.

Expansion EC under clause 7(ii) of EIA Notification for change in configuration and product mix, keeping the plant capacity (crude steel production) unchanged accorded to M/s. Rashmi Alloy Steel Pvt. Ltd. by Ministry of Environment, Forest and Climate Change, Government of India had Environmental Clearance vide letter no. J-11011/169/2017-IA-II (I) dated 19.03.2021.

Certificate of Incorporation pursuant to name change from M/s Rashmi Alloy Steel Private Limited to M/s Orissa Alloy Steel Private Limited has been approved by Ministry of Corporate Affair, Govt. of India on 17$^{th}$ April 2020. Change in the name of the Company is being undertaken to promote ease of business and easy identification of the name with its holding company M/s Orissa Metaliks Private Limited. So, EC is renamed in favour of M/s Orissa Alloy Steel Private Limited vide File No.- J-11011/169/2017-IA-II(I) dated 12.05.2021 and conceptually project of 'Expansion of Integrated Steel Plant (1.2 To 2.0 Million TPA Finished Steel) with 270 MW Captive Power Plant for which TOR is granted by ministry vide File No.- J-11011/169/2017-IA-II(I) dated 08.04.2021' is deemed to be read in favour of M/s Orissa Alloy Steel Private Limited.

Project is for enhancement of production of Integrated Steel Plant from 1.2 to 2.0 Million TPA finished steel capacity by adopting MBF/DRI-IF Route with installation of additional 270 MW CPP. The area will be expanded from 310 to 360.0 acres. Cost of expansion project will be Rs. 2900.0 crores.

| Sl. No. | Units | As per EC dt-19.03.2021 & 12.05.2021 | | Expansion Proposal considering 350 annual working days | | Ultimate Configuration | | Product |
|---|---|---|---|---|---|---|---|---|
| | | Configuration | Capacity | Configuration | Capacity | Configuration | Capacity | |
| 1 | Blast Furnace with matching PCM | 1 x 550 $m^3$ | 0.6 Million TPA | **No change In Blast furnace size** | (+) 0.17 Million TPA | 1 x 550 $m^3$ | 0.77 Million TPA | **Hot Liquid Metal / Pig Iron/ High Quality Billet & steel product** |
| | Matching LD,CCM & Rolling Mill | *** | *** | **2 x 45 T** | 0.77 Million TPA | 2 X 45 T | | |

| Sl. No. | Units | As per EC dt-19.03.2021 & 12.05.2021 | | Expansion Proposal considering 350 annual working days | | Ultimate Configuration | | Product |
|---|---|---|---|---|---|---|---|---|
| | | Configuration | Capacity | Configuration | Capacity | Configuration | Capacity | |
| 2 | Sinter | 1 x 70 $m^2$ | 0.60 Million TPA | **No change** | (+) 0.24 Million TPA | 1 x 70 $m^2$ | 0.84Million TPA | **Sinter** |
| 3 | Enhancement of DRI plant capacity | 4 x 600 TPD | 0.744 Million TPA | **No change same kiln** | (+) 0.156 Million TPA | 4 x 600 TPD (Same kilns) + 2 x1200 TPD | 1.80 Million TPA | **Sponge Iron** |
| | New DRI plant | | | **Addition** (2 x 1200 TPD) | (+) 0.90 Million TPA | | | |
| 4 | SMS with LRF/AOD,CCM and oxygen optimized furnace | 10 x 20 T EIF + 2 x 50 T EAF | 1.0 Million TPA | **Addition & change in technology** (25 T I.F x 12 + 30 T I.F. x 5) | (+) 0.80 Million TPA | 20 T I.F X 10 + 25 T I.F x 12 + 30 T I.F. X 5 | 1.80 Million TPA | **Billet** |
| 5 | SMS Slag Crusher | *** | *** | 4 x 25 TPD | (+) 100 TPD | 4 x 25 TPD | 100 TPD | **Metal Recovery** |
| 6 | Ferro Alloy Plant | 4 x 9 MVA | 0.048 Million TPA | **No change** | | 4 x 9 MVA | 0.048 Million TPA | **Ferro Alloys (FeMn, FeSi, SiMn & FeCr)** |
| 7 | Jigging Plant | *** | *** | 2 x 15 TPD | (+) 30 TPD | 2 x 15 TPD | 30 TPD | **Metal Recovery** |
| 8 | Chrome Briquette Manufacturing plant | 1 x 40 TPH | 40 TPH | **No change** | | 1 x 40 TPH | 40 TPH | **Chrome Briquette** |
| 9 | Non-recovery type Coke Oven Plant (*modified wet quenching type*) | 2 x 0.25 MTPA | 0.5 Million TPA | **(+0.05)** | | 2 x 0.25 MTPA | 0.55 Million TPA | **Metallurgical Coke** |
| 10 | Lime Dolomite Plant | 1 x 200 TPD | 200 TPD | **No change** | | 1 x 200 TPD | 200 TPD | **Lime & Dolomite** |
| 11 | Oxygen Plant | 1 x 200 TPD | 200 TPD | **Addition** (2 x 200 TPD) | 400 TPD | 3 x 200 TPD | 600 TPD | **Oxygen** |
| 12 | Rolling Mill | **** | 0.6 Million TPA | **Expansion** | (+) 1.2 Million TPA | ** | 1.8 Million TPA | **TMT Bar, Wire & Wire Rod** |
| 13 | Rolling Mill | *** | 0.35 | **(-) 0.35 MTPA** | | **SURRENDERING THE UNIT** | | |

