

EXECUTIVE SUMMARY

PROPOSED INTEGRATED STEEL PLANT OF 3.1 MILLION TON PER ANNUM ALONG WITH 230 MW (80 MW WHRB/TRT BASED + 150 MW COAL BASED) CAPTIVE POWER PLANT

At

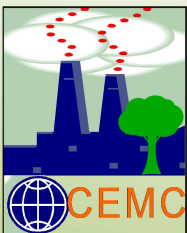
Mouza - Changual (J.L. No. - 360), Jethia (J.L. No. - 361) &
Khatranga (J.L. No. - 362), P.S. – Kharagpur (L),
Dist. - Paschim Medinipur, West Bengal

FOR

M/s Rashmi Green Hydrogen Steel Pvt. Ltd.

**9 AJC Bose Road, 1st Floor, Ideal Centre,
Kolkata – 700 017, West Bengal**

SEPTEMBER 2022



Centre for Envotech and Management Consultancy Pvt. Ltd.

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 General Background

M/s Rashmi Green Hydrogen Steel Private Limited, a Private Limited company incorporated under Company Act on 27th day of July 2021 having its registered Office at 9 AJC Bose Road 1st Floor, Ideal Centre, Kolkata, West Bengal 700017. The Company is directed by Shri Sudam Mitra & Shri Abhishek Singh a young, prolific, highly educated and enthusiastic industrialist, having business and industrial experience in Iron & Steel Industry.

M/s Rashmi Green Hydrogen Steel Private Limited has proposed to set up a green field Integrated Steel Plant of capacity 3.1 Million Ton per Annum (Finished Steel) along with 230 MW (80 MW WHRB/TRT based + 150 MW Coal based) Captive Power Plant at Mouza – Changual (J. L. No. - 360), Jethia (J. L. No. - 361), Khatranga (J. L. No. - 362), P.S. – Kharagpur (Local), Dist. – Paschim Medinipur in the state of West Bengal.

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard TORs "Activity 2(b) – Mineral Beneficiation, Activity 3(a) – Metallurgical Industry (Ferrous and Non-Ferrous) & 4(b)(ii) – Coke Oven Plant" were prescribed for undertaking detailed EIA and EMP study by Ministry vide File No. IA-J-11011/102/2022-IA-II(IND-I) dated 18th July, 2022.

Proposed project is Greenfield Integrated Steel Plant of capacity 3.1 Million Ton per Annum (Finished Steel) along with 230 MW (80 MW WHRB/TRT based + 150 MW Coal based) Captive Power Plant. The total land area of 260 Acres for proposed project and 17 acres of additional land for rail corridor & road access will be required. Estimated cost of proposed project is ₹ 2,900 Crores.

The unit configuration and capacity of proposed facilities of the project as per TOR dated 18th July, 2022 are given below in **Table No. 1**.

Table No. 1: Proposed Facilities, configuration & Production details

S. No.	Particulars of Facilities	Configuration	Capacity	Product
1.	Blast Furnace with matching PCM	3 x 750 m ³	3.0 Million TPA	Molten Metal
	LD Converter & CCM	1x125 Ton + 1x 100 Ton		Pig Iron
				High Quality Billets, Slab
2.	Sinter Plant	2 x 130 m ² + 1 x 70 m ²	4.0 Million TPA	Iron Ore Sinter
3.	Ferro Alloy Plant with matching jigging & briquette plant	4 x 9 MVA	0.070 Million TPA	FeSi , FeCr , FeMn, SiMn,
4.	Non-recovery type Coke Oven Plant	2 x 0.5 MTPA	1.0 Million TPA	Metallurgical Coke
5.	Seamless Tube/Pipe Line	***	0.5 Million TPA	Seamless Tube/Pipe
6.	Strip Mill/CRM	***	2.0 Million TPA	H.R. Plate/Coil Flat Products
	Pickling Line & Galvanizing Line	***		Galvanised Product
7.	Ductile Iron Pipe Unit,	***	0.6 Million	Ductile Iron,Pipe,

	Fitting & Accessories Plant		TPA	Fitting & Accessories
8.	Oxygen Plant	3 x 200 TPD	600 TPD	Oxygen
9.	Lime Dolomite Plant	3 x 200 TPD	600 TPD	Lime dolomite
10.	Pellet Plant with matching wet grinding	2 x 0.6 Million TPA	1.2 Million TPA	Iron Ore Pellet
11.	Producer Gas Plant	15 x 7,500 Nm ³ /hr	112500 Nm ³ /Hr	Producer Gas
12.	Captive Power Plant	80 MW WHRB Based (69 MW from Coke Oven Plant + 11 MW from TRT MBF) 150 MW CFBC (3 x 50 MW Coal Based)	230 MW	Power
13.	Railway Siding	01 No.	01 No.	Raw Material/ Finished Product Transportation

