EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. Maa Mangla Ispat Pvt. Ltd. is a private limited company incorporated under the Companies Act, 1956, on June 8, 2004, with the objective of establishing a DRI-based steel plant and a captive power plant. Currently, the company operates two 100 TPD Sponge Iron Kilns with an annual production capacity of 60,000 TPA, along with a 4.5 MW WHRB, a 4.5 MW FBC boiler, and an induction furnace with a production capacity of 30,000 TPA of MS billets. The implementation of a hot charging rolling mill is under process.

The existing unit has got valid consent to operation from CECB, Raigarh. The consent for these units was renewed until February 28, 2026.

The company proposes an expansion that includes:

1. Installing two new Sponge Iron Kilns (350 TPD each) and extending the operating days of existing kilns, adding 237,000 TPA of Sponge Iron production. Thus it is proposed to bring the total sponge iron production capacity to 297,000 TPA (Including existing 60000 TPA)
2. Expansion and upgrading of the induction furnace, CCM, and rolling mill to increase production from 30,000 TPA MS Billets to 220,800 TPA of Hot Billets or 212,000 TPA of rolled steel.
3. Adding an 18 MW WHRB and a 5.5 MW FBC based power unit, which will enhance in Captive Power Plant to 32.5 MW capacity (22.5 MW WHRB and 10 MW FBC) inclusive of existing 4.5 MW WHRB and 4.5 MW FBC.
4. Establishing a 35,000 TPA fly ash brick manufacturing plant.

The expansion requires prior Environmental Clearance to proceed.

In accordance with the Environmental Impact Assessment (EIA) Notification dated September 14, 2006, and its subsequent amendments, the proposed project falls under Category "A". It is classified under Project Activity '3(a)' for Metallurgical Industries and '1(d)' for Thermal Power Plants, with the Waste Heat Recovery Boiler (WHRB) being exempt under Activity '1(d).' As a result, the project requires Environmental Clearance (EC) from the Expert Appraisal Committee (EAC) of the Ministry of Environment, Forest and Climate Change (MoEF&CC), New Delhi.

The application for prior Environmental Clearance (Form-1) for proposed metallurgical project was submitted to EAC, MoEFCC, New Delhi (Online Proposal No. IA/CG/IND1/505203/2024) on 18th December, 2024.

The proposal was considered by the Expert Appraisal Committee (EAC) and Standard ToR was granted on 23/12/2024 (vide. file no.: IA-J-11011/475/2024-IA-II(Ind-I).

Anacon Laboratories Pvt. Ltd., Nagpur, is QCI-NABET accredited in 'Category A' environment consultant organization has been assigned to undertake an Environmental Impact Assessment (EIA) study and preparation of Environment Management Plan (EMP) for various environmental components, which may be affected due to the impacts arising out of the proposed project.

The Environmental Impact Assessment (EIA) report is prepared for obtaining Environmental Clearance (EC) from Ministry of Environment, Forest and Climate Change (MoEFCC), New Delhi and the Consent for Establishment from the Chhattisgarh Environment Conservation Board (CECB) for the proposed Expansion project.

1.1 IDENTIFICATION OF PROJECT

M/s. Maa Mangla Ispat Pvt Ltd. proposes brown field project involving expansion of production of Sponge Iron, MS Billets, Steel Rerolled products and Fly Ash products along with captive power generation plant comprising of Waste Heat Recovery Boiler (WHRB) and Atmospheric Fluidized Bed Combustion (AFBC).. The project is proposed to be located at Village – Natwarpur, Tahsil and District – raigarh (CG). The proposal is to seek Environment Clearance based on energy efficient as well as well proven technology process.

TABLE 1: EXISTING AND PROPOSED CAPACITY DETAILS (IN TPA)

S. NO.	Product	Existing Configuration	Existing capacity (In TPA)	Proposed change in configuration	Proposed addition in Capacity (In TPA)	Final Configuration after expansion	Final Capacity (In TPA)
1	Sponge iron	100 TPD X 2 Nos. (with on Line Coal Deshaler unit)	60000	350 TPD x 2 Nos. (With on Line Coal Deshaler unit 50 TPH X 3 Nos)	237000	100 TPD X 2 N0s. and 350 TPD x 2 Nos (With on Line Coal Deshaler unit 50 TPH X 3Nos)	297000
2	MS Ingot/Billet and Hot Charging Rolled Product	I.F. 8 MT X 2 Nos.	30000	Existing 8 MT X 2 Nos and one 8-ton x 1 No new crucible along with 3 More New 15 Tones crucibles will be added) with Hot charging facility	190800	8 MT X 3 Nos. 15 MT X 3 Nos. Induction furnace	220800 TPA (In the Form of Hot Billets) or 212000 in the Form of Rolled steel
3	WHRB based power	2 Nos. to WHB Boiler of 10 TPH boiler	4.5 MW	2 Nos WHRB boiler	18	4 Nos. of WHRB boiler	22.5
4	FBC based power plant	-	4.5	-	5.5	-	10
5.	Fly Ash Brick / Block plant	Fly Ash product making facilities	10500		24500	Fly Ash product making facilitates	35000

1.2 LOCATION OF THE PROJECT

The proposed expansion project activities will be carried out at total 29.981 Ha land at Village - Natwarpur, Tehsil and District Raigarh of Chhattisgarh State. The total land area is 29.981 hectares of land out of which 28.075 hectares is owned by the company, while 1.906 hectares have been acquired through a registered long-term lease agreement. The entire land is

already diverted for industrial purpose. The Khasra Number of the project are 231/1, 232/1, 233/2, 232/3, 232/5, 233/1, 234/1, 239/2(K), 239/4.