| Sl. No. | Units | As per EC dt-19.03.2021 & 12.05.2021 | | Expansion Proposal considering 350 annual working days | | Ultimate Configuration | | Product |
|---|---|---|---|---|---|---|---|---|
| | | Configuration | Capacity | Configuration | Capacity | Configuration | Capacity | |
| | with Pickling Line & Continuous Galvanizing | | Million TPA | | | | | |
| 14 | Ductile Iron Pipe Unit, Fitting & Accessories | *** | 0.20 Million TPA | **No change** | | ** | 0.20 Million TPA | **DI Pipe, Fitting & Accessories** |
| 15 | Captive Power Plant | WHRB Based 104 MW (68 MW from DRI Plant) + 34 MW from Coke Oven Plant + 2 MW from EAF+ CFBC (Coal & Dolochar Mix based) 2 x 45 MW] | 194 MW | **Expansion of WHRB Based CPP** | (+) 68 MW from WHRB DRI Plant + 8 MW from Coke Oven Plant (+) 2 MW B.F.-TRT - 2 MW from EAF | **180 MW WHRB** Based (136 MW from DRI Plant) + 42 MW from Coke Oven Plant + 2 MW from B.F. – TRT<br><br>**90 MW CFBC** (Coal & Dolochar Mix based) 2 x 45 MW | 270 MW | **Power** |
| 16 | Pellet Plant with matching Beneficiation Plant | 1 x 2.4 MTPA | 2.4 Million TPA | **No change same Pellet module** | (+) 0.6 Million TPA | 1 x 2.40 MTPA (Same kilns) + 2 x 4.0 MTPA | 11.0 Million TPA | **Iron ore Pellet** |
| | New Pellet Plant with matching Beneficiation Plant | *** | *** | **Additional (**2 x 4.0 MTPA) | (+) 8.0 Million TPA | | | |
| 17 | Producer Gas Plant | 20 x 7,500 $Nm^3$/hr | 1,50,000 | **Additional** (6 x7,500 $Nm^3$/hr) | (+) 45,000 $Nm^3$/hr | 26 x 7,500 | 1,95,000 $Nm^3$/hr | **Producer Gas** |
| 18 | Railway Siding | 01 No. | 01 No. | ** | ** | 01 No. | 01 No. | *** |

### 1.2 Location and communication

The proposed plant, after expansion will fall in villages Nandarchalk ,Bargai, Shyamraipur & Kanjarichak, Village – Gokulpur, P.O – Shyamraipur, P.S – Kharagpur (L), Dist. Paschim Medinipur, West Bengal. The location of plant is given in **Fig. No. C1-1** of Chapter 1. The outermost co-ordinates of various parts of the proposed plant, based on google earth, are:

| Latitude | Longitude |
|---|---|
| **Existing** | |
| 22°21'39.93"N | 87°17'57.63"E |
| 22°22'05.60"N | 87°17'48.71"E |
| 22°22'14.07"N | 87°18'11.67"E |
| 22°22'08.35"N | 87°18'29.62"E |
| 22°21'40.33"N | 87°18'29.19"E |
| 22°21'38.26"N | 87°18'12.82"E |
| **Proposed** | |
| 22°21'43.26"N | 87°18'40.85"E |
| 22°21'50.56"N | 87°18'41.34"E |
| 22°21'55.08"N | 87°18'35.88"E |
| 22°21'37.63"N | 87°18'25.76"E |
| 22°21'34.78"N | 87°18'29.77"E |
| 22°21'27.01"N | 87°18'26.71"E |
| 22°21'30.28"N | 87°18'22.30"E |

The project site is well connected to NH-6 & NH-60. Nearest city to the project site is Kharagpur (~4 km in SE direction). Nearest Railway Station is Gokulpur Railway Station (~1.4 km in East direction) & Kharagpur Railway Station (~5.5 km in SE direction) and nearest airport is Netaji Subhash Chandra Bose International Airport, Kolkata (~120 km in NE direction).