1.2 Location and communication

The proposed site for integrated steel plant is located at Mouza – Changual (J. L. No. - 360), Jethia (J. L. No. - 361), Khatranga (J. L. No. - 362), P.S. – Kharagpur (Local), Dist. – Paschim Medinipur West Bengal. The location of plant is given in **Fig. No. 1**. The co-ordinates of the site as per Google earth are as given in **Table No. 2**.

Table No. 2: CO-Ordinates of the Site

S. No.	Location	Latitude	Longitude
1	Point 1	22°19'31.85"N	87°23'49.15"E
2	Point 2	22°19'32.36"N	87°23'50.51"E
3	Point 3	22°19'31.79"N	87°23'50.84"E
4	Point 4	22°19'31.94"N	87°23'55.41"E
5	Point 5	22°19'32.39"N	87°23'56.19"E
6	Point 6	22°19'32.95"N	87°23'56.75"E
7	Point 7	22°19'32.96"N	87°23'58.08"E
8	Point 8	22°19'33.32"N	87°23'59.05"E
9	Point 9	22°19'33.60"N	87°24'0.32"E
10	Point 10	22°19'33.63"N	87°24'1.67"E
11	Point 11	22°19'32.87"N	87°24'1.79"E
12	Point 12	22°19'32.79"N	87°24'5.83"E
13	Point 13	22°19'38.62"N	87°24'6.09"E
14	Point 14	22°19'38.28"N	87°24'13.56"E
15	Point 15	22°19'37.59"N	87°24'14.02"E
16	Point 16	22°19'37.52"N	87°24'15.10"E
17	Point 17	22°19'38.02"N	87°24'15.34"E
18	Point 18	22°19'37.73"N	87°24'17.02"E
19	Point 19	22°19'38.95"N	87°24'17.09"E
20	Point 20	22°19'39.21"N	87°24'15.76"E

21	Point 21	22°19'41.14"N	87°24'15.79"E
22	Point 22	22°19'41.07"N	87°24'14.68"E
23	Point 23	22°19'46.02"N	87°24'14.67"E
24	Point 24	22°19'46.15"N	87°24'13.52"E
25	Point 25	22°19'48.36"N	87°24'13.47"E
26	Point 26	22°19'48.45"N	87°24'11.78"E
27	Point 27	22°19'48.65"N	87°24'11.68"E
28	Point 28	22°19'48.70"N	87°24'10.10"E
29	Point 29	22°19'48.93"N	87°24'9.88"E
30	Point 30	22°19'48.96"N	87°24'8.71"E
31	Point 31	22°19'52.30"N	87°24'9.07"E
32	Point 32	22°19'52.76"N	87°24'8.46"E
33	Point 33	22°19'53.61"N	87°24'8.15"E
34	Point 34	22°19'54.41"N	87°24'6.48"E
35	Point 35	22°19'54.68"N	87°24'6.92"E
36	Point 36	22°19'55.64"N	87°24'7.01"E
37	Point 37	22°19'55.65"N	87°24'6.69"E
38	Point 38	22°19'58.07"N	87°24'6.62"E
39	Point 39	22°19'58.11"N	87°24'4.77"E
40	Point 40	22°19'57.80"N	87°24'4.46"E
41	Point 41	22°19'57.80"N	87°24'3.95"E
42	Point 42	22°19'58.55"N	87°24'3.86"E
43	Point 43	22°19'58.85"N	87°24'4.38"E
44	Point 44	22°20'0.29"N	87°24'4.53"E
45	Point 45	22°20'0.32"N	87°24'5.46"E
46	Point 46	22°20'0.57"N	87°24'5.52"E
47	Point 47	22°20'1.35"N	87°24'5.28"E
48	Point 48	22°20'1.71"N	87°24'6.34"E
49	Point 49	22°20'3.07"N	87°24'5.92"E
50	Point 50	22°20'3.08"N	87°24'4.85"E
51	Point 51	22°20'2.49"N	87°24'4.67"E
52	Point 52	22°20'2.73"N	87°24'3.82"E
53	Point 53	22°20'2.70"N	87°24'3.37"E
54	Point 54	22°20'3.33"N	87°24'3.41"E
55	Point 55	22°20'3.63"N	87°24'2.13"E
56	Point 56	22°20'3.81"N	87°24'2.07"E
57	Point 57	22°20'4.00"N	87°24'2.38"E
58	Point 58	22°20'5.00"N	87°24'2.34"E
59	Point 59	22°20'4.96"N	87°24'1.91"E
60	Point 60	22°20'3.55"N	87°24'1.87"E