The nearest city is Raigarh which is around 9.07 Km in west-south-west direction. Nearest airport is Jharsuguda Airport, which is around 56.36 km at east direction. The nearest habitation is Dhumabahal Village which is at 0.83 Km in North North West direction and Natwarupur is 1.50 KM in North East direction from project site. The project site can be reached from through internal district roads which connect to Tilga and Natwarpur Road which is approx. 0.02 Kms (E) from the site. Then further connects to Raigarh-Sundergarh road at 3.42 Kms in W direction. The nearest railway station is Kotarlia Railway Station which is 6.58 Km in the south south west direction and Raigarh Railway station which is main Railway station in this area is at 12.38 km west south west direction.

The study area of 10 km radial distance from the project site is shown in **Figure 1**.

1.3 EIA/ EMP REPORT

As per approved ToR obtained from EAC (Industry –I), MoEFCC, New Delhi, baseline environmental monitoring was already conducted during during **post-monsoon season (15th October 2024 – 15th January 2025)** has been considered for determining the status of ambient air quality, ambient noise levels, surface and groundwater quality, soil quality, status of flora, fauna and eco-sensitive areas and socio-economic status of the villages within 10 km radius study area from the project site **(Figure 1).** The observations of the studies are incorporated in the EIA/EMP report. Impacts of the proposed expansion project activities during construction and operation stages were identified and duly addressed in the EIA- EMP report.

EIA - EMP report along with the proposed management plan to control/ mitigate the impacts. Environmental Management Plan is suggested to implement the pollution control in the project.