## 2.0 PROJECT DESCRIPTION

### 2.1 Plant layout

The land use of the core area will be changed during the construction and the operation phases. Land use of the entire project area will be changed from waste & barren and low-yield agricultural land to industrial use. The total land requirement for the integrated steel plant is 360 acres land. During construction phase, parts of the project area will be converted into internal roads, water reservoir, buildings, colony, green belt and plantation, etc. The proposed layout map is shown in **Fig. No. C2-1** of Chapter-2.

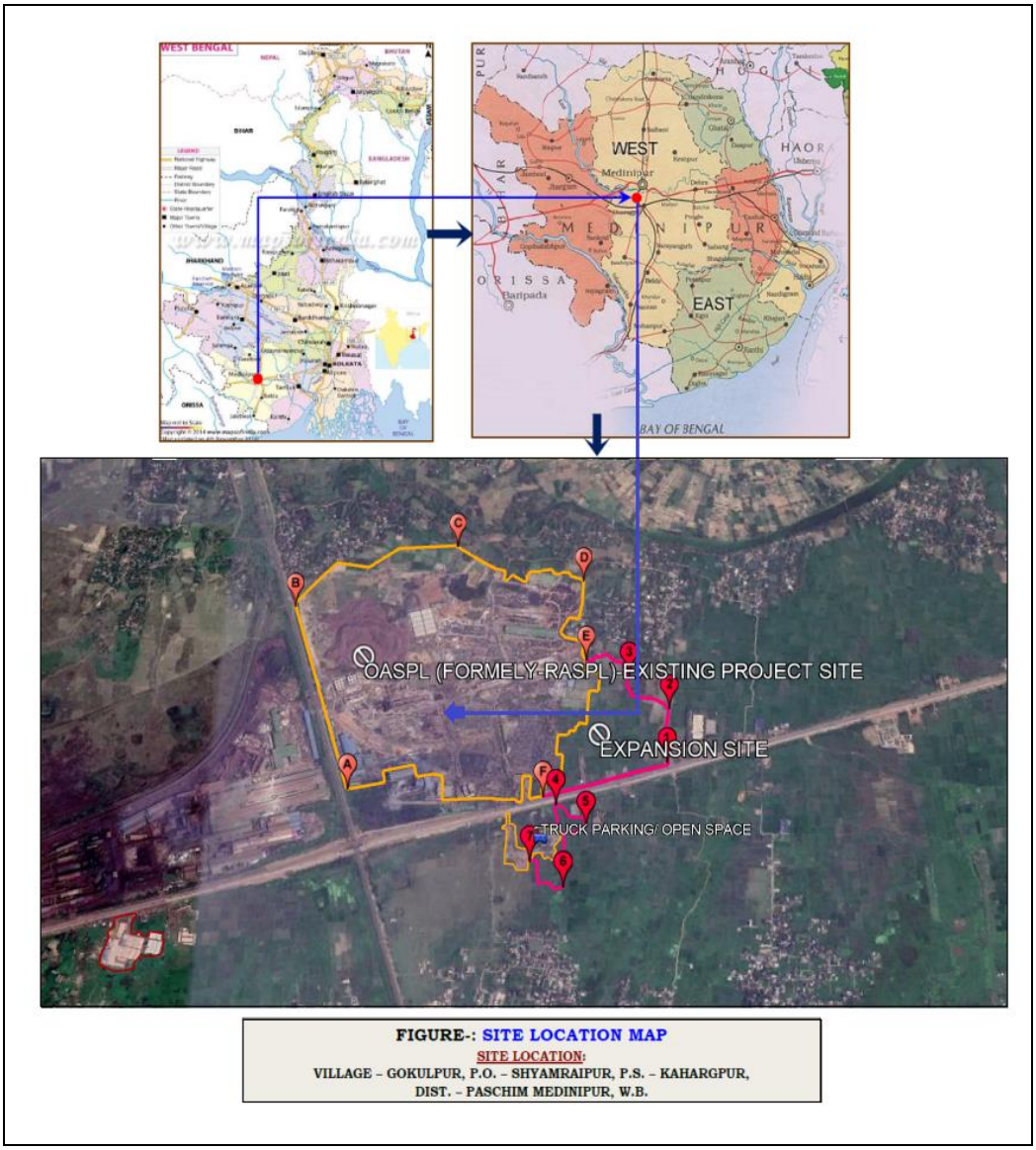


**Fig No. 1: Location Map**

## 2.2 Process Description

**Pellet Plant (2.40 to 11.0 MTPA):** The pellet plant will produce oxide pellets suitable for use in D.R.I. and blast furnace. Pellets are heat hardened balls produced from concentrates and natural iron ores of different mineralogical and chemical composition. The pellets have improved properties for iron making. Pelletization process involves feed preparation, green ball formation, pellet induration and product dispatch.

