SUMMARY
OF
ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN
OF

EXPANSION OF INTEGRATED STEEL PLANT
(FROM 0.5 MTPA TO 7.65 MTPA FINISHED STEEL.)

AT

Village Beherapali, Budipadar, Ektali U No.1, Marakuta, Pandripathar, Singhabaga, Kukurjangha, Jamera, Hanshamurakatapali, Tehsil and District Jharsuguda, Odisha

(EXISTING AREA: 141.09 HA, PROPOSED AREA: 1012.54 HA, TOTAL AREA: 1153.63 HA)

Project Proponent:

M/s ACTION ISPAT & POWER PVT. LTD.
Plant Address : At Pandripathar, P.O. Markuta, Dist. Jharsuguda, Odisha- 768202;
E-mail: aiappl.jsg@gmail.com
CIN-U27109DL2004PTC127305

ToR granted: Letter no. IA-J-11011/247/2024-IA-II(IND-I) dated 13.06.2024.
Project as per Schedule of EIA Notification 2006 : 3(a), 2(a), 2(b), 3(b), 4(b), 1(d)

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SUMMARY

1.0 INTRODUCTION

1.1 General background

M/s Action Ispat & Power (P) Ltd. (AIPL) incorporated in July, 2004. It has been working majorly in manufacturing the business of metals, chemicals and products during last 19 years. The company had set up a steel plant of 0.5 MTPA capacity finished rolled steel products at Village Marakuta & Pandaripathar, Tehsil and District Jharsuguda, Odisha after obtaining the following environmental clearances:

I. J-11011/186/2007- IA II (I) dated 15.09.2008 for Expansion of Steel Plant (1,15,000 TPA to 6,00,000 TPA), Captive Power Plant [WHRB (8 MW to 40 MW) and FBB (108 MW)].

II. J-11011/535/2008- IA II (I) dated 18.03.2009 for the Steel Plant (Part-2 of Phase-II) to further expand with installation of additional 1800 TPD DRI plant, additional 1,00,000 TPA (1 X 150 m^3) Blast Furnace, 3,00,000 TPA Coke Oven Plant (Non-recovery type) and 4,00,000 TPA (1 X 25 m^3) Sinter Plant.

III. J-11011/535/2008-IA II(I) dated 04.05.2009 for the change in the capacity of the Induction Furnace from 4X12 T to 9X12 T to achieve the same previously approved 8,00,000 TPA of steel production.

IV. J-11011/819/2008- IA II(I) dated 14.07.2009 for setup of Ferro Alloy Plant (4 x 9 MVA, 57,000 TPA Si-Mn)

From the above, the company could only establish 1 no. X 1.5 MTPA Coal washery, 0.21 MTPA (2 nos. X 350 TPD) DRI plant, 0.375 MTPA Steel Melting comprising 6 nos. X 12 T IF, 1 no. X 12 T LRF, continuous caster, 0.3678 MTPA billets/ bloom/ slab caster, 1 no. X 0.50 MTPA Rolling Mill, 2 nos. X 8 MW DRI Kiln exit gas based, CPP 106 MW (1 no. X 20 MW AFBC + 2 nos. X 43 MW CFBC) and 0.014 MTPA Submerged arc furnace for silico manganese production.

The company had undergone ‘corporate insolvency resolution process’ (“CIRP”) under the provisions of the Insolvency and Bankruptcy Code, 2016 (“IBC”) which culminated in an order dated 26.09.2023 of the Hon’ble NCLT New Delhi, Principal Bench whereby a Resolution Plan was approved. The plant has been lying shut since the year 2016 and now the project is being revived after the completion of NCLT proceedings.

M/s Action Ispat & Power (P) Ltd. (AIPL) is now proposing for an Expansion of Integrated Steel Plant (From 0.5 MTPA to 7.65 MTPA Finished Steel) at

Village Beherapali, Budipadar, Ektali u No.1, Marakuta, Pandripathar, Singhabaga, Kukurjangha, Jamera, Hanshamurakatapali, Tehsil and District Jharsuguda, Odisha State. The total finished steel manufacturing capacity will be enhanced from 0.5 MTPA to 7.65 MTPA per annum (MTPA).

The existing project land use is industrial which is on an area of 141.09 hectare (348.63 acre). For the purpose of expansion of Steel Plant, 1012.54 ha (2502 acres) of land will be required, which has been recommended by IDCO, Bhubaneswar. Out of this 1012.54 ha (2502 acres), 944.02 ha (2332.68 acre) land is private land, 68.52 ha (169.32 acres) land is government land. Hence, the total area of the project after expansion will be 1153.63 ha (2850.63 acre). No forest or forest land falls within the expansion project boundary.

The expected cost of the expansion project will be Rs. 21,000 Crores.

1.2 Location and communication

The proposed project is located in Village Beherapali, Budipadar, Ektali u No.1, Marakuta, Pandripathar, Singhabaga, Kukurjangha, Jamera, Hanshamurakatapali, Tehsil and District Jharsuguda, Odisha The location map is shown in **Fig 1.** The coordinates of the plant area based on Google Earth as on 09.04.2024 fall between latitude 21°48'50.05" N to 21°53'41.94" N and longitude 83°56'58.54" E to 83°59'51.53" E.

Road: The proposed plant is accessible by all weather road connected to NH-49 Jharsuguda Raigarh Road and SH-10, which connects project to Sambalpur and Sundergarh.

Railway: The nearest railway station is Jharsuguda Junction at a distance of 2.6 km in ENE.