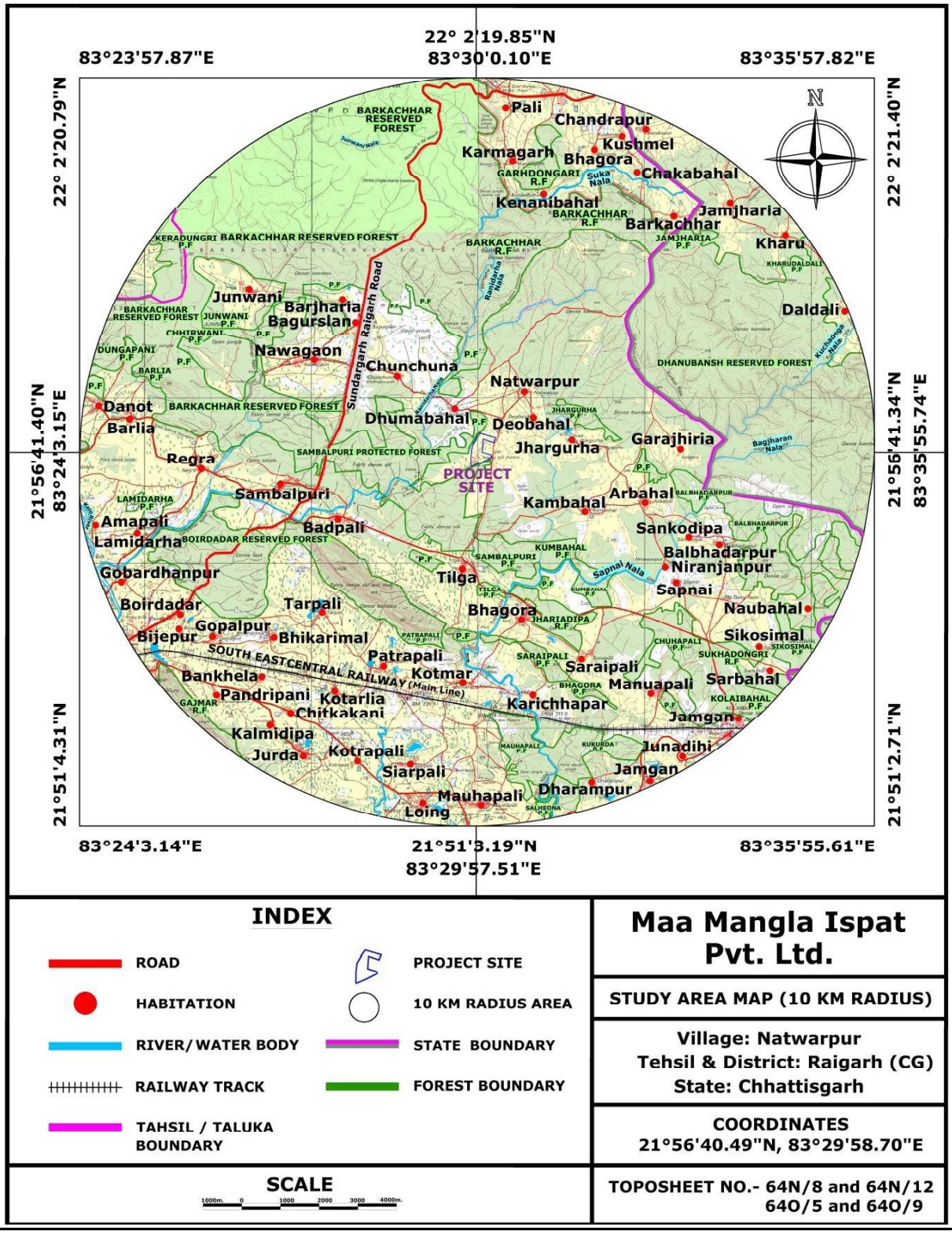

FIGURE 1 A: STUDY AREA (10 KM RADIAL DISTANCE)

TABLE 2: DETAILS OF ENVIRONMENTAL SETTINGS

Sl.	Particulars	Details
1.	Project Location	Village - Natwarpur District - Raigarh State - Chhattisgarh 496001
2.	Latitude/Longitude	21°56'40.49"N, 83°29'58.70"E
3.	Location covered in Toposheet No	64N/8, 64N/12, 64O/5 and 64O/9
4.	Nearest representative IMD Station	IMD Jharsuguda – 59 KM E IMD Raigarh-13.45km/WSW (Presently not working)
5.	Site elevation above Mean Sea Level	283m to 295m
6.	Nearest roadway	1.Road connecting village Tilga and Natwarpur- 0.02km/E 2.Sundargarh-Raigarh Road - 3.42km/W
7.	Nearest Railway Station	1.Kotarlia Railway Station-6.58km/SSW 2.Raigarh Railway Station-12.38km/WSW
8.	Nearest Air Port	1.OP Jindal Airport-14.88km/WSW 2.Raigarh Airport-19.29km/SW 3.Veer Surendra Sai Airport, Jharsuguda-56.36km/E
9.	Nearest village	Dhumabahal-0.83km/NNW Natwarpur-1.50km/NE
10.	Nearest Port	1.Gopalpur Port-330km/SSE 2.Paradip Port-378km/ESE
11.	Distance from Sea Coast	Bay of Bengal-324km/SE
12.	Nearest major city with 2,00,000 population	Raigarh- 9.07km/WSW
13.	Nearest State/National Boundaries	1.Odisha- 4.09km/ENE
14.	Hills/Valleys	1.Gajmar Pahad- 9.65km/SW 2.Hills near village Patrapali- 3.80km/SW
15.	Ecologically sensitive zone	None within study area
16.	National Parks, Wildlife Sanctuaries, etc.	None within study area
17.	Nearest Reserved / Protected forests	1. Garhdongari R.F - 6.97km/NNE 2. Keradungri P.F-9.57 km/NW 3. Jamjharia P.F-7.21 km/NE 4. Kharudaldali P.F-9.48 km/NE 5. Barkhachar Reserved Forest-3.5km/NW 6. Junwani P.F-6.38km/NW 7. Chhirwani P.F-7.62km/WNW 8. Barlia P.F-8.14km/WNW 9.Dungapani P.F-9.35km/WNW 10.PF near Danot village-9.58km/WNW 11.P.F near Nawagaon village-5.94km/WNW 12.P.F near Dhumabahal village-1.20km/NNW 13.Dhanubansh Reserved Forest-4.38km/NE 14.Lamidarha P.F-7.81km/WSW 15.Sambalpuri Protected Forest-Adjacent/W 16.Jhargurha P.F-2.03km/ENE 17.PF near Arbahal village-3.85km/E 18.Balbhadarpur P.F-4.81km/ESE 19.Boirdadar Reserved Forest-4.15km/WSW 20.PF near Tilga village-2.71km/SW 21.Tilga P.F-3.22km/S 22.PF near Bhagora village-3.56km/SSE 23.Kumbahal P.F-3.82km/SE 24.Jhariadipa R.F-3.47km/SSE 25.Gajmar R.F-9.56km/SW