**Direct reduced iron (D.R.I.) Plant (0.744 to 1.80 MTPA):** Main raw materials - iron ore, coal and dolomite are fed to the ground hoppers with the help of pay loaders and tippers. They are carried away by belt conveyors to the crusher house and thereafter fed to kiln. Iron ore is reduced by heating with coal in the rotary kiln at a temperature of about 1000°C. After reduction, products are cooled in a drum type rotary cooler. Product is then separated into

D.R.I. or sponge iron and char by magnetic separation. In rotary cooler, product is cooled by indirect water spray.

**Mini blast furnace (0.6 to 0.77 MTPA):** The purpose of a blast furnace is to chemically reduce and physically convert iron oxides into liquid iron called "hot metal". Iron ore, Sinter, Pellet, coke and limestone are fed into the top of the blast furnace. Preheated air is blown into the bottom. The raw materials descend to the bottom of the furnace where they become liquid iron (final product) and liquid slag (waste). These are drained from the furnace at regular intervals. The blast furnace flue gas will be as fuel in Rolling mill, DIP and SMS.

**Steel melting shop (1.0 to 1.80 MTPA):** Steel melting shop will have 10X20 tonne, 12x25 tonne, 5x30 tonne induction furnaces (I.F.). Induction furnace works on the principle of induction melting of scrap/ sponge iron with the help of electric power. In the electric arc furnace, electric arc is generated between electrodes, which heats the metallic charge. In both furnaces, the melted contents separate into liquid metal and slag. The slag is removed and considered as waste. The liquid metal is sent to the continuous casting machine (C.C.M.) where semi-finished product is made.

**Rolling mill (0.6 to 1.8 MTPA):** Semi-finished product from the continuous casting machine of induction furnace and electric arc furnace as well as from outside purchase will be reheated and converted into finished products such as TMT, Flat, Round, Wire Rod, Structural and others products.

**Ductile Pipe Plant (0.2 MTPA):** Ductile pipe plant will receive hot metal directly from the mini blast furnace and manufacture finished product comprising of ductile pipes. As a back up measure, provision of reheating furnace has also been made.

**Sinter Plant (0.60 to 0.84 MTPA):** Sintering is an agglomeration process of iron ore fines/ blue dust, coke breeze and fluxes. The iron ore dusts collected from other units and pollution control equipments will also be utilised as raw material for sinter. Thus, utilising maximum solid waste from within the plant. The sinter generated will be 100% utilised in mini blast furnace.

**Coke oven plant (0.5 to 0.55 MTPA):** Raw coal will be crushed in a crusher into powdered form and charged in the oven for carbonisation. The volatile matter in raw coal gets released in the form of gas and gets burnt in the oven as well as in the flues. After the completion of the carbonization process, raw coal get converted to coke within 64 hours. The coke is then pushed out from the oven and quenched by water. Coke will be utilised in mini blast furnace and sinter plant. Balance leftover shall be sold in the market.

**Captive Power Plant (CPP): (1) Waste Heat Recovery Boiler:** 180 MW waste heat recovery boilers based power plant is proposed to utilize the heat from gases exiting DRI kilns (136 MW), blast furnace (TRT- 02 MW) and coke oven (42 MW). **(2) AFBC/ CFBC:** 90 MW (2 x 45 MW) power plant based on coal and char from DRI kilns has been proposed. The power generated from the CPP will meet the requirement of the steel plant.

For material handling within plant premises a coal handling system, ash handling system, roads etc shall be provided. Water requirement in various locations within the plant will be supplied through a circulating water system with a cooling tower, make up water system and blow down system.

## 2.3 Raw material, power and water

Major raw material and fuel requirement for project will be various grades of iron ore, non coking coal (domestic/Import) and coking coal (imported). Other raw material required is limestone, dolomite, bentonite, clay, silica component, flocculant, gypsum, quartz, silica, pig iron and semi finished products. Fuels required in various units will be coking and non coking coal, coke breeze & fines, low sulphur heavy stock diesel oil/ furnace oil, coke oven gas and MBF gas.