61	Point 61	22°20'3.42"N	87°24'1.09"E
62	Point 62	22°20'3.69"N	87°24'1.07"E
63	Point 63	22°20'3.78"N	87°24'0.93"E
64	Point 64	22°20'4.54"N	87°24'0.80"E
65	Point 65	22°20'4.65"N	87°23'59.86"E
66	Point 66	22°20'4.36"N	87°23'59.78"E
67	Point 67	22°20'4.46"N	87°23'59.36"E
68	Point 68	22°20'5.11"N	87°23'59.40"E
69	Point 69	22°20'5.23"N	87°23'59.82"E
70	Point 70	22°20'5.50"N	87°23'59.83"E
71	Point 71	22°20'5.61"N	87°23'59.62"E
72	Point 72	22°20'6.76"N	87°23'59.79"E
73	Point 73	22°20'7.25"N	87°23'57.70"E
74	Point 74	22°20'5.27"N	87°23'57.65"E
75	Point 75	22°20'5.20"N	87°23'58.29"E
76	Point 76	22°20'4.37"N	87°23'57.96"E
77	Point 77	22°20'4.52"N	87°23'57.66"E
78	Point 78	22°20'4.40"N	87°23'56.69"E
79	Point 79	22°20'3.61"N	87°23'56.70"E
80	Point 80	22°20'3.19"N	87°23'56.57"E
81	Point 81	22°20'1.91"N	87°23'56.63"E
82	Point 82	22°20'2.12"N	87°23'54.42"E
83	Point 83	22°20'3.04"N	87°23'54.47"E
84	Point 84	22°20'14.98"N	87°23'50.26"E
85	Point 85	22°20'41.16"N	87°24'3.55"E
86	Point 86	22°20'44.97"N	87°23'48.85"E
87	Point 87	22°20'27.53"N	87°23'41.30"E
88	Point 88	22°20'27.73"N	87°23'34.14"E
89	Point 89	22°20'15.35"N	87°23'32.09"E
90	Point 90	22°20'2.79"N	87°23'46.21"E
91	Point 91	22°20'2.58"N	87°23'49.57"E
92	Point 92	22°19'58.63"N	87°23'49.80"E
93	Point 93	22°19'58.36"N	87°23'53.51"E
94	Point 94	22°19'58.84"N	87°23'55.33"E
95	Point 95	22°19'54.28"N	87°23'55.36"E
96	Point 96	22°19'54.15"N	87°23'53.79"E
97	Point 97	22°19'54.65"N	87°23'52.78"E
98	Point 98	22°19'54.03"N	87°23'52.34"E
99	Point 99	22°19'34.11"N	87°23'50.48"E
100	Point 100	22°19'33.29"N	87°23'48.45"E

The project site is well connected by roads and rail. The project site is connected to Asian Highway AH 45 (NH 16) which passes adjacent to the site. Nearest city is Kharagpur (~7.5 km in W direction). The nearest airport is Netaji Subhash Chandra Bose International Airport at distance of about 112 Km from the proposed project site. The proposed plant site is at distance of around 2.1 Km from Jakkpur railway station and around 6.8 Km from Kharagpur Junction. Nearest port is Haldia Port which is around 78 Km away from the proposed project site.