<table>
<tr><th>Sl.</th><th>Particulars</th><th>Details</th></tr>
<tr><td></td><td></td><td>26.Saraipali P.F-4.68km/S
27.Bhagora P.F-6.55km/SSE
28.PF near Manuapali village-7.96km/SE
29.Chuhapali P.F-5.93km/SE
30.Sukhadongri R.F-7.82km/SE
31.Sikosimal P.F-8.71km/ESE
32.Kolaibahal P.F-8.65km/SE
33.Mauhapali P.F-6.89km/SSE
34.Kukurda R.F-7.75km/SSE
35.Salheona P.F-9.45km/SSE
36.Patrapali P.F-3.80km/SW</td></tr>
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<tr><td>1</td><td>Kharkhari river picnic Spot</td><td>8.43</td><td>SSE</td></tr>
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<tr><td>1</td><td>Maa Mani Industries Pvt. Ltd.</td><td>0.02</td><td>E</td></tr>
<tr><td>2</td><td>Rolling Mill Division (TMT)</td><td>8.01</td><td>SE</td></tr>
<tr><td>3</td><td>Power Plant, ISL</td><td>7.27</td><td>S</td></tr>
<tr><td>4</td><td>Sponge Iron/Direct Reduced Iron (DRI)</td><td>8.87</td><td>SE</td></tr>
<tr><td>5</td><td>Blast furnace and sinter, ISL</td><td>7.35</td><td>SSW</td></tr>
<tr><td>6</td><td>MSP Steel & Power Limited</td><td>9.18</td><td>SE</td></tr>
<tr><td>7</td><td>IND Synergy Limited</td><td>7.06</td><td>S</td></tr>
<tr><td>8</td><td>M/s. Black Diamond fly ash bricks Industries</td><td>9.90</td><td>NNE</td></tr>
<tr><td>9</td><td>Maa Shakambari Steel Ltd Sambalpuri Raigarh CG</td><td>2.71</td><td>WNW</td></tr>
<tr><td>10</td><td>Shiv Shakti Steel Pvt. Ltd.</td><td>3.73</td><td>WNW</td></tr>
<tr><td>11</td><td>Jindal Food Products, Sambalpuri, Raigarh (C.G.)</td><td>4.25</td><td>WSW</td></tr>
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<tr><td>20.</td><td>Nearest Water Bodies</td><td>
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<tr><td>2</td><td>Bagjharan Nala</td><td>5.98</td><td>E</td></tr>
<tr><td>3</td><td>Kuchadega Nala</td><td>5.91</td><td>E</td></tr>
<tr><td>4</td><td>Suka Nala</td><td>7</td><td>NNE</td></tr>
<tr><td>5</td><td>Junwani Nala</td><td>8.43</td><td>NNW</td></tr>
<tr><td>6</td><td>Sapnai Nala</td><td>3.38</td><td>SE</td></tr>
<tr><td>7</td><td>Kelo River</td><td>9.9</td><td>W</td></tr>
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<tr><td>21.</td><td>Archaeological Sites</td><td>None</td></tr>
<tr><td>22.</td><td>Religious Places</td><td>
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<tr><td>2</td><td>Shri Shri Shakti Pitham Mahalaxmi Mandir</td><td>9.14</td><td>SW</td></tr>
<tr><td>3</td><td>Ma Mankesri Temple</td><td>8.01</td><td>NNE</td></tr>
<tr><td>4</td><td>Ma Banjari Mandir</td><td>5.48</td><td>NE</td></tr>
<tr><td>5</td><td>Samleswari Temple</td><td>7.83</td><td>SE</td></tr>
<tr><td>6</td><td>Mankameshwar Mandir</td><td>8.68</td><td>SW</td></tr>
<tr><td>7</td><td>Hanuman Mandir</td><td>7.78</td><td>SE</td></tr>
<tr><td>8</td><td>Jagnnath Mandir Bhagora</td><td>4.45</td><td>SSE</td></tr>
<tr><td>9</td><td>Mankeswari Temple Jamgaon (Basti)</td><td>9.68</td><td>SSE</td></tr>
<tr><td>10</td><td>Mahakaleshwar Mandir</td><td>9.86</td><td>SSE</td></tr>
<tr><td>11</td><td>Samlewsari Temple</td><td>9.84</td><td>SSE</td></tr>
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<tr><td>13</td><td>Maa Bhadrakali Darbar</td><td>9.48</td><td>S</td></tr>
<tr><td>14</td><td>Jagannath mandir</td><td>9.50</td><td>S</td></tr>
<tr><td>15</td><td>Mahadev Mandir</td><td>9.75</td><td>S</td></tr>
<tr><td>16</td><td>Community Health Centre - Loing</td><td>9.23</td><td>SSW</td></tr>
<tr><td>17</td><td>Jagannath Temple Loing</td><td>9.69</td><td>SSW</td></tr>
<tr><td>18</td><td>Ram Janaki Temple Tarpali</td><td>5.53</td><td>SW</td></tr>
<tr><td>19</td><td>Bhikharimal, Shiv Mandir</td><td>7.04</td><td>SW</td></tr>
<tr><td>20</td><td>Mahakaleshvar Temple</td><td>4.86</td><td>WSW</td></tr>
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<tr><td>23.</td><td>Hospitals and Education Institutions (Sensitive Manmade Landuse)</td><td>
HOSPITALS
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<tr><td>1.</td><td>Primary Health Center Bhagora</td><td>6.01</td><td>SSE</td></tr>
<tr><td>2.</td><td>Raigarh Ayurvedic Hospital</td><td>7.85</td><td>SSW</td></tr>
<tr><td>3.</td><td>Shri Dental Clinic, Raigarh, Chhattisgarh</td><td>8.62</td><td>WSW</td></tr>
<tr><td>4.</td><td>Primary Health Center Sambalpuri</td><td>1.12</td><td>WSW</td></tr>
<tr><td>5.</td><td>Primary Health Centre Bangursiya</td><td>4.40</td><td>NW</td></tr>
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EDUCATIONAL INSTITUTIONS
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<tr><td>1</td><td>Raigarh College of Education</td><td>8.25</td><td>SSW</td></tr>
<tr><td>2</td><td>College of Agriculture & Research Station IGKV, Boirdadar, Raigarh</td><td>8.53</td><td>WSW</td></tr>
<tr><td>3</td><td>Raigarh College of Pharmacy</td><td>8.14</td><td>SSW</td></tr>
<tr><td>4</td><td>Higher Sec School Kotarliya</td><td>7.04</td><td>WSW</td></tr>
<tr><td>5</td><td>Rainbow English Medium School</td><td>9.80</td><td>WSW</td></tr>
<tr><td>6</td><td>St. Xavier English medium school Raigarh</td><td>9.33</td><td>WSW</td></tr>
<tr><td>7</td><td>Batmul College</td><td>9.34</td><td>S</td></tr>
<tr><td>8</td><td>St. Teresa Convent School, Boirdadar, Raigarh, Chhattisgarh</td><td>9.06</td><td>WSW</td></tr>
<tr><td>9</td><td>MSP Public School</td><td>9.88</td><td>SE</td></tr>
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<tr><td>11</td><td>Govt HSS Tilaga</td><td>2.38</td><td>S</td></tr>
<tr><td>12</td><td>Khadu Primary School</td><td>9.61</td><td>NE</td></tr>
<tr><td>13</td><td>Government Primary School Natwarpur</td><td>1.77</td><td>NE</td></tr>
<tr><td>14</td><td>Primary School Karma Garh</td><td>7.80</td><td>NNE</td></tr>
<tr><td>15</td><td>Middle School Bhagora</td><td>8.81</td><td>NNE</td></tr>
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<tr><td>18</td><td>Govt. Hr Sec. School Loing</td><td>9.24</td><td>S</td></tr>
<tr><td>19</td><td>Govt. Middle School Gopalpur Raigarh</td><td>7.87</td><td>SW</td></tr>
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<tr><td>21</td><td>Govt. School Darramuda Mohalla Regda</td><td>6.94</td><td>W</td></tr>
<tr><td>22</td><td>Tarpali School</td><td>6.21</td><td>SW</td></tr>
<tr><td>23</td><td>Hemsundar Gupta Government Higher secondary School Mahapalli</td><td>9.54</td><td>S</td></tr>
<tr><td>24</td><td>Mukti Prakash Shalini High School</td><td>9.21</td><td>WSW</td></tr>
<tr><td>25</td><td>Government Higher Secondary School Sambalpuri, Raigarh, Chhattisgarh</td><td>4.22</td><td>WSW</td></tr>
<tr><td>26</td><td>Secondary School Balbhadrapur</td><td>6.61</td><td>ESE</td></tr>
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<tr><td>24.</td><td>Community Places</td><td>
COMMUNITY PLACES-
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<tr><td>1</td><td>Community hall Karichhapar</td><td>6.67</td><td>SSE</td></tr>
<tr><td>2</td><td>Utsav Island</td><td>8.11</td><td>WSW</td></tr>
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<tr><td>25.</td><td>Seismic zone</td><td>Zone-II (Least Active)</td></tr>
</table>