**Raw Material Requirement:**

| Sl. No. | Raw Materials | Quantity Required (in TPA) | | |
|---|---|---|---|---|
| | | As per EC | Proposed | Final |
| 1 | Sized Iron Ore Lump and fines | 37,52,534 | (+) 99,06,966 | 136,59,500 |
| 2 | Non-coking Coal | 14,71,300 | (+) 99,6740 | 24,68,040 |
| 3 | Coking Coal | 6,70,000 | (+) 1,27,500 | 7,97,500 |
| 4 | Dolomite | 1,00,080 | (+) 2,07,120 | 3,07,200 |
| 5 | Limestone | 1,32,023 | (+) 87,977 | 2,20,000 |
| 6 | Bentonite | 48,000 | (+) 1,72,000 | 2,20,000 |
| 7 | Manganese Ore | 1,24,000 | No change | 1,24,000 |
| 8 | Chromium Ore | 1,05,600 | No change | 1,05,600 |
| 9 | Quartzite | 2,58,000 | (+) 57,700 | 3,15,700 |
| 10 | Inoculants | 168 | No change | 168 |
| 11 | Magnesium | 300 | No change | 300 |
| 12 | Runner Coat | 900 | No change | 900 |
| 13 | Slag Coagulant | 264 | No change | 264 |
| 14 | Zinc | 408 | No change | 408 |
| 15 | Bitumen/ Epoxy Solution | 1,150 KL/Year | No change | 1,150 KL/Year |
| 16 | Sand | Variable | No change | Variable |
| **TOTAL** | | **67,97,627** | | **182,20,730** |

The existing power requirement of the project is 263 MW. Additional 215.9 MW will be required for the expansion project. The total power requirement of the project shall be 478.90 MW. 270 MW will be sourced from Captive Power Plant & balance 208.90 MW from State Grid power supply system.

The total water requirement for the 2.0 million tonne per annum plant will be 605 $m^3$/hr. It shall be sourced from Kansabati River, treated municipal waste / nala water, ground water (till Dec-23) and rain water harvesting pond.

### 2.4 Manpower

The manpower requirement will be 5000 (Direct) persons for various activities of the 2.0 million tonne plant like plant operation, loading, unloading, handling, transportation, general cleaning, horticulture and other miscellaneous works inside the plant. Additional 5500 indirect employment will be created. Three shifts working for 350 days are planned.

### 2.5 Site services

Infrastructure facilities such as administrative office, rest rooms, canteen, first aid centre, etc. will be provided to employees.

## 3.0 PRESENT ENVIRONMENTAL SCENARIO

The project area has been referred to as the "core zone" while the area upto 10 km radius of the project has been referred to as the "buffer zone".

### 3.1 Topography and drainage

***Topography:*** The major part of the study area has the rolling and flat plain topography with substantial part under recent flood plains. The area presents a gradually sloping topography with dense/scrub forest cover in the northwest and southern parts. The highest altitude is 90 m above mean sea level (msl) near Shalika in the southwest and the lowest altitude is 11 m above msl near Dharma in the northeast. The general slope of the land in the study area is towards east/southeast. The topography of the project site is plain with general elevation ranging from 32 m to 35 m above msl. The topographic features of the study area may be seen from Survey of India OSM Nos. F45J3 & F45J7 (73 N/3 and 73N/7).

***Drainage:*** The study area is drained by the river Kasai and its tributaries. Kangsabati river flows around 4.5 km NNW plant site in a meandering course mainly NW-SE to E-W and after traversing through Medinipur town ultimately meets the Hugli river near Haldia Anchorage in Purba Medinipur district. The drainage in the study area is of radial to dendritic. There are number of small ponds spread over the entire surface area. There are no streams or river passing through and no visible drainage course spread in the existing plant premises.

### 3.2 Climate and micro-meteorology

The climate of region is mainly sub-tropical type. Monthly average of minimum temperatures recorded at IMD station Midnapore, ranges from 7.0°C to 25.0°C and maximum temperature ranges from 28.0°C to 42.0°C, total of annual rainfall is 1569.0 mm and average wind speed is 3.23 km/hr.

The micro meteorological data of the core zone has been recorded using an automatic weather station from December 2020 to February 2021. The temperature ranged between 13.0°C to 34.0°C and relative humidity ranged between 36.0 % to 83.0 % during the monitoring period.

The wind speed varied between calm to 12.74 km/hr and the predominant wind direction was observed from North with 27.6% of occurrences (including calm).

### 3.3 Ambient air quality

Ambient air quality study was monitored at 8 locations including one location in the core zone (expansion area). Seven locations in the buffer zone are near village Malancha, Kalaikunda, Kharagpur, Gokulpur, Jamkunda, Medinipur and Madipur. Twenty four hour average PM10 level was found to range from 63.5 to 83.7 µg/$m^3$, PM2.5 was found to vary from 26.5 to 37.2 µg/$m^3$, $SO_2$ from 4.0 to 18.4 µg/$m^3$ and $NO_2$ from 12.8 to 26.5 µg/$m^3$. The concentration of carbon monoxide, nickel, arsenic, lead, B(a)P and benzene were also measured.

### 3.4 Water resource and quality

Water samples were collected from 08 ground water sources. These are Project site, Kalikapur, Malancha, Kharagpur, Gokulpur, Jamkunda, Medinipur and Madipur villages. It is observed that the physico-chemical parameters present in ground water are within the permissible limits specified by IS: 10500:2012 for drinking purposes in absence of alternate source.