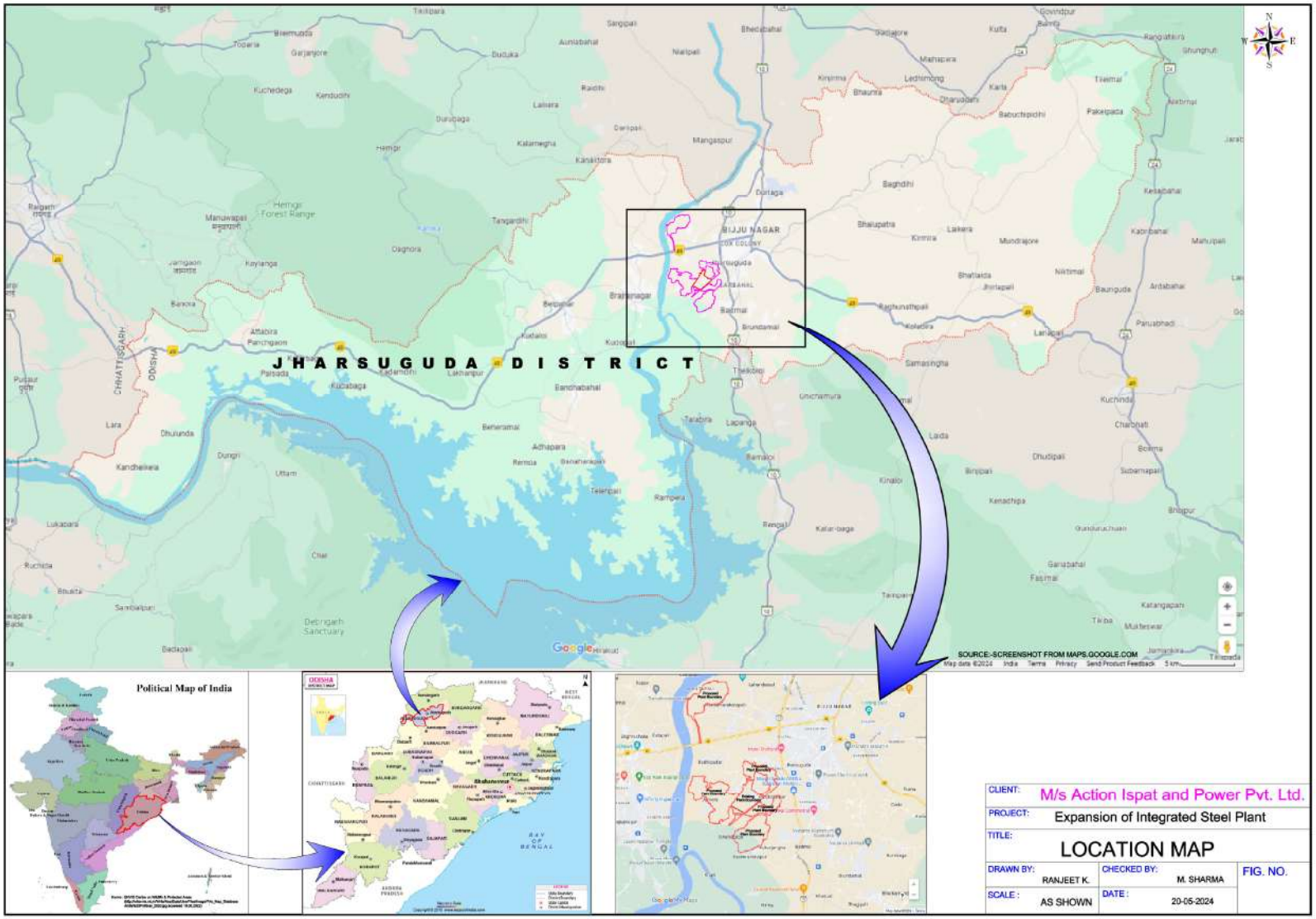
Airport: The nearest airport is Veer Surendra Sai Airport, Jharsuguda, which is 7.6 km in ENE, aerially.

2.0 PROJECT DESCRIPTION

2.1 Plant layout

The existing plant area 141.09 ha and proposed additional land area 1012.54 ha become 1153.63 ha. Out of this total land, 505.77 hectares shall be under plant & facilities; 48.45 hectares under stock yards, 58.32 hectares for solid waste management, 14.16 hectares for administration & other buildings, 30.00 hectares for water reservoir, 18.70 hectare for open space, 4.05 hectare for MRRS and 67.78 hectares for roads and railway siding. Green belt will comprise 463.29 hectares, which is 40.16% of the project area.

FIG 1: LOCATION MAP



2.2 Process Description

Iron ore beneficiation plant, proposed 15.5 MTPA: There will be total 2 nos. X 4.5 MTPA + 5 nos. X 1.3 MTPA beneficiation units. It will mainly involve wet grinding of iron-ore fines and separation of gangue to improve the quality of iron ore. The product from the beneficiation unit shall be fed into the pellet plant. The rejects will be sent to temporary tailing storage area till further utilisation/ disposal.

Pelletization plants, proposed 12.0 MTPA: There will be total 2 nos. X 3.5 MTPA + 5 nos. X 1.00 MTPA pelletiszation units. 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 will involve feed preparation, green ball formation, pellet induration and product dispatch or inhouse consumption.

Coal washeries, Existing 1.5 MTPA, Proposed 8.0 MTPA, Total 9.5 MTPA: There will be total 1 no. X 1.5 MTPA + 4 nos. X 2.0 MTPA washery units. The raw coal will need crushing and washing to reduce the ash content before it can be used in D.R.I. kilns and producer gas plant. Therefore, a three product coal washery will be provided. It will consist of a coal crusher, screening station and washing equipment. Raw coal will be fed to the washery. Washed coal recovered will be 50%, middlings will be 42.5% and rejects will be 7.5%.

Direct reduced iron kilns, Existing 0.21 MTPA, Proposed 4.97 MTPA, Total 5.18 MTPA: There will be total 2 nos. X 350 TPD + 4 nos. X 100 TPD + 4 nos. X 1200 TPD + 4 nos. X 900 TPD + 4 nos. X 600 TPD kilns. Main raw materials will be iron ore/ pellets, coal and dolomite. They will be fed to the ground hoppers with the help of pay loaders and tippers. They will be carried away by belt conveyors to the crusher house and thereafter fed to kiln. Iron ore will be reduced by heating with coal in the rotary kiln at a temperature of about 1000°C. After reduction, products will be cooled in a drum type rotary cooler. Product will then be separated into D.R.I. or sponge iron and char by magnetic separation. In rotary cooler, product will be cooled by indirect water spray.

Mini blast furnaces, Proposed 5.51 MTPA: There will be total 2 nos. X 1680 cum + 3 nos. X 650 cum blast furnaces. The purpose of a blast furnace is to chemically reduce and physically convert iron oxides into liquid iron called "hot metal" and solidified form “pig iron”. Iron ore/ pellet, coke and limestone will be fed into the top of the blast furnace. Preheated air will be blown into the bottom. The raw materials will descend to the bottom of the furnace where they will become liquid iron (final product) and liquid slag (waste). These will be drained from the furnace at regular intervals. The blast furnace flue gas will be passed through Waste Heat Recovery Boilers (W.H.R.B.) for power generation. Thereafter, the gas will be used as fuel in blast furnace stove and elsewhere after cleaning in Gas Cleaning Plant

(G.C.P.). Unutilised gas will be flared. Power will also be generated by top pressure recovery turbine.

Sinter Plants, Proposed 7.02 MTPA: There will be total 2 nos. X 225 sq.m. + 3 nos. X 130 sq.m. sintering units. 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 equipment will also be utilised as raw material for sinter. Thus, solid waste from within the integrated steel plant shall be utilised to maximum extent. The sinter generated will be 100% utilised in mini blast furnace.

Coke oven plants, Proposed 2.9 MTPA: There will be total 4 nos. X 300,000 TPA + 5 X 350,000 TPA coke oven plants. Raw coal will be crushed in a crusher into powdered form and charged in the oven for carbonisation. The volatile matter in raw coal will get released in the form of gas and burnt in the oven as well as in the flues. After the completion of the carbonization process, raw coal will get converted to coke within 36 to 38 hours. The coke will then be pushed out from the oven and quenched by water. Coke will be utilised in mini blast furnace and sinter plant.