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION

2.1.1 Manufacturing process of Sponge Iron (DRI)

- Iron ore/Pellet, coal, dolomite/limestone is fed in the weighed quantity and the kiln is rotated at 0.5 RPM speed. A temperature between 1000 ^{0}C to 1050 ^{0}C is maintained in about 70% of the kiln length towards discharge end side for required reaction.
- After the reaction, the product is taken into an indirect cooling drum cooler. The product is cooled to 100 ˚C and taken for product separation and then taken for final use.
- The kiln has three functions; heat exchange, chemical reaction in vessel and conveying solids.

2.1.2 WHRB based Power Generation

- The Waste heat Recovery boilers are attached with DRI Kiln. The flue gases released from DRI Kilns will be passed through Waste Heat Recovery Boiler, where waste heat will be recovered and steam will be generated in required temperature and pressure. The source of energy is the heat content in waste flue gases released from DRI Kilns.

2.1.3 AFBC Based Power Generation

- In an AFBC boiler, the fluidized bed media, which consists of ash, sand, limestone and other such materials is heated to the ignition temperature of the fuel.
- Fuel, such as char and coal is continuously supplied to the bed as it burns very quickly in the high bed temperatures of almost 1000˚C.
- The heat generated from this combustion is used to produce steam which, like in WHRB systems, will produce power through a steam generator.

2.1.4 Process of brick making from waste

- To make Fly ash bricks Fly ash, Lime, Sand and Gypsum along with granulated slag from the induction and arc furnaces are fed into a pan mixer, where water is added in the

appropriate proportion before mixing it all together.

- After mixing; the mixture is shifted to hydraulic presses for where the mixture is given its brick like shape.
- The molded bricks are then carried into the open area where they are air dried and cured in an autoclave to give them its rigidity.

2.2 LAND REQUIREMENT

The proposed expansion project activities will be carried out at total 29.981 Ha land at Village - Natwarpur, Tehsil and District- Raigarh of Chhattisgarh State. The total land area is 29.981 hectares of land out of which 28.075 hectares is owned by the company, while 1.906 hectares have been acquired through a registered long-term lease agreement. The entire land is already diverted for industrial purpose. The Khasra Number of the project are 231/1, 232/1, 233/2, 232/3, 232/5, 233/1, 234/1, 239/2(K), 239/4. Greenbelt area 34.80% (i.e., 10.434 Ha.) will be kept unchanged. The land already sufficient flat land, free from major undulations and sparse vegetation is available within the plant premises.