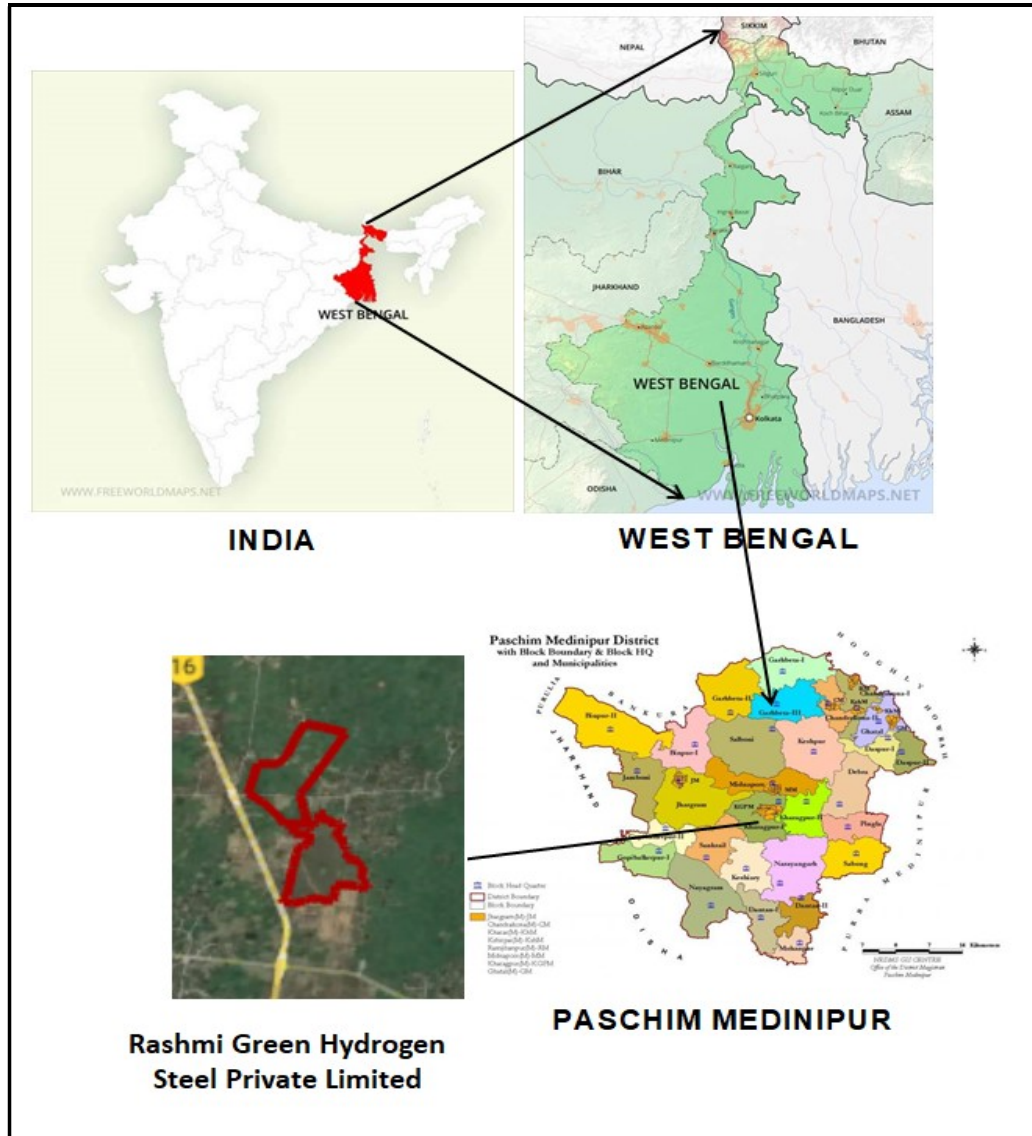


Fig. No. 1: Location Map

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 undeveloped/agricultural land to industrial use. The total land requirement for

the integrated steel plant is 260 Acres and 17 Acres of additional land for rail corridor & road access. During construction phase, parts of the project area will be converted into internal roads, water reservoir, buildings, guest house, green belt and plantation etc. The proposed layout map is shown below in Fig. No. 2.