Steel melting shops, Existing 0.3678 MTPA, Proposed 5.49 MTPA, Total 5.858 MTPA: Steel melting shop will have (1) 6 nos. X 12 tonne + 40 nos. X 20 tonne induction furnaces (I.F.) with 1 no. X 12 tonne + 10 nos. X 45 tonne ladle refining furnaces (L.R.F.) via A.O.D./ V.D. route, capacity 2.615 million tonnes per annum and (2) 2 nos. X 175 tonnes /BOF followed by AOD/ VD electric arc furnaces (E.A.F.)/ Energy Optimisation Furnace (E.O.F.)/ Zero Power Furnace (Z.P.F.)/ New Oxygen Furnace (N.O.F.)/ Basic Oxygen Furnace (B.O.F.) followed by Vacuum Degassing (V.D.)/ Argon Oxygen Decarburization (A.O.D.), capacity 3.36 million tonnes per annum. 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. Other furnaces also use electric energy under different condition for melting the charge. In all furnaces, the melted content will separate into liquid metal and slag. The slag will be removed and sent to slag clusher for recovery of metal. Reject will be considered as waste and used for land filling. The liquid metal will be sent to the continuous casting machine (C.C.M.) where semi-finished product will be made. There will be several casters for Billets/ Bloom/ Slab/ Ingot for continuous casting/ stainless steel/ Alloy/ Special Steel.

Finished product facilities (Rolling mills), Existing 0.5 MTPA, Proposed 7.15 MTPA, Total 7.65 MTPA: Hot charge or semi-finished product from the various continuous casting machine of steel melting shop as well as billets from outside purchase can be reheated and converted into various types of finished products. These are Long/ TMT/ Flat/ Strip/ Round/ Wire Rod/ TMT & Wire Rod/ Hot Rolled/ HRC/ Structural Mill/ Plate/ ERW/ HFW/HFIW / Pipe & Tube Products/ Binding wire/ Seamless Steel Tubes and Pipes/ Tin Plate/ Electrical Steel/ CRGO/ wire drawing/ LRPC HB Wire/ Nail/ Barbed Wire/ GI Wire/ Highway Guard and other value added products

of MS Grade/ Carbon Steel grade/ SS Grade/ Alloy Grade/ Special Grade, SS Grade/ Alloy Grade/ Special Grade-Rolled Products. followed by one or more in series of pickling, cold rolling, annealing, galvanizing, colour coating, OCTG finishing, etc.

DI pipe plant and DI fitting plant: A 1.8 MTPA Ductile Iron (D.I.) plant wth configuration 3 nos. X 0.6 MTPA and a 0.1 MTPA DI fitting plant with configuration 4 nos. X 0.025 MTPA will be installed.

Other finishing units: There will also be a Plate Mill; Cold Rolling Complex/ Plate Mill/ Pipe Mill; H SAW Tube & Pipes and/or S SAW Tube & Pipes and/ or D SAW Tube & Pipes and/or L SAW Tube & Pipes with 3 LPE Coating and/or 3LP Coating along with CML Plant and/ Or CWC Plant and / Or Internal Coating Plant and/or External Coating Plant and other products of tube and /or pipe; Cold Rolled mill; Galvanized Coil/ Wet flux galvanised coil/ Galvalume coil/ Sheet; and Colour Coated Lines/ CRCA/Tin Mill/ Tin Plate Mill.

Producer Gas Plants, proposed 3675 million Nm^3/annum: It will comprise of 20 nos. X 12500 Nm^3/hr + 15 nos. X 7500 Nm^3/hr + 15 nos. X 5000 Nm^3/hr units. A coal based producer gas plant will be installed to make producer gas, which will be used as fuel for pellet plant, predominantly. Producer gas will be generated by injecting a blast of air and steam through a layer of incandescent coal. The carbon of the coal combines with oxygen of the air to form carbon dioxide. Any carbon dioxide formed also reduces to carbon monoxide as it goes up and passes through hot unburnt coal. Water vapors which pass through the fuel react to form carbon monoxide and hydrogen.

Oxygen Plants, total 2030 TPD: It will have 3 no. X 60 TPD + 3 nos. X 150 TPD + 2 nos. X 250 TPD + 3 no. X 300 TPD units. The Oxygen Plant is required to meet the oxygen & argon requirement for mini blast furnace, electric arc furnace, new oxygen furnace, basic oxygen furnace, etc. to improve lancet, which reduces the electricity consumption and also reduces considerable tap to tap time increasing productivity. Occasional purging need of the steel plant will be met by nitrogen, which will also be generated from the oxygen plant.

Lime Calcination/ Dolo Plants, Proposed 0.556 MTPA: There will be 1 nos. X 1650 TPD + 1 nos. X 50 TPD units. Lime and dolomite will be used in converters and electric arc furnaces, where they will help to form slag which draws off harmful impurities such as silicon and phosphorus. Lime will also be used to improve productivity in the ore agglomeration process.

Captive Power Plant (C.P.P.), Existing 122 MW, Proposed 1317 MW, Total 1439 MW: (1) Waste Heat Recovery Boiler: *699* MW waste heat recovery boilers based power plant is proposed to utilize the heat from gases exiting DRI kilns (2 nos. X 8 MW + 2 nos. X 75 MW + 4 nos. X 30 MW + 4 nos. X 21.6 MW=372 MW), blast furnace (1 no. X 10 MW + 2 nos. X 30 MW=72 MW), coke oven (217 MW) and clinker (20 MW); (2) **Top**

pressure recovery turbine on Blast furnace (TRT) of 20 MW and (3) **AFBC/ CFBC:** 740 MW power plant based on coal, coal fines, washery middlings and char from DRI kilns has been proposed. The power generated from the CPP will meet the requirement of the steel plant. The fly ash shall be used for making fly ash bricks, cement, filling, etc.

Ferro Alloy Plants, Proposed 0.146 MTPA: Ferro-silicon (0.051 MTPA) or ferro-manganese (0.146 MTPA) or silico-manganese (0.129 MTPA) or ferro-chromium (0.106 MTPA) shall be manufactured using submerged arc furnaces. These will also have additional units such as briquetting/ sintering plants, slag crushers, jigging plants, etc. There will be AOD and/ or CLU and/or Arc Refining Furnace and/or Electric Arc Furnace to make 0.11 MTPA Fe-Mn Low/ Medium Carbon and/or 0.866 MTPA Si-Mn Low/ Medium Carbon and/ or 0.864 MTPA Fe-Cr Low/ Medium carbon. A 2 nos. X 500 TPD chrome ore beneficiation plant will also be there in this plant.

Cement Plant, Proposed 3.0 MTPA: Limestone will be the primary raw material for clinker making. Clinker plant will be of 1.5 MTPA. Along with coal, it will be fed into the clinker kiln and the manufactured clinker will be sent to cement mill. At cement mill, ordinary portland cement (OPC), Portland Pozzolana Cement (PPC) using fly ash and Portland Blast Furnace Slag Cement (PBFS) using blast furnace slag shall be manufactured and sold in the market. Cement Plant will be of 3.0 MTPa capacity with configuration 4 nos. X 2500 TPD.