Water samples were collected from 08 surface water sources. These are (1) Pond near Kankabati village, (2) Kasai Nadi near plant (up stream), (3) Kasai Nadi near plant (Down stream), (4) River near Srirampur village (down stream), (5) Juarhati village (down stream), (6) Pond near Saha chawk village, (7) Pond near Khalkon village, (8) Pond near Gokulpur village. The analysis of surface water sample shows that all the parameters are within the permissible limits as per IS 10500:2012.

### 3.5 Land use pattern and soil quality

Total land required for the expansion project is 360.0 acres. 310 acres land is already in possession of Rashmi Alloy Steel Pvt. Ltd. and for the remaining 50 acres land consent obtained from private rayat.

Top soil samples were collected and analyzed from 5 locations in and around plant premises. The results indicate that all the soil samples are medium grained sand and have pH between 7.15-7.42.

### 3.6 Noise and traffic volume survey

Noise levels at ten stations (2 within the core area and six within buffer area) were observed. Leq values observed during day time varied from 47.4 to 76.2 dB (A) and at night time varied from 42.4 to 67.2 dB (A). traffic volume survey was conducted at National Highway-6 Road near SAHA Chowk at a distance of 1.5 from plant. Total number of motorised vehicles and cycles were found as 6766 nos.

### 3.7 Ecology

Biodiversity is the degree of variation of life forms within a given ecosystem, biome, or an entire planet. Biodiversity is a measure of the health of ecosystems. Greater biodiversity implies greater health. Biodiversity is in part a

function of climate. The Biological environment is intended to cover the prevalence of all living forms (plants and animals) in the study area and the impact of them if any, due to operation of the proposed Project. Such impacts could be changed in terms of strain in all the living forms, invisible damage or diseases, changes in occurrence/prevalence and in the ultimate extinction of certain species. In this study on enumeration of plant species with their dominance of the section of the study area along with available aquatic terrestrial fauna are recorded in this chapter. Listing of all living forms are included with all living forms are included with all living species starting from micro organism, plant, animal and human being in addition to domestic and wild animal seen in the study area by the field team and as informed by the local people have also been recorded.

### 3.8 Socio-economic conditions

There is no habitation within the project area. There are 59 inhabited villages and census towns in the buffer zone of the study area. The total population within the study area is 99,555.

The SC population is 20.8% and ST population is 10.8%. The average literacy rate is 67.2%. The literacy level is approximately 37.5% among males and it is lower among females (29.70%). There are 967 women against every 1000 men in the study area.

### 3.9 Places of archaeological/ historical/ tourist/ religious importance

There is no important archaeological (ASI)/historical place or other place of tourist or religious importance within the study area except village temples and mosques.

## 4.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION

### 4.1 Topography and drainage

**Impact:** Change in topography is occurring in core zone due to cutting, filling, construction activities such as walls, buildings, stock yards, etc. For the plant sanctioned vide environmental clearances dated 19.03.2021 & 12.05.2021. The ground is being levelled, where required, due to ongoing construction. Land requirement for existing project is 310 acres and additional 50 acres land required for expansion project so total land requirement is 360 acres, the topography will change permanently due to leveling and establishment of additional buildings. The construction once achieved will not be reversed. There will be no impact on topography of the buffer zone since no construction is proposed except widening and strengthening.

Impact on the drainage in the buffer zone is not anticipated as no construction will be taking place outside plant boundary. However, the volume of water from the plant area going outside the plant will reduce during rainfall as the rainwater will be stored in raw water reservoir / rain water harvesting ponds.

**Mitigation:** The change in topography in the core zone will be permanent and irreversible. Excavated soil will be used in leveling, filling and landscaping to

minimise the impact of change in topography. Changes in the sheet flow pattern of rain water will be managed through storm water drains. The impact of the new construction will, therefore, be managed through mitigation measures.

### 4.2 Air quality

**Impact:** During construction phase, sources of air pollution will be due to vehicle exhausts, excavation work, construction material handling (cement, sand and gravel), vehicle movement on unpaved roads and exhaust from non-mobile construction equipment like compressors. Primary impact will be high dust generation resulting into increased suspended particulate matter levels in the surrounding areas. The secondary impacts of air emissions, dust as well as other emission may affect the health of the labour force working in close vicinity and nearby villagers. During operation phase the air quality impact will be due to emissions from the stacks attached to various units, from stock yards and from transportation. Each of these has been evaluated for potential impact using mathematical models.