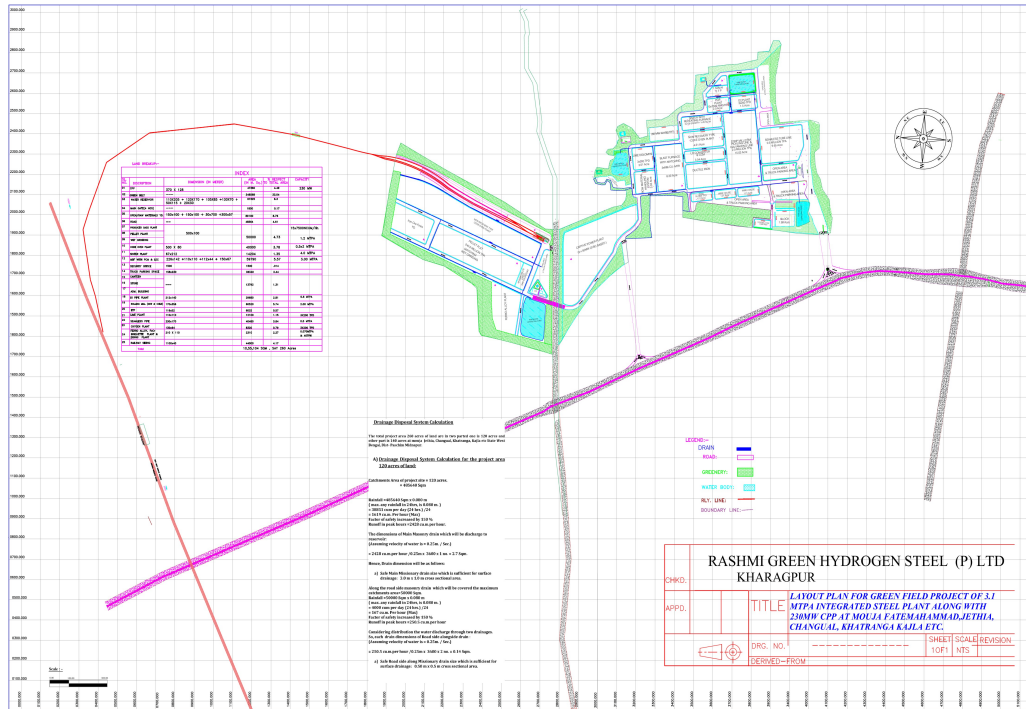


Fig. No. 2: Proposed Layout Map

2.2 Process Description

Blast furnace (3.0 Million Ton Per Annum): 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 quartzite etc. 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 utilized in Pellet Plant, DI Pipe, Coke Oven, Lime Dolo Plant and Rolling Mill.

Sinter Plant (4.0 Million Ton Per Annum): Sintering is an agglomeration process of iron ore fines/ flue 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 blast furnace.

Continuous Casting Machine (2.6 Million Ton Per Annum): Continuous casting, also called strand casting, is the process whereby molten metal is solidified into a "semi-finished" Billet/ Slab for subsequent rolling in the finishing mills.

Ferro Alloy Plant (70,000 Ton Per Annum): Ferro manganese, Silico Manganese, Ferro Chrome or ferro silicon is used to make various grades of stainless steel. The process comprises continuous smelting of

manganese/Chromium ore, coke & coal and quartz in smelting electric furnace (Submerged Arc Furnace - SAF). 70,000 Ton Per Annum ferroalloys will be produced from the 4 x 9 MVA furnaces. During smelting operations, solid charge like ore, coal and quartz will be transformed into liquid form as metal and slag.

Coke oven plant (1.0 Million Ton Per Annum): 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 blast furnace, sinter plant and ferro alloy plant.

Lime Dolomite Plant (600 Ton Per Day): 3 x 200 TPD Lime Dolomite plant is proposed to be installed for calcination. Metallurgical lime and dolomite will be used as flux in Sinter, LD & CPP.

Oxygen Plant (600 Ton Per Day): An air separation unit (commonly called oxygen plant) of 3 x 200 TPD capacity will be installed in the proposed project to meet the requirement of oxygen, nitrogen and argon for the steel plant. ASU will have facilities for generation of oxygen, nitrogen and argon at the required pressures and produced by air separation process based on low-pressure cryogenic cycle and double column rectification.

Rolling mill (2.5 Million Ton Per Annum): Semi-finished product from the continuous casting machine of blast furnace will be reheated and converted into finished products such as Seamless Tube/Pipe, galvanised product, H.R. Plate, Flat products & coils other products.

Ductile Iron Pipe, Fitting & Accessories Plant (0.6 Million Ton Per Annum): A ductile iron pipe is produced with centrifugal casting method. The molten ductile iron is poured into a rapidly spinning water-cooled mould and centrifugal force results in an even spread of iron around the circumference.

Pellet Plant (1.2 Million Ton Per Annum) with wet grinding unit: The pellet plant will produce oxide pellets suitable for use in 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.

Captive Power Plant (CPP): (1) Waste Heat Recovery Boiler: 80 MW waste heat recovery boilers based power plant is proposed to utilize the heat from Coke oven & TRT of Blast Furnace. (2) CFBC: 150 MW (3 x 50 MW) power plant based on coal 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 (private & Government mines), non-coking coal (domestic/Import) and coking coal (imported). Other raw material required is Manganese/Chromium Ore, limestone, dolomite, bentonite, quartz, silica, DRI and semi-finished products etc. Fuels required in various units will be coking and non-coking coal, coke breeze & fines, low sulphur heavy stock diesel oil/furnace oil.