Other units: 6 nos. X 250 TPH + 4 nos. X 200 TPH + 6 nos. x100 TPH Integrated Stone Crusher Plant for Stone Crushing and M Sand and P Sand or Crushed Sand will also be established within project area. 3 nos. X 2500/hr brick making plant will also established within project site. Slag Crusher Plant of configuration 3 nos. X 100 TPH will also be established.

Raw material handling systems: For material handling within plant premises a coal handling system, ash handling system, roads, etc shall be provided.

2.3 Resource requirement

Raw Material : Major raw material and fuel requirement for project will be 23.44 MTPA of various grades of iron ore/ fines/ concentrate (source- Odisha Mining Corporation/other private mines), 18.46 MTPA of non coking coal (source- domestic/ imported), 4.371 MTPA of limestone (source- Odisha) and 4.4 MTPA of coking coal (open market/ imported). Other raw material required will be dolomite (2.06 MTPA), bentonite (0.168 MTPA), silica component (0.06 MTPA), flocculant, gypsum, quartz, pig iron, semi finished products, etc. Total raw material to be purchased from outside will be 52.958 million tonnes per annum. Fuels required in various units will be coking and non coking coal, coke breeze & fines, low sulphur heavy stock diesel oil/ furnace oil, producer gas, coke oven gas and MBF gas.

Power: The power requirement for entire plant will be 1439 MW. The power will be sourced from captive plant.

Water : The industrial and domestic water requirement shall be 5414 KLH. The water required for the plant shall be sourced from Ib River or Bhedan River, treated waste water and rain water harvesting pond Water used in various units within the plant will also be re-used through circulating water systems with cooling towers and the blow downs/ discharges treated and reused through common basin or unit-wise treatment systems.

Site services: New supporting infrastructure like canteens, rest room, vehicle parking, cycle stands, drinking water, toilets, medical room, first aid, etc. are proposed. These will be used for workers & drivers during operation phase. No residential facilities are envisaged for the employees. Temporary sheds for workers will be established at the site during construction phase only.

Manpower: The manpower requirement for the plant will be 9025 persons (3525 direct and 5500 contractual). Some skilled manpower may be required from outside the area while remaining unskilled/ semi-skilled manpower will be sourced from the local villages.

3.0 PRESENT ENVIRONMENTAL SCENARIO

For the description of baseline environmental scenario, the plant area (existing plus proposed) has been considered as the “core zone”. The area falling within a distance of 10 km from the boundary of the core zone has been considered as the “buffer zone”. The core zone and the buffer zone together form the “study area”. Baseline status and impact assessment has been done for the study area as shown in **Fig 2**.

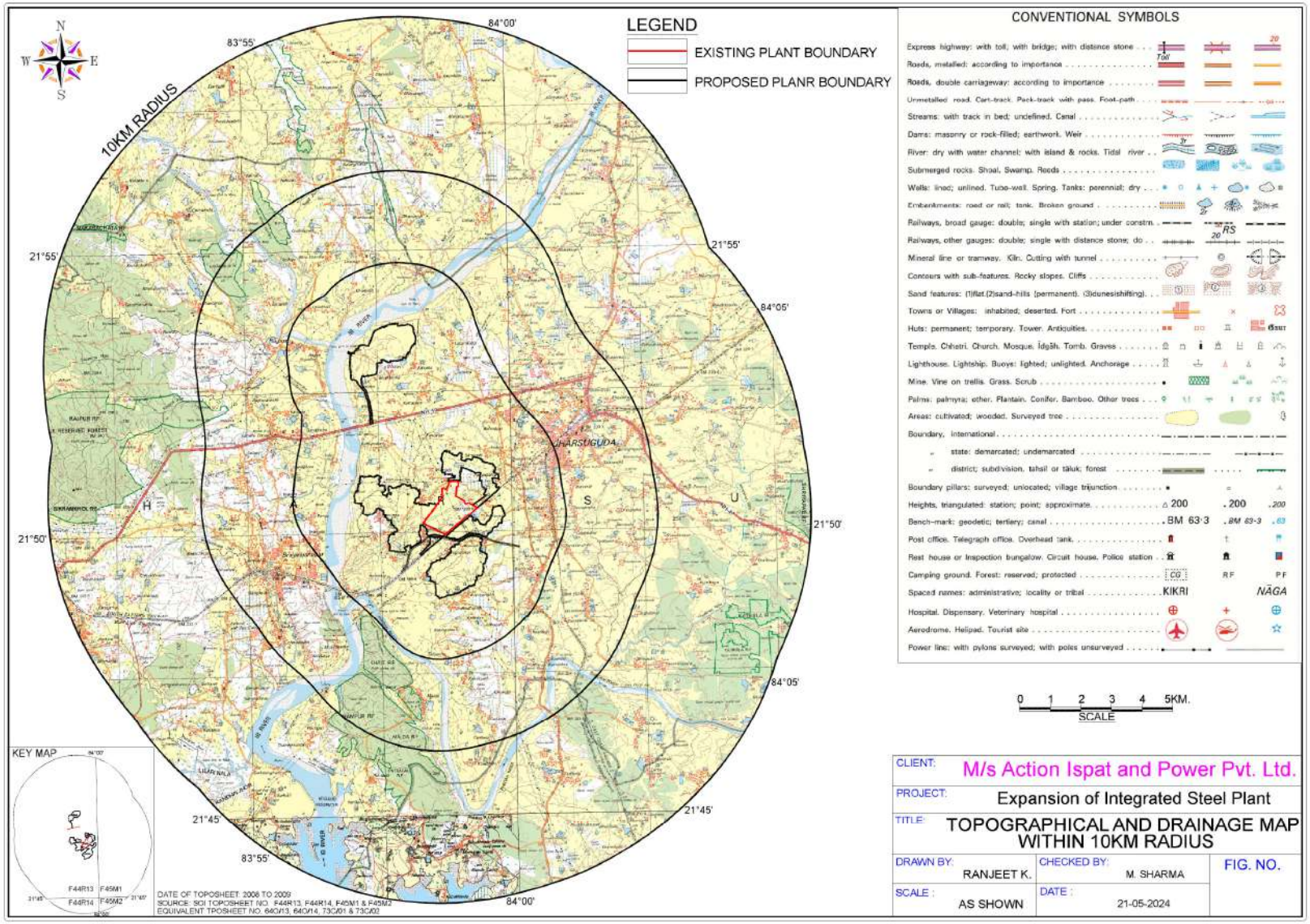
3.1 Topography and drainage

Core zone: The topography of the proposed project area is flat with an average site elevation of 205 to 235 m amsl as per google earth. The overall slope is towards the northern side. Total 36 seasonal ponds/ tanks/ water bodies/ water logged low lying areas in the expansion area (1012.54 ha).

Buffer zone: The 10 km radius around project is having predominantly flat land. Its natural elevation varies from 193 to 444 m near Rajpur RF in West above mean sea level. The main drainage of the area is controlled by the Ib River (0.1 km, West) and Bhedan River (1.9 km, south west).

The various tributaries of Ib river are Bheden River, Lilari Nala, Basundhara nala and various other seasonal tributaries. These form the main drainage in the study area. The drainage network in study area is dendritic in nature.