The detail of land use planning in the project area is provided as follows:

TABLE 3: AREA STATEMENT

Land Use	Existing Area	Proposed change/ Additional Land Area	Final Area	In %
Built Up Area	5.070	5.610	10.680	35.62%
Road and Paved area	0.790	1.960	2.750	9.17%
Storage	1.544	1.772	3.316	11.06%
Water Reservoir	0.055	1.000	1.055	3.52%
Parking Area	0.060	0.200	0.260	0.87%
Green Belt Area	4.631	5.803	10.434	34.80%
Misc.	0.700	0.786	1.486	4.96%
Total	**12.850**	**17.131**	**29.981**	**100.00%**

2.3 RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

The raw material will be transported through rail and truck. Coal from SECL, Iron Ore from Odisha Iron Ore Mine and from NMDC, will be transported through rail upto nearest railway siding and thereby transported to site through covered truck.

Availability of raw material is abundant within 50 km to 500 km area. Fuel consumption will be mainly source from local sources [SECL Mines (200 KM)].. Iron Ore can also be procured from NMDC and Odisha Mines through bidding [NMDC Iron Ore Mines (600 KM)]. Iron ore pellets is also available from local Pellet plants. Coal is also allowed to be imported. Bulk Material like Iron Ore; and Coal, etc. are proposed to be brought by Rail up to nearest railway siding. From there will be transported by covered truck through road to the plant. Whereas the other raw material required for the project is Dolomite/ Quartz, CI/ Pig Iron Heavy Scrap, LDO for Laddle Preheating, Ferro Alloys are readily available within 100 km radius and these will be transported through covered trucks.

2.3.1 Solid and Hazardous waste generation

The details of solid and hazardous waste generations are given in **Table 4** and **5**, respectively.

TABLE 4: SOLID WASTE GENERATION AND ITS DISPOSAL

Name of Waste generated	Qty (TPA)	Proposed Disposal Plan
Char / Dolochar (SID)	74,250	Captive use in Captive Power plant
Kiln Accretion & Refractory waste (SID)	297	Sold to authorized recyclers
Bottom Flue Dust Ash (SID)	59,400	Used for Road making and Land filing.
Mill Scale (IF)	4,342	Sold to Ferro Alloys Plants
Refractory & Ramming Mass waste (IF)	268	Sold to authorized recyclers
Defective Billets (IF)	4,416	Reused in own Induction furnace
Slag from Induction Furnace	25,969	Captive use in own Fly Ash Brick unit and remaining (after recovery of metal) used for Road making and Land filing
Defective and Miss Roll (RM)	6,600	Reused in own Induction furnace
Fluidized Bed Material (PP)	50	Used in own Fly Ash Brick making unit
Fly Ash (Power Plant)	77,662	Captive use in own Fly Ash Brick unit/ sold to Cement plant
Ash From Coal (PP)	21,974	Sold to nearby Cement plants.
Total	**275,228**	

TABLE 5: HAZARDOUS WASTE GENERATION AND DISPOSAL ESTIMATES

Item	H.W Category /Rule	Existing	Proposed Addition	Final after expansion
Used/Spent OIl	5.1(as per HWM Schedule I)	1 KL	2 KL	3 KL
Contaminated Drums	Sch. I (5.2)	20 Nos	30 Nos	50 Nos
Oil soak /Cotton rags etc	Sch. I (5.2)	500 Kgs	500 Kgs	1000 Kgs
ETP Lime Sludge				73 kg/day
STP Sludge				40 kg/day
Used Lead Acid batteries	Covered under The Batteries (Management and Handling) Rules, 2001	Not evaluated	0.5 TPA	Total 0.5 MTPA The lead acid battery or dry battery will be given to authorized recycler having authorization from competent Authority.
E-waste generation	E-waste Management rule 2022	Not evaluated	0.5 TPA Computers, laptops, Monitors, printers, and other electronic appliances	Total 0.5 TPA Shall be disposed through authorized recyclers as per e-waste Management rule 2022

2.4 WATER REQUIREMENT & SOURCE

The total water requirement, including the existing usage and the proposed expansion, will be **1,548 KLD** (510,294 KLA), with 20 KLD allocated for domestic purposes. The water source will be surface water drawn from the nearest surface water source i.e. Nalla (approx. 1.5 KM at west direction). The project does not anticipate utilizing groundwater resources for the proposed expansion.

To support sustainable water management, the company will implement rainwater recharge systems within the plant premises. These systems are designed to recharge 100% of the runoff potential back into the groundwater.

2.5 POWER REQUIREMENT & SUPPLY

The total power requirement for the project will be 35 MW, of which 32.5 MW will be supplied by the captive power plant, and 2.5 MW will be sourced from the State Grid (CSPDCL). Additionally, emergency power backup will be ensured through existing DG sets, comprising five units: 2 x 500 KVA, 1 x 600 KVA, and 2 x 1010 KVA.