Raw Material Requirement:

S. No.	Name of the Raw Materials	Quantity (TPA)	Source	Distance of source	Mode of Transportation
1	Iron Ore Fines & Lump	55,31,234	Purchased from Barbil-Joda, Orissa	270-300	Rail /Road
2	Non-coking coal	22,88,063	CCL, MCL & Imported Coal.	300-500	Rail /Road
3	Coking Coal	13,40,001	E-Auction, Purchased from BCCL, Dhanbad or Imported	300-500	Rail /Road
4	Coke	6,32,193	Imported, E-Auction	300	Rail /Road
5	Dolomite/Dolomite fines	3,93,265	From Birmitrapur, Orissa / Bilaspur, CG	270-350	Rail /Road
6	Limestone	7,72,967	From Birmitrapur, Orissa / Bilaspur, Raipur CG / Katni MP	270-350	Rail /Road
7	Manganese	1,78,200	From Balaghat, MP & Orissa	1000	Rail /Road
8	Chrome Ore	1,75,000	From Balaghat, MP & Orissa	1000	Rail /Road
9	Quartzite	4,26,000	From Belpahar Orissa / Bilaspur, Raipur CG	500	Rail /Road
10	DRI	3,69,650	From associate company of Group, Kharagpur, Jhargram	<100	Rail /Road
11	Pyroxenite	90,000	From Jharkhand, Orissa	500	Rail /Road
12	Mould powder	13,322	Local Market	---	Road
13	Refractory	4,620	Local Market	---	Road
14	Inoculant	550.0	Local Market	---	Road
15	Slag Coagulant	875	Local Market	---	Road
16	Runner Coat	3,025	Local Market	---	Road
17	Magnesium	1,017	Local Market	---	Road
18	Bituminous Epoxy Solution* /	3,368	WRAS* Approved vendor	---	Road
19	Zinc	1,262	Local Market	---	Road

20	Bentonite	24,000	From Kutch, Gujarat	2500-3000	Road
21	Binder & Resin, Hot Metal Glue	1,250	Local Market	---	Road
22	Latex Emulsion	100.00	Local Market	---	Road
23	Castable High Aluminum	4.25	Local Market	---	Road
24	Expandable Polystyrene, Plastic Sheet	400.00	Local Market	---	Road
25	Shot Blasting Grit, Steel Shots	1,300	Local Market	---	Road
26	Paper Tips, Thermocol Block, Hollow Sprue, Steel Straps	Variable	Local Market	---	Road
Total (TPA)			1,20,76,667		

The total power requirement of the proposed project shall be 279 MW. Out of which 230 MW will be sourced from proposed Captive Power Plant & balance 49 MW from WBSIEDCL/open access.

The total water requirement for Integrated Steel Plant will be 458.3 m³/hr (11,000 KLD). It shall be sourced from surface water (Kangsabati river), rain water harvesting pond and ground water (domestic water requirement only).

2.4 Manpower

Total manpower requirement for the proposed project is 3,000 persons (1,000 Regular & 2,000 Contractual). Additional In-direct employment: 2,000 persons will be created in the surrounding areas by transport, business, vehicle drivers and attendants, workshops, grocery and retails, medical etc.

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 up to 10 km radius of the project has been referred to as the "buffer zone".

3.1 Topography and drainage

Topography: The topography of the study area is flat plain. The highest altitude is 51 m above mean sea level (msl). The general slope of the land in the study area is towards south west & south east. The topography of the project site is plain with general elevation ranging from 26 m to 30 m above msl. The topographic features of the study area may be seen from Survey of India Open Series Map No. F45J3, F45J7, F45J8 & F45J11.

Drainage: The area is drained by the river Kangsabati (Kasai) and its tributaries. Kangsabati river flows around 5.0 km north of plant site in a

meandering course mainly NW to NE and after traversing through Medinipur town ultimately meets the Hugli river near Haldia Anchorage in Purba Medinipur district.

3.2 Climate and micro-meteorology

The climate of the region is sub-tropical, being characterized by hot and dry summer, cold winter and erratic rainfall in monsoon. 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.

- 1. Temperature:** The minimum temperature ranges from 9.9 °C in January to 24.1 °C in August while maximum temperature ranges from 28.9 °C in December to 41.3 °C in April.
- 2. Relative Humidity:** The relative humidity is higher in the morning hours averaging 70% compared to night hours which is averaging 66%. During June to October, it is on higher side compared to other months.
- 3. Rainfall:** It can be seen that June to October are the months of heavy rainfall, while in rest of months it is low. The annual rainfall varies from the lowest value of 5.9 mm in December to 356.5 mm in July. The annual average rainfall is 1659 mm.

The micro meteorological data of the core zone has been recorded using an automatic weather station from December 2021 to February 2022. The temperature ranged between 9.9 °C to 34.0 °C and relative humidity ranged between 47.0% to 64.0% during the monitoring period.