FIG 2: TOPOGRAPHY AND DRAINAGE MAP OF THE STUDY AREA



3.2 Climate and micro-meteorology

The climate of this region tropical is characterized by an oppressive hot and dry summer, followed by monsoon and a cold winter. The winter season extends from November to end of February, which is followed by summer season from March to the middle of June and rainy season from middle of June to middle of October. As per data available from India Meteorology Department for 1991 to 2020 for IMD Angul station, the average annual rainfall is **1475.6** mm.

Monthly average maximum and minimum temperature was recorded as 41.3 degree Celsius in May and 12.3 degree Celsius in January. Annual average humidity is found to be 67% at 8:30 hrs and 51% at 17:30 hrs.

The micro-meteorology was monitored at site for the summer season from 1st March 2024 to 31st May 2024. The minimum temperature recorded was 14.28 degree celsius and maximum 46.52 degree celsius. Relative humidity varied from 22.0% to 75.6% during the monitoring period.

The wind speed varies between 0.07 km/hr to 22.28 km/hr and the predominant wind direction was observed from South (24.14% occurrences including calm).

3.3 Ambient air quality

Ambient air quality study was monitored at 8 locations. One location was at existing plant area (Guest House) within the core zone (project area). Seven stations were in buffer zone at villages Malidih, Renda, Rautbandh, Ekatali, Rajpur, Near Ib Railway Station, Sarbahal and Remja villages. Twenty four hour average PM10 level was found to range from 46.5 to 70.8 $\mu g/m^3$ (limit 100 $\mu g/m^3$). PM2.5 was found from 25.8 to 41.3 $\mu g/m^3$ (limit 60 $\mu g/m^3$). Sulphur dioxide from 6.3 to 18.6 $\mu g/m^3$ and nitrogen dioxide from 7.3 to 21.4 $\mu g/m^3$ (limit for both 80 $\mu g/m^3$). CO level was observed between 0.115 to 0.802 mg/m^3 while the limits are 2 mg/m^3. Lead and Nickel were also measured and while Arsenic was found below detectable limit and Benzo (a) Pyrene and Benzene were not detected.

3.4 Water environment and quality

The area falls in the Mahanadi basin. The main drainage of the study area is controlled by Ib river, a tributary of the Mahanadi. Ib River is located 0.1 km west of the project site. It has a number of seasonal tributaries draining the study area. Some of these tributaries originate or pass through the proposed project area also. A number of ponds/ tanks can also be been in the study area. 36 such seasonal ponds/ tanks/ water bodies/ water logged low lying areas occur in the expansion area (1012.54 ha). They collect the rain water runoff during monsoon season and are used by local people. Ib River and Bhedan Rivers are perennial water bodies in the study area.

Thirteen surface water samples were collected. These are (1) Reservoir Core zone near Existing Plant area, (2) Reservoir near Pandripathar in village (3) Pond near Ganthijabor village, (4) Nala near Tiharipali village (upstream) (5) Nala in Proposed Plant area (Downstream), (6) Nala within proposed expansion area (7) Ib River near Panchapahar village (up stream) and (8) Ib River near Katabaga village (down stream), (9) Bhedan River near Kherual Bridge (up stream), (10) Bhedan River near Ib Railway station (down stream), (11) Pond near Katapali Village (12) Pond in proposed plant area and (13) another pond in proposed plant area.

Nine ground water samples were collected. These are from handpumps and borewells at (1) Existing Plant area, (2) Banjiborna village, (3) Rautbandh village, (4) Marakuta village, (5) Sarasmal village, (6) Jamera village, (7) Talpatia village, (8) Tarekela Village and (9) Chandlimal village.

It is observed that the surface water and ground water quality is within the permissible limits as specified by IS: 10500 - 2012 for drinking purposes.

3.5 Land use pattern and soil quality

The proposed project is located in Village Beherapali, Budipadar, Ektali U No.1, Marakuta, Pandripathar, Singhabaga, Kukurjangha, Jamera, Hanshamurakatapali, Tehsil and District Jharsuguda, Odisha. The total area of existing plant is 141.09 ha (348.63 Acres) and is already in possession of the company. Proposed expansion area is 1012.54 ha (2502 Acres) which has been allotted by IDCO, Govt. Of Odisha. It is to be acquired by the company through IDCO. Total plant area will become 1153.63 ha (2850.63 Acres).

The total plant area comprises 944.023 ha (2332.680 acres) private land and 68.5233 ha (169.320 acres) Government land.

Land use pattern of study area is available from Census 2011. The data shows that 29.72 % of area under non agricultural use followed by 26.65% is current fallows, 14.86% is forest land, 9.99% is net area sown, 7.10% is culturable waste land, 5.53% is barren and un-cultivable land, 3.32% is permanent pastures and other grazing land, 1.54% is land under miscellaneous tree crops and 1.29% is fallows land other than current fallows.

Top soil samples were collected from six locations. One from existing plant area, three from expansion plant area and two from buffer zone.

Texture of soil is medium grained sand and colour varies from light yellow to dark brown. The soil is slightly acidic to neutral in nature. Conductivity of soil shows it is free from salinity. Organic carbon in two soil samples is deficient, optimum in two and rich in balance two. Soil is deficient in nitrogen, phosphorous and potassium.

3.6 Noise level and traffic density

Noise levels at ten stations were observed. The noise levels ranged from 50.16 to 56.21 dB(A) during day time and at night time it varied from 37.78 to 45.42 dB(A).

A traffic density survey was conducted at four locations namely (1) Village Road near Gate No. 2 & 3 (Adjoining), (2) NH-49, Jharsuguda-Raigarh Road Near Hotel Popular (0.2 km, east), (3) SH-10, Biju Expressway near Panchpada Railway Bridge (3.1 km, east) and (4) SH-10, Sambalpur road near Sahuparha Village (2.0 km, south east). Total number of equivalent passenger car units were found as 1919, 27349, 21992 and 46053 per day.

3.7 Ecology

There is no forest present within existing and proposed expansion plant area.

There are fifteen protected and reserved forest present within 10 km of the study area of the project. Total forest land in the study area as per Census 2011 is 8314.00 ha (14.86%). As per Champion and Seth's classification of the revised forest types of India, the forests of Jharsuguda district is Tropical Moist Deciduous Forest (3C).

There are 40 tree species, 15 shrub species, 10 grass species, 7 climbers, 2 bamboos and 2 orchid species that are found in the core zone.

There are 91 species of trees, 32 species of shrubs, 10 species of grasses, 10 species of climbers, 2 species of bamboos and 2 species of orchids in buffer zone. Some of the common species of trees are Acacia (*Acacia auriculiformis*), *Mangifera indica* (Amba), *Aegle marmelos* (Bel), *Diospyros melanoxylon* (Kendu), *Anthocephalus cadamba* (Kadam), *Albizzia lebbek* (Siris), etc. Herbs, shrubs, grasses and climbers found in study area include *Calotropis procera* (Arakh), *Ziziphus jujuba* (Barakoli), *Cymbopongon martinii* (Khar), *Cynodon dactylon* (Duba), *Combretum decandum* (Atundi), *Butea parviflora* (Murdha), etc.