2.6 MANPOWER REQUIREMENT

M/s. Maa Mangla Ispat Pvt. Ltd. will provide employment to 362 peoples as direct employment which includes 160 people as existing staff (Administrative -15, Production -145) and 202 people will be proposed staff (Administrative - 31, Production - 171). Preference will be given to local people depending upon their qualification and skill.

2.7 FIRE FIGHTING FACILITIES

To manage emergency fire situations within the plant premises, firefighting facilities are installed across various plant units. Furthermore, all plant units, office buildings, laboratories, and other facilities will be equipped with a sufficient number of portable fire extinguishers for initial fire response.

2.8 PROJECT COST

The total cost of proposed expansion project is **Rs. 38,536.68 Lakhs** (Existing project cost – Rs. 14867.68 Lakhs + Additional cost for expansion – Rs. 23669.00 Lakhs)

3.0 EXISTING ENVIRONMENTAL SCENARIO

3.1 BASELINE ENVIRONMENTAL STUDIES

Baseline environmental studies were conducted at project site along with 10 km radial distance from the project site. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land were monitored during **post-monsoon season (15th October 2024 – 15th January 2025).**

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated at Site (15th October 2024 – 15th January 2025)

First Predominant Wind Direction	NNE (14.60%)
Second Predominant Wind Direction	NE (14.38%)
Calm conditions (%)	4.26
Avg. Wind Speed (m/s)	1.90

The status of ambient air quality within the study area was monitored for **post-monsoon season (15th October 2024 – 15th January 2025)** at 8 locations. All these 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind, cross wind directions and reference point. The levels of Respirable Particulate Matter (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,), Oxides of Nitrogen (NO_X) and carbon monoxide

(CO), Ammonia, Ozone, Benzene and BaP were monitored. The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 6.**

TABLE 6: SUMMARY OF AMBIENT AIR QUALITY RESULTS (PERIOD – 15TH OCTOBER 2024 – 15TH JANUARY 2025)

Sr. No.	Location		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	Ozone µg/m³	NH_3 µg/m³
1	Project Site	Min	64.4	24.8	13.7	19.2	0.458	7.4	9.7
		Max	81.4	42.7	19.1	28.7	0.618	11.1	15.2
		Avg	72.8	32.4	16.1	23.6	0.527	9.2	12.1
		98th	80.1	40.9	18.7	28.1	0.611	10.9	14.7
2	Dumabahal	Min	55.4	20.3	11.5	14.6	0.424	6.8	8.9
		Max	70.2	28.6	17.1	19.1	0.545	10.3	14.3
		Avg	63.3	24.5	13.8	16.5	0.482	8.5	11.2
		98th	69.6	28.3	16.5	18.7	0.540	10.1	13.9
3	Natwarpur	Min	50.9	17.6	7.9	14.8	0.318	5.1	6.8
		Max	68.7	25.6	11.3	21.5	0.438	7.7	10.7
		Avg	59.0	22.2	9.3	18.2	0.382	6.6	8.4
		98th	68.0	25.6	11.3	21.2	0.435	7.6	10.3
4	Deobahal	Min	48.6	16.4	7.2	12.6	0.233	5.4	5.7
		Max	65.5	26.1	9.5	18.4	0.314	8.1	9.5
		Avg	57.2	21.3	8.4	15.3	0.276	6.7	7.4
		98th	64.5	25.6	9.5	18.0	0.309	8.0	9.1
5	Badpali	Min	54.2	18.6	10.2	12.4	0.244	5.8	6.5
		Max	72.1	27.8	14.7	17.1	0.368	9.6	12.6
		Avg	62.9	23.8	12.3	14.8	0.299	8.1	9.6
		98th	70.5	27.5	14.2	17.0	0.355	9.6	12.1
6	Tarpali	Min	58.2	21.9	9.5	16.6	0.296	7.7	8.4
		Max	78.6	34.2	14.2	24.1	0.398	11.4	13.2
		Avg	67.4	28.6	11.4	20.4	0.348	9.6	10.4
		98th	77.6	34.0	14.0	23.7	0.395	11.3	12.7
7	Tilga	Min	57.1	20.8	8.1	14.7	0.277	6.2	6.4
		Max	72.1	29.3	12.2	20.1	0.364	8.8	9.7
		Avg	65.1	25.0	9.7	17.2	0.319	7.5	8.1
		98th	71.7	29.0	11.7	19.7	0.358	8.8	9.7
8	Kambahal	Min	49.2	15.2	8.1	11.5	0.186	5.1	5.9
		Max	62.5	25.9	11.2	17.1	0.251	7.7	8.8
		Avg	55.5	19.6	9.4	14.2	0.216	6.3	7.5
		98th	61.2	24.8	10.9	16.8	0.251	7.6	8.8
CPCB Standards			**100 (24hr)**	**60 (24hr)**	**80 (24hr)**	**80 (24hr)**	**2 (8hrs)**	**100 (8hr)**	**400 (24hr)**

3.3 AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 08 monitoring locations; those were selected for ambient noise quality monitoring. The monitoring results are summarized in **Table 7.**