The wind speed varied between 0.2 to 11.6 km/hr and the predominant wind direction was observed from North.

3.3 Ambient air quality

Ambient air quality monitoring was undertaken at nine (9) different stations (Village Khatranga – near Project Site, Gopinathpur, Bhatachak, Jakpur, Mirpur, Changual, Banspukhuria, Mawa & Kaliara) during winter season from December 1st 2021 to February 28th 2022. Twenty four hour average PM₁₀ level was found to range from 56.12-75.71 µg/m³, PM_{2.5} was found to vary from 26.67-47.08 µg/m³, NO_x from 9.51-24.60 µg/m³ and SO₂ from 4.02-12.05 µg/m³. The concentration of carbon monoxide, nickel, arsenic, lead, B(a)P and benzene were also measured.

3.4 Water resource and quality

Ground Water Quality study monitored at eight locations in the buffer zone is near village Kajla, Dakshinnaraharipur, Near Plant boundary, Changual, Khagra, Papparara, Dubgohal & Walipur. 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) Kangsabati River near Juarhati village, (2) Kangsabati River, (3) Paiknagari village, (4) Changual village, (5) Sankoa, (6) Benapur, (7) Digra and (8) Kajla village. The analysis of surface water sample shows that all the parameters are within the permissible norms stipulated by CPCB.

3.5 Land use pattern and soil quality

Agricultural Land is the most dominant land use pattern surrounding the 10 km radius of proposed project site. Human Settlement comes next to it. "Industries" is the next leading category in the land use pattern of the study area. Industrial and allied activity comes next in abundance in the 10 km radius of the proposed project site.

Top soil samples were collected and analysed from 6 locations in and around plant premises. All the soil samples collected were grey in colour and the texture was sandy clay or sandy clay loam, which is acceptable to agriculture. The pH ranged from 5.76 to 6.32 which is slightly acidic for agricultural soils.

3.6 Noise and traffic volume survey

Noise levels at eight stations within 10 km radius area from the plant site were observed. Leq values observed during day time varied from 45.7 to 51.8 dB(A) and 35.9 to 44.1 dB(A) during night time.

A traffic volume survey was conducted at National Highway-60 (towards Bhubaneswar) near junction of NH-60 & NH-16, which is around 1.2 km NW (shortest aerial distance from proposed site) w.r.t. the proposed project site. Volume in PCU/hr of National Highway-16 is 868.58.

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. 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.

The tree species are Akashmoni (*Acacia auriculiformis*), Siris (*Albizia lebbek*), Kadam (*Anthocephalus cadamba*), Kathal (*Artocarpus heterophyllus*), Neem (*Azadirachta indica*), Palm Tree (*Borassus flabellifer*), Amaltas (*Cassia fistula*), Radhachura (*Peltophorum pterocarpum*), Mahua (*Madhuca indica*), Devdaru -

Ashoka (*Polyalthia longifolia*), Arjun (*Terminalia arjuna*), Eucalyptus (*Eucalyptus globules*), Mango (*Mangifera indica*) etc.

Since there is no eco-sensitive zone like National Park, Wildlife Sanctuary, Reserve Forest etc. in the study area, wild animals in the study area are rare. Only a few wild animals like Fox, Common Langur and Porcupine etc. could be observed in the study area occasionally. Survey of terrestrial fauna reveals that in general there has been no impact of pollution on fauna.

3.8 Socio-economic conditions

There is no habitation within the core zone of project area. The total population within the study area is 2,92,306 as per census data 2011. The SC population is 18.18% and ST population is 15.89%. The average literacy rate is 76.16% and it is lower among females (68.91%). There are 981 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 will occur in core zone due to cutting, filling, construction activities such as walls, buildings, stock yards, etc. Land requirement for proposed project is 260 Acres and 17 acres of additional land for rail corridor & road access, the topography will change permanently due to leveling and establishment of 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.

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 predicted maximum cumulative contribution from all the point source emission and traffic movement of all the existing units and propose projects of the associate companies in the study area for PM₁₀, SO₂ and NO_x was 9.39 µg/m³, 10.02 µg/m³ and 9.69 µg/m³ respectively.