There are 15 mammals species, 12 amphibian species, 17 reptile species and 65 bird species in the core zone. Fauna in the core zone is less as compared to buffer zone. Buffer zone has a total of 150 faunal species comprising 26 species of mammals, 22 species of reptiles, 12 species of amphibians, and 90 avifaunal species. The mammalian species observed in the study area are Jungle Cat, Jackal, Sloth Bear, Indian Elephant, Spotted Deer, Indian Hare, Wild Boar, Rhesus Macaque, Hanuman Langur, etc.; Avian species are Shikra, Jungle Crow, Ashy Drongo, Pigeon, Spotted owlet, Tailor bird, etc. and reptiles are Skink, Python, Common Indian Krait, etc.

There are no national parks or wildlife sanctuaries or biosphere reserve within 10 km radius. The nearest wild life sanctuary is Debrigarh Wildlife

Sanctuary is at a distance of 33.5 km in SW, the ESZ of Debrigarh Wildlife Sanctuary is at a distance of 28.5 km in SW. Simlipal – Satkosia Tiger Corridor is located at distance of 98 km in SE. The nearest National Park is Palamau National Park which is located at 160 km in North direction.

3.8 Socio-economic conditions

Approximately 10 households will have to be displaced, resettled and rehabilitated. There will be 2011 land losers from 1012.546 ha private land.

There are 96 inhabited villages and census towns in the buffer zone of the study area. The total population within the study area is 307094 persons, as per Census 2011. It includes 51.84% males and 48.16% females. The schedule caste population is 18.47% and schedule tribe population is 21.67%. The average literacy rate is 71.63%. The literacy amongst women is lower at 31.35%. Main workers are 29.61% of the total population. Marginal workers are 7.67 % and 62.71 % are non workers.

3.9 Industries around the project area

Within the 10 km radius of the project area there are total 27 industries comprising manufacturing industries (sponge iron, billet, ferro alloys, solar panels, PVC, etc.), brick manufacturers, food processing units, LPG bottling and distribution units, crusher, etc.

3.10 Places of archaeological/ tourist/ religious importance

Three major Tourism and Religious place are there within the study area of 10 km. They are Shree Maa Rama Chandi Mandir (3.3 km, south west), Pahadi Mandir (3.9 km, northeast), Shree Jhadeswar Temple (3.8 km, east). In addition to these there are local places of worship and river banks that are visited by the people.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

4.1 Topography and drainage

Impact: Change in topography over unutilised part of the existing 141.09 ha and entirety of 1012.54 ha proposed expansion area will occur at site due to leveling activities. Further change in topography will occur due to construction of buildings, roads, stock yards, sub station and other plant facilities. The construction, once achieved, will not be reversed. There will be negligible impact on topography of the buffer zone since no construction is proposed except widening and strengthening of approach roads, if required.

Several of the 36 seasonal ponds/ tanks/ water bodies/ water logged low lying areas in the expansion area (1012.54 ha) shall get affected within the core zone due to installation of buildings. The change in topography will require management of rain water flow in project area. Impact on the

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

Management: The change in topography in the core zone will be permanent and irreversible. Excavated soil will be used in levelling, filling and landscaping to minimise the impact of change in topography. Changes in the surface flow pattern of rain water will be managed by constructing storm water drains. Thus, the impact of the new construction will be managed.

4.2 Climate and meteorology

Impact: The climatic conditions including temperature variations, wind direction and speed, rainfall and humidity are governed by regional factors and the monsoon. As such the proposed project and other allied activities will not tend to influence the climate. However, emission of greenhouse gases due to combustion of fossil fuels and increase in suspended particulate matter concentration will be there.

Management: Development of greenbelt in the plant premises over 40.16% area of the total project area will be done during construction phase. The trees planted will help in sequestering of carbon. The company will also undertake measures to minimise the CO_2 emissions. These will include regular maintenance of all fossil fuel based machinery and equipment and ensuring their emissions are within limit. To keep suspended particulate matter in limit, water sprinkling will be done.

4.3 Ambient air quality

Impact: During the construction phase there will be several sources of air pollution. These will be vehicle exhausts, dust generation due to excavation work, shifting of construction materials (cement, sand and gravel), vehicle movement on unpaved roads and exhaust from diesel based construction equipment. Primary impact will be dust generation causing an increase in suspended particulate matter levels in the surrounding areas. The secondary impacts of gaseous emissions and dust may be on the health of the workers and villagers living in close vicinity. During operation phase, the emissions will be due to process stack emissions, material handling in stock yards, crushing, fugitive dust within project and transportation.

Management: During construction, the dust generated due to excavation, leveling and transportation activities will be controlled by sprinkling of water. Construction equipment will be maintained regularly to minimize source emissions. During both construction and operation, all trucks being used for transportation of construction material, raw material and finished product will be covered with tarpaulin to prevent spillage, maintained, optimally loaded and have PUC certificates. During operation, high efficiency ESP, bag filters and other air pollution control equipment will be installed to control the

particulate emission from the processes. Sprinkling during crushing, handling and transfers will control dust. The establishment of the project is expected to cause an increase of pollutants at ground level around the project. The impact on surrounding air quality has been calculated using a mathematical model ISCST3. There will be an increase by 27.55 $\mu g/m^3$, 10.47 $\mu g/m^3$, 36.05 $\mu g/m^3$ and 21.79 $\mu g/m^3$ for PM10, $PM_{2.5,}$ SO_2 and NOx, respectively. The traffic movement due to project, on public roads will also cause an increase in pollutants which has been assessed separately (an increase by 3.21 $\mu g/m^3$, 0.79 $\mu g/m^3$, 0.527 $\mu g/m^3$ and 23.83 $\mu g/m^3$ for PM10, $PM_{2.5,}$ SO_2 and NO_2, respectively). After these increments, the highest resultant values in study area are likely to be 76.24 $\mu g/m^3$, 38.27 $\mu g/m^3$, 45.087 $\mu g/m^3$ and 43.14 $\mu g/m^3$ for PM_{10}, $PM_{2.5,}$ SO_2 and NO_2, respectively and the impact of the project will remain within permissible limits of National Ambient Air Quality Standards 2009, for business as usual scenario. 24 hours average standards for PM_{10} is 100 $\mu g/m^3$, $PM_{2.5}$ is 60 $\mu g/m^3$, SO_2 80 $\mu g/m^3$ and NO_2 80 $\mu g/m^3$.

4.4 Water environment

Impact: During construction phase, the requirement of water will be on account of concrete mixing, curing, cooling water for various machines, spraying, sprinkling for dust suppression, irrigation for plantation and for greenbelt and landscaping. Waste water generation will be from construction workers and cleaning activities.

During operation phase, water will be required for process. It will be taken from Ib River and Bhedan River, harvested rain water and recycled water within the plant. The total waste water generation from the proposed plant will be 196 KLH. The sewage and sanitary wastewater from toilets, washrooms and canteen will be to the tune of 17 KLH.