**Mitigation:** During construction, dust is anticipated due to levelling, construction and transportation activities. It will be controlled by sprinkling of water and using covers & wind breaks. Construction equipment and transport vehicle will be maintained periodically as per manufacturers norms. All trucks that will be used for transportation of construction material, raw material and finished product will be covered with tarpaulin, kept maintained, be optimally loaded, be spill proof and have Pollution-Under-Check (PUC) certificates. Various pollution control equipment like electrostatic precipitators (E.S.P.), bag filters, dust extraction systems, dry fog systems, gas cleaning plant, scrubber and sprinklers shall be installed as per the requirement of every unit. The air quality prediction exercise was carried out for stack emissions and fugitive dust from stock yards. The incremental ground level concentrations on expansion from 1.2 to 2.0 MTPA with control measures has been calculated as 5.3 $\mu g/m^3$ for PM10, 8.0 $\mu g/m^3$ for $SO_2$ and 6.9 $\mu g/m^3$ for $NO_2$. The impact of the plant will remain within permissible limits.

### 4.3 Noise and traffic density

**Impact:** The noise level during construction will be due to construction machinery. It will be temporary and reversible in nature. The noise level at sources like plant machinery are anticipated to go as high as 90 dB(A). During operation, noise will be generated due to operation of various equipment, machinery, pumps, turbo generators, etc.

**Mitigation:** The equipment shall be provided with acoustic shields or enclosures to limit the sound level within the plant boundary. Vibration dampers shall be used during erection of machinery. Maintenance of machinery and vehicles will be done regularly. The proposed green belt will also help to prevent noise generated within the plant from spreading beyond the plant

boundary. Ear muffs or plugs will be provided to the workers in close vicinity of noise source.

### 4.4 Water environment

**Impact:** During construction phase, water will be required for concrete mixing, curing, cooling water for various machineries, sprinkling for dust suppression, irrigation for green belt and lawns. Sewage will be generated from site office and labour camp.

During operation phase, the requirement of water will be for process and sourced from Kansabati River, Treated waste water / nala water & ground water (till Dec-2023). The withdrawal of water from Kansabati River can also have an impact in absence of mitigation measures. 1280 $m^3$/day waste water will be generated after expansion from various operations and sewage from buildings. During monsoon there will be run off from stock yard, solid waste storage area, roads, open areas and roof tops.

**Mitigation:** During construction phase, the sewage from site office and labour camps will be treated in septic tank- soak pit system. During operation, waste water streams from various units, processes and services of the plant will be collected in neutralisation tank (if needed) and common monitoring basin. From common monitoring basin, it will be utilized for dust suppression, sprinkling, ash quenching, fly ash brick plant and green belt watering. The sewage from toilets, washrooms and canteen of plant and colony sewage shall be treated in de-centralised septic tanks and sewage treatment plant.

The rainwater falling within the entire project area will be routed to the raw water reservoir and/or intermediate rainwater harvesting ponds through storm water drains. This will reduce water demand from the Kansabati river. Rooftop rainwater will be recharged to the ground. The run off from stock yards and solid waste storage areas will be guided to settling chambers prior to discharge into rainwater harvesting ponds or raw water reservoir.

### 4.5 Land use

**Impact:** The total plant area of proposed 2.0 million tonne steel plant will be spread over 360 acres. The construction and development in the existing project area has or is taking place. It comprises of internal roads, water reservoir, buildings, green belt and plantation, etc. During expansion, additional buildings and sheds of the new units will come up along with facilities. The temporary storage of solid wastes like char, ESP & bag filter dusts, sludges, FES dust, various slags from various sub-units, fly ash and other solid wastes on land would also impact the land.

**Mitigation:** The topsoil generated during construction will be preserved and shall be spread over the area where plantation is proposed. Plantation will be carried out at earliest to minimise soil erosion. To prevent contamination of water and soil, the finished product stock yards will be covered. Raw material stock yard and solid waste storage areas will have impervious flooring to

prevent seepage of leaching due to rains. Runoff will be collected in a garland drain around the stock yard & solid waste storage areas, settled in settling pond and directed to rain water harvesting ponds or raw water reservoir.

### 4.6 Solid waste

**Impact:** During construction phase, due to work force deployed for construction, there will be development of temporary establishment of residential and commercial nature. These will generate garbage. In the integrated steel plant operation dust collected from dust collectors, empty barrels (metal and plastic), bags, fly ash, bed ash, dust from air pollution control equipment, dolochar, I.F. slag, mill scale, scrap, rejected billets, coal fines & rejects, M.B.F. slag, iron ore fines, sinter returns, effluent treatment sludges, sweepings and other biodegradable wastes from the canteen are the solid wastes generated.

**Mitigation:** Sponge iron kilns ESP dust and dolochar will be used as fuel in power plant. The I.F. slag will be given for metal recovery, converted into aggregates and used for road making. M.B.F. slag will be used for cement manufacturing. Mill scales, coke fines, iron ore fines, sinter returns and various E.S.P. & bag filter dusts will be used for sinter. Steel scraps and rejects will be recycled by melting. Fly and bottom ash from existing & proposed expansion of power plant shall be used for brick making in house and balance given to cement plants, brick plants, road projects & other users. All stock piles will be laid on top of a stable liner to avoid leaching of materials to ground water.