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 Kangsabati River & rainwater harvesting pond. Domestic water requirement shall be met from ground water sources. The withdrawal of water

from Kangsabati River can also have an impact in absence of mitigation measures. Waste water will be generated from proposed DM unit regeneration; water pre-treatment; discharges from various units like CPP, furnaces, etc.; plant washings; leakages 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 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 Kangsabati River. 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 project will be spread over 260 Acres. The construction and development in the proposed project area will take place after obtaining all the statutory clearances. It comprises of internal roads, water reservoir, buildings, green belt and plantation, etc. The temporary storage of solid wastes like 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 proposed plant operation dust collected from dust collectors, empty barrels (metal and plastic), bags, fly ash, bed ash, dust from air pollution control equipment, LD/BOF slag, mill scale, scrap, rejected billets, coal fines & rejects, Iron ore fines,

effluent treatment sludges, Ferro slag and other biodegradable wastes from the canteen are the solid wastes generated.

Mitigation: The LD/BOF slag will be given for metal recovery, converted into aggregates and used for road making. Mill scales, iron ore fines and various E.S.P. & bag filter dusts will be used for sinter making. Steel scraps and rejects will be recycled by melting. Fly and bottom ash from proposed power plant, ESP dust shall be supplied to brick and cement manufacturers, 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 proposed project area. 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 modelling shows that negligible impact will be caused on the surrounding forests.

Mitigation: Under the proposed green belt and plantation programme, 86.74 Acres of land within premises (33.36% of total plant area 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 shall be met through the fund earmarked under EMP for Social & Infrastructure Development.

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, 3000 people will be employed at full capacity of proposed project.

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 the fund earmarked under EMP for Social & Infrastructure Development to be carried by company.

5.0 ANALYSIS OF ALTERNATIVES

5.1 Alternative Site Analyses

The proposed greenfield project "Integrated Steel Plant of capacity 3.1 Million Ton per Annum (Finished Steel) along with 230 MW (80 MW WHRB/TRT based +

150 MW Coal based) Captive Power Plant at Mouza – Changual (J. L. No. - 360), Jethia (J. L. No. - 361), Khatranga (J. L. No. - 362), P.S. – Kharagpur (Local), Dist. – Paschim Medinipur in the state of West Bengal.

Following three land parcels were identified for the proposed integrated steel plant with captive power plant in West Bengal:

1. 260 acres land in Mouja- Changual (J.L. No. - 360), Jethia (J.L. No. - 361), Khatranga (J.L. No. - 362) in P.S. – Kharagpur (Local), Dist. – Paschim Medinipur in the state of West Bengal. Out of the 260 acres of land for 127 acres of land has been acquired and for rest of land (133 Acres) final stage negotiation from private rayat is in progress.
2. 235.0 acres in village – Biasmat & Hirapuri, Tehsil – Narayangarh, District – Paschim Medinipur, West Bengal.
3. 250.0 acres land in village – Harina, Tehsil – Kharagpur LI, District – Paschim Medinipur, West Bengal.

The factors considered in selecting the above mentioned locations are as follows:

1. Availability of adequate land and other infrastructure including power.
2. Easy availability of surface water from Kangsabati River at an aerial distance of ~ 5.13 km in North direction. The area has annual rainfall of 1400 mm. rain water harvesting mechanism will be used to meet the water requirement.
3. Sources of supply of raw materials & their delivered cost.
4. Existence of rail & road connection in the vicinity for transportation of raw materials/finished products & solid waste.
5. Land use Based units set up in order to have minimal impact on surrounding.
6. Cost of land acquisition, difficulty in acquiring land and more Govt. land availability.
7. R & R issues.

After due analysis and evaluation of the above factors in details for selecting the best suitable site for the proposed integrated steel plant with captive power plant it was concluded that Site-1 at Mouza – Changual (J. L. No. - 360), Jethia (J. L. No. - 361), Khatranga (J. L. No. - 362), P.S. – Kharagpur (Local), Dist. – Paschim Medinipur, West Bengal of 260 acres is more appropriate.

5.2 Technology selected after assessing alternatives

RGHSPL is committed to use well known and established process for manufacturing of different products and intermediate products. Various options were evaluated and selected based on the quality and cost of the product.

6.0 ENVIRONMENTAL CONTROL AND MONITORING ORGANISATION

M/s Rashmi Green Hydrogen Steel Private Limited already has an Environment Management Department at the head quarter and proposes to set up an Environment Management Department at 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 will be appointed at plant site. 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 capital cost of environmental safeguards and implementation of control measures for proposed project is estimated to be ₹ 350.0 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 3,000 persons will be under direct employment of the company at full capacity. Many more persons will be indirectly engaged (2,000) 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 EMP for Social & Infrastructure Development.

9.0 DISCLOSURE OF CONSULTANTS

The consultant engaged for the preparation of the EIA/EMP of the project is Centre for Envotech and Management Consultancy Pvt. Ltd. (CEMC), Bhubaneswar, 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.