Management: During construction phase, mobile toilet block shall be provided for construction workers. The sewage will be treated in portable batch type sewage treatment plant.

During operation phase, the discharge will be from cooling water system, floor washings and process waste waters. Units like beneficiation plant, washery, coke oven, rolling mill, etc will be reusing their discharge waters with or without treatment. Cooling waters will be collected in common monitoring basin and used for dust suppression and greenbelt. The sewage from toilets, washrooms and canteen shall be treated in sewage treatment plant and reused. Sludge removed will be used as manure. The project will have zero liquid effluent discharge except monsoons.

The rainwater falling on rooftops of buildings and sheds will be recharged to the groundwater. Rain water from green area shall be recharged through trenches. Rainwater falling on roads, parking, open area, stock yards, sub station, etc. will be routed to the raw water reservoir or rain water harvesting ponds via desilting chambers.

4.5 Land use and soil quality

Impact: The existing 348.63 acre (141.09 Ha.) land is under the possession of the company. The entire 2502 acre (1012.54 Ha.) land for expansion has been allotted to M/s Action Ispat and Power Private Limited by the Odisha Industrial Infrastructure Development Corporation (IDCO) vide letter no. ED/SLNA/EXP-AIPPL/871/24 dated 15.03.2024. Construction and development will take place in the project area. There will be construction of roads, water reservoir, plant buildings, raw material shed, product shed, green belt, etc. The construction activities will disturb the top soil. During operation, the temporary storage of solid wastes like char, ESP & bag filter dusts, sludges, fume extraction system dust, various slags from various sub-units, fly ash and other solid wastes on land would also impact the land.

Management: The topsoil generated during construction will be removed carefully, stored temporarily and spread over area where additional plantation is proposed. Stabilization of soil with plants will minimize erosion. 40.16% of total project area will be under greenbelt. The raw material yard and slag yard will have lining to prevent percolation of contaminants during rainfall. Runoff will be collected in a garland drain around the stock yard & solid waste storage areas, settled in settling pond, treated if required, and directed to rain water harvesting ponds or raw water reservoir. Part of the raw material storage will be covered, thus, reducing interaction with water and soil. The land use of the project will permanently be industrial use.

4.6 Noise

Impact: The noise level during construction will be due to construction machinery and activities. It will be of temporary and reversible nature. During operation, noise will be generated due to operation of various equipment, machinery, pumps, crusher, etc. The noise level at sources are anticipated to be between 90-110 dB(A).

Management: The machinery shall be provided with acoustic shields and enclosures to limit the sound level inside the plant. Vibration dampners shall be used during erection of machinery. Maintenance of machines and vehicles will be done regularly. The proposed green belt will also help to prevent noise generated within the project from spreading beyond the project boundary. Earmuffs/ plugs will be provided to the workers deployed in the close vicinity of noise source.

4.7 Traffic

Impact: There will not be any road diversion due to acquisition of proposed expansion area. However, approach road to access the northern patch of the plant will have to be constructed. Raw material transportation shall be from various locations such as Jharkhand, Chhattisgarh, Odisha, Paradip port (for imported material) etc. to the proposed integrated steel plant via the Biju Expressway and State Highway 49. Manufactured finished products will be sold in the open markets available in various parts of the state or

even exported via the same routes. There will be to and fro movement of 13250 trucks (30-35 tonnes capacity) per day. The impact of traffic will be felt on the roads and adjoining habitation.

Management of traffic: Policy will be in place that the trucks bringing in raw material are taking finished goods or solid waste to designated consumer. This will keep the trucks volume to its lowest. All trucks used for transportation of raw material and finished product will be covered with tarpaulin, maintained, optimally loaded and have Pollution under control (PUC) certificates. Trucks will be weighed at the weigh bridge to ensure optimal loading, which in turn optimizes emissions. Pollution Under Control (PUC) certificates will be obtained as per specified periodicity for all categories of vehicles. In case of petrol vehicles idling CO measurements will be taken and in case of diesel vehicles, free acceleration smoke will be measured. Water sprinkling on roads and parking area within plant will be done periodically to mitigate dust. Speed breakers and caution signs will be installed along roads. Tyre washing facilities shall be provided at main gate. Railway siding is proposed, which is expected to become operational before the plant achieves full capacity at end of 7th year.

4.8 Solid waste

Impact: During the construction phase, the generation of solid waste will be low. It will comprise of waste construction material and used packaging material, boxes, containers, etc. Stone obtained during land levellign will be crushed and used as construction material. In the operation phase, the integrated steel plant will generate empty barrels (metal and plastic), bags, fly ash, bed ash, dust from air pollution control equipment, dolochar, various furnace slags, mill scale, scrap, rejected billets, coal fines & rejects, M.B.F. slag, iron ore fines, sinter returns, effluent treatment sludges and sweepings. Domestic waste shall be generated from workers during construction as well as operation phase.

Management: Construction wastes will be segregated at site itself. The recyclable material will be recovered for reuse or sale. The non-recyclable material shall be used for leveling. Litter collection bins will be installed around the work site. Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, solder butts, etc. will be disposed through recyclers. Domestic waste will be generated from the plant office, organic component of which shall be composted/ vermi composted.

Sponge iron kilns' dolochar will be used as fuel in power plant. Various furnace slags will be given for metal recovery, converted into aggregates or precious slag balls and used for several purposes. 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. Some of these can also be sent to pre-mixing bin of pellet plant. Steel scraps and rejects will be recycled by melting. Fly and bottom ash of power plant shall be used for brick making in house and balance given to cement plants, brick

plants, road projects, filling & other users. All stock piles will be laid on top of a stable liner to avoid leaching of materials to ground water.

4.9 Ecology

Impact: There is no forest land in the proposed expansion area. No significant adverse impact of proposed project is anticipated on the flora or fauna in the immediate surroundings. This conclusion is based on the low biodiversity in the vicinity of the project, distance of forest areas from project and low level of increase in ground level concentrations of pollutants in forest areas due to proposed project.

Management: The project will have a green belt over 40.16% (463.29 Ha) of the plant area. Plantation of 11.58 lakh saplings is proposed. A three-tier green belt is proposed along the peripheral boundary. The greenbelt will act as a micro-habitat for small sized mammals and birds. The trees to be planted shall be of native species such as Kendu (*Diospyros melanoxylon*), Bel (*Aegle marmelos*), Char (*Buchanania lanzan*), Siris (*Albizzia lebbeck*), Neem (*Azadirachta indica*), Mango (*Mangifera indica*), Peepal (*Ficus religiosa*), Amla (*Phyllanthus embelica*), etc. Native ethno-medicinal species will be preferred. Existing trees in the project area will be preserved as per layout to the extent possible.

4.10 Socio-economics status

Impact: Approximately 10 households will have to be displaced, resettled and rehabilitated. There will be 2011 land losers from 1012.546 ha private land. Land shall be acquired through IDCO. Most of the work force required for construction and operation phase will be taken from the surrounding areas. Approximately 1000 persons (200 permanent, 800 contractual) will be required during construction phase. During operation phase, 3525 people are expected to get direct employment and 5500 people will be contractual. Additionally, there will be equal number of indirectly employed persons.