### 4.7 Ecology

**Impact:** During construction and operation phase, negligible impact is anticipated on the flora in the plant area. There is no forest land in the expansion area of 360 Acres. Negligible adverse impact of proposed project is anticipated on the fauna as the density is low in the area immediately surrounding the proposed project. The air quality modeling shows that negligible impact will be caused on the surrounding forests.

**Mitigation:** Under the proposed green belt and plantation programme after expansion, 118.8 acres of land within premises (33% of total area) shall be provided with green cover. The greenbelt will act as a micro-habitat for small sized mammals and birds. Company proposes extensive plantation outside plant boundary also. The expenditure for plantation and wildlife conservation plan shall be met through the fund earmarked for Corporate Social Responsibility (CSR).

### 4.8 Socio-economics

**Impact:** Most of the work force required for construction and operation of the proposed project will be drawn from the surrounding areas. Once the plant will commence operation, amenities like education, school, health, medical, entertainment, canteen, etc. will get developed in and around the plant. These facilities will inevitably be available to local people also in addition to those

directly associated with the plant. During operation phase, 5000 people will be employed at full capacity of 2.0 million tonne.

**Mitigation:** It is proposed to hire the manpower locally in the proposed plant, to the extent possible in order to have a positive socio-economic impact. For the purpose, training for capacity building shall be undertaken by the company. Land owners from whom land has been bought, will be given preference in employment. Other than direct and indirect employment leading to economic growth, the major benefit to the community will be through Corporate Social Responsibility (C.S.R.) activities of the company.

## 5.0 ANALYSIS OF ALTERNATIVES

Rashmi Alloy Steel Private Limited already has an environmental clearance of 1.2 million tonne finished steel dated 19.03.2021 & 12.05.2021. Its construction is underway. Therefore, no alternative site has been selected. It is intended to expand the plant into adjoining or nearby areas and share the resources and facilities of the sanctioned plant. For steel making, the Induction Furnace (I.F.) technologies have been selected. The Non Recovery type Coke Oven plant has been proposed for use.

For the captive power plant, waste heat recovery boiler & CFBC boiler is proposed. Based on the techno-economic analysis and operating experience of existing pellet plants, grate kiln process has been selected.

## 6.0 ENVIRONMENTAL CONTROL AND monitoring organisation

Rashmi Alloy Steel Private Limited already has an Environment Management Department at the headquarter as well as plant site. It will also be responsible for ensuring the environmental monitoring of the proposed plant. Monitoring of stack emissions, ambient air quality, water quality, water levels, noise levels, soil quality, tree count, etc. shall be carried out periodically at plant level. An environment officer has already been appointed at the plant. He will be responsible for the aforementioned plant level monitoring, developing greenbelt, ensuring good housekeeping, ensuring statutory compliances as well as imparting environmental training to work force. The total capital investment on environmental protection work is envisaged as Rs. 163.06 Crores and recurring expenditure during operation will be Rs. 15.88 Crores.

## 7.0 DISASTER MANAGEMENT PLAN

All types of industries face certain types of hazards which can disrupt normal activities abruptly. They can lead to disasters like fires, inundation, failure of machinery, explosion, oil spillage, acid spillage, electrocution and hazardous waste spillage/ exposure, etc. Disaster management plan is formulated with an aim of taking precautions to control hazard propagation and avert disaster. It also instructs to take action after the disaster to limit the damage to minimum. To tackle the situation, a disaster control room will be established having links with all control rooms of the plant. An up-to-date communication facility will be

provided to control rooms. The disaster control room shall be headed by emergency leader called Site Main Controller, who will be the plant manager.

## 8.0 PROJECT BENEFIT

During operation phase, around 5000 (Direct) persons will be under direct employment and 5500 under Indirect employment of the company, at full capacity. Many more persons will be indirectly engaged either on contract basis or in transportation of materials or in provision of different services associated with the project. As majority of unskilled and semi-skilled persons will be from the surrounding villages, social & infrastructural benefits will extend to the local population. Improvement is expected in education facilities, health care services, road infrastructure and drinking water facilities through proposed Corporate Environmental Responsibility (CER).

## 9.0 DISCLOSURE OF CONSULTANTS

The consultants engaged for the preparation of the EIA/EMP of the project are Centre for Envotech and Management Consultancy Pvt Ltd. (CEMC), Bhubaneshwar, Odisha. CEMC is one of the leading Environmental and Forest consultancy organisations in the state of Odisha. CEMC was established during 2005 and registered under Companies Act 1956 and is NABET, QCI accredited consultant.