Management: For land that is to be acquired, compensation shall be paid for it as per government norms. The displacees shall also be resettled and rehabilitated as per the states R&R policy. Preference will be given to displacees and land losers for employment. It is proposed to hire the manpower locally, to the extent possible. This will have a positive socio-economic impact on local people due to steady income. Training for capacity building shall be supported by the company. This will enable displacees, land losers and local persons to become employable. Thus, the direct and indirect employment will lead to economic growth.

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. The company will

also carry out activities for social welfare through Corporate Social Responsibility (CSR). The commitments made during public hearing shall also be fulfilled.

4.11 Occupational Health

The Company will have a safety officer who will be the Deputy Manager (Safety). He will develop, implement and monitor Occupational Health and Safety Policy, Programs and Procedures. He will be assisted by safety supervisors. Pre-induction and during employment monitoring of occupational health shall be carried out as per Factories Rules. A first aid center will be developed in the plant which will be equipped and manned by competent persons. First-aid boxes will be provided and maintained in different locations. Personal protective equipments (PPE) will be provided to all the workers. Regular safety training will be conducted. Company shall put 100% efforts for a zero accident rate.

5.0 ANALYSIS OF ALTERNATIVES

The alternate sites have been evaluated Site 1- around existing plant area, Site 2-near Pacnhaparha & Bhuyanparha and Site 3-near Abanakela village. Site 2 was found inappropriate due to higher displacement and large number of water bodies. Site 3 was found inappropriate because of large displacement and a large patch of cashew plantation. Hence, Option 1 has been considered most suitable due to its location near to existing plant and all other conditions are also favorable.

6.0 ENVIRONMENTAL MONITORING MECHANISM

An environment management team shall be responsible for implementation of environment management plan. It will also be responsible for environmental monitoring. Regular monitoring of the statutory environmental parameters will be taken up. The total capital investment on environmental monitoring is envisaged as Rs. 12.07 crores and recurring expenditure during operation will be Rs. 3.16 crores /year.

7.0 ADDITIONAL STUDIES

Risk Assessment: All types of industries face certain types of hazards which can disrupt normal activities abruptly. They can lead to disaster like fires, inundation, failure of machinery, explosion, oil spillage, electrocution, etc. The aim of the disaster management plan is to take precautions, prevent hazard from occurring and avert disaster. It also plans for actions that are taken after a disaster occurs. This limits the damage to the minimum. To tackle a disaster situation, an emergency control room will be set up with communication facility. The emergency team shall be headed by the Unit Head, who will be called Site Main Controller.

Public Consultation: The draft EIA report has been prepared on the basis of which the public consultation will be held. Action plan to address the

issues raised during public consultation will be added after conduct of public hearing.

8.0 PROJECT BENEFIT

The permanent employment generation from the proposed project will be 3525 persons during operation. In addition to this, there will be 5500 persons for temporary employment. In addition to this, there will be indirect employment. As majority of unskilled and semi-skilled persons will be from the displacees, land losers, surrounding villages and the local population will be benefited. Social welfare activities shall be carried out by the project management in the surrounding villages. It will be for improving social infrastructure (road, drainage, water supply, school) or for activities desired by villagers. The amount earmarked shall be as per the corporate social responsibility program which requires 2% of the average profit of the previous three years.

9.0 ENVIRONMENT MANAGEMENT PLAN

An environment management team shall be responsible for implementation of environment management plan, developing greenbelt, ensuring good housekeeping, statutory compliance as well as creating environmentally aware work forces. Regular monitoring of the statutory environmental parameters will be taken up. The parameter wise management plan comprises of following:

- **Air quality management plan:** provision of electro static precipitators, dust extraction systems, bag filters, dry gas cleaning plants, scrubbers, etc. shall be there. Sprinkling on roads and material handling areas and green belt for absorption of pollutants shall be there.

- **Noise level management plan:** plant machinery will be established in enclosed shed to prevent noise propagation to surrounding, will have acoustic enclosure, boundary wall and green belt will also mitigate noise.

- **Solid waste and hazardous waste management plan:** Slag generated from integrated steel plant will be predominantly reuseable for direct re-use, metal recovery, sinter making, pelletisation etc. Wastes not recyclable in process also have several uses such as for construction material or filling of low lying areas.

- **Effluent management plan:** There will be 107 KLH waste water generation and reused in the plant premises. The blow down from the cooling system shall be reused for sprinkling and green belt watering besides other unit wise treatment and reuse measures. Beneficiation plant and washery will have their closed loop treatment systems.

- **Storm water management plan:** There will be rain water harvesting from roof tops. Rain water from the premises will be collected through storm water drainage system and sent to settling tank prior to storage in

rain water harvesting tanks or raw water reservoir and excess released to natural drain.

- **Occupational health and safety management plan:** Pre-induction and during employment monitoring of occupational health shall be carried out as per Factories Rules. Medical room with first aid, necessary medicines and support staff will be maintained as per norms. Personal protective equipment (PPE) will be provided to workers. Regular training shall be provided for safe handling of material and machines. Company shall put 100% efforts for a zero accident rate.

- **Green belt development plan:** shall be undertaken over 40.16% of the plot area comprising of 11.58 lakh plants of native species.

- **Socio economic management plan:** social welfare measures to fulfill the issues raised during public hearing as well as undertake peripheral development activities under Corporate Social Responsibility

The investment for the proposed expansion project is Rs. 21,000 crores. The environmental management cost for the project shall be Rs. 159.49 Crore capital cost and Rs. 79.15 crore/ annum recurring cost. This includes monitoring cost.

10.0 DISCLOSURE OF CONSULTANTS

The consultants engaged for the preparation of the EIA/EMP of the project are Min Mec Consultancy Pvt. Ltd. It was registered in July 1983 with the Registrar of Companies, Delhi & Haryana, India. In 1994, Min Mec established a modern R&D Laboratory. Min Mec is ISO 9001: 2015 certified under ANZ-JAS. In June 2006, the laboratory received accreditation from NABL (latest certificate no. TC-14312), which has been renewed as per procedure since. In 2012, lab had been accredited under Environment Protection Act (EPA) by Ministry of Environment, Forest & Climate Change, Government of India and renewed till 2024. The laboratory also has ISO 14001:2015 and ISO 45001:2018 certification. On 25.02.2021, Min Mec Consultancy was accredited by QCI-NABET as Mine Plan Preparing Agency (MPPA). Min Mec is preparing EIA/EMP Reports vide NABET's Accreditation Certificate No. NABET/ EIA/2225/IA 0096 (Rev.01) valid till 29.03.2025.

11.0 CONCLUSION

The analysis of the cost benefit shows that the project will be profitable after taking into the accounts of all requisite environmental management cost. The cost effectiveness analysis in terms of topography, drainage, climate, ambient air quality, water resource, water quality, noise level, traffic volume, land environment, soil quality, ecology and socio-economics shows that the project will have an overall positive impact.