TABLE 7: AVERAGE NOISE LEVELS IN THE STUDY AREA

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq_{Day}	Leq_{Night}
Residential Area			
1	Deobahal	52.5	40.7
2	Dumabahal	53.7	42.4
CPCB Standards dB(A)		**55.0**	**45.0**
Commercial Area			
3	Badrpali	58.4	50.2
4	Tilga	60.7	48.6
CPCB Standards dB(A)		**65.0**	**55.0**
Silence Zone			
5	Government Primary School Natwarpur	46.7	38.1
6	Primary Health Center Sambalpuri	47.6	37.8
CPCB Standards dB(A)		**50.0**	**40.0**
Industrial Area			
7	Project Site	64.7	53.2
8	Nr. Maa Mani Industries main gate	62.1	51.5
CPCB Standards dB(A)		**75.0**	**70.0**

***Source**: Field monitoring and analysis by Anacon Laboratories Pvt. Ltd., Nagpur*

3.4 SURFACE AND GROUND WATER RESOURCES & QUALITY

3.4.1 Regional Geology

Site Specific Geology

The study area is characterized by sedimentary rocks of Gondwana Supergroup. The geological succession of the study area is given in **Table 8.**

TABLE 8: GEOLOGICAL SUCCESSION OF STUDY AREA

Super group	Formations	Age	Lithology
Gondwana	Talchir Formation	Early Permian to late carboniferous	Shale and silty shale
	Karharbari Formation	Early Permian	Sandstone and shale
	Barakar Formation	Early Permian	sandstone, shale, clay stone, and coal
	Kamthi Formation	Late Permian	Sandstones and shales

***Source: -** Modified After Aquifer Mapping and Management of Ground Water Resources Raigarh District, Chhattisgarh 2020*

Geomorphology

Broadly, the entire area can be divided into two physiographic regions namely Mahanadi plain (Chhattisgarh plain) and Northern hills of Chhotanagpur plateau. Chhattisgarh plain covers the southern part of the area and is divided into two parts by Mahanadi River. This region has a general slope towards the south. The foothills are characterized by pediments. This region is feeder to the drainage network of the study area, and has narrow and moderate steep valleys between hill ranges.

3.4.2 Hydrogeology and Aquifer Systems

The occurrence of groundwater and its distribution in space are highly influenced by the underlying geological formations and hydrogeological characteristics of the surroundings. The porous, weathered, jointed, and fractured zones present in the rocks or formation provide scope for groundwater occurrence, storage, and movement. The hydrogeology of the area broadly describes the disposition of water-bearing formations, occurrence of groundwater and its yield potential, groundwater regime conditions, depth to water levels in different seasons, etc.

The aquifer material controlling ground water flow in the study area can be broadly divided into two major media (1) Porous media (Phreatic Aquifer) and (2) Fractured media (Deeper Aquifer).

The major aquifer group are:

I. Chandrapur Sandstone
II. Gunderdih Shale
III. Charmuria Limestone
IV. Gondwana Sandstone

The yield of Gunderdih shale and granite gneiss ranges from 1 to 6.5 lps, while the yield of Gondwana sandstone and sandstone-shale-coal ranges from 6.5 to 10.5 lps. The pre-monsoon Depth to Water Level in and around the study area varies between 6 to 12 mbgl, whereas the post-monsoon Depth to Water Level ranges between 3 to 6 mbgl. As per the CGWA categorization of assessment units under the Dynamic Ground Water Resources of India, the area falls under the "Safe" category.

Source: *Aquifer Mapping and Management of Ground Water Resources Raigarh District, Chhattisgarh 2020*

3.4.2 Water Quality

Groundwater and surface water quality was assessed by identifying 8 groundwater (Borewell/ hand pump) locations in different villages and 5 surface water samples.

A. Groundwater Quality

The analysis results indicate that the pH ranged 6.94 – 7.67. The TDS was ranging from 270 – 368 mg/l. Total hardness was found to be in the range of 128.36 – 223.71 mg/l. The fluoride concentration was found to be in the range of 0.17 – 0.33 mg/l. The nitrate and sulphate were found in the range of 2.44 – 4.23 mg/l and 21.98 – 46.67 mg/l respectively. The chloride concentration was found in the range of 58.17 to 107.54 mg/l. The Total suspended solid concentration was found below detection limit (DL -10mg/l) at all sampling location. Heavy metals like As, Pb, Ni was found below detection limit i.e. BDL (DL-0.01), BDL (DL-0.001), BDL (DL-0.01) respectively and Iron was found in the range of 0.16 to 0.25 mg/l.

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.18 – 8.21 which is well within the specified standard of 6.5 to 8.5. The TDS was observed to be 274 – 312 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 152.63– 199.99 mg/l as $CaCO_3$ which is also within the permissible limit of 600 mg/l. The levels of chloride and sulphate were found to be in the range of 18.38 – 36.45 mg/l and 21.91 – 41.76 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O_2) dissolved in water. Because fish and other aquatic organisms cannot survive without oxygen, DO is one of the most important water

quality parameters. The reported value of range of 5.7 – 6.8 mg/l. Phosphorus (as PO_4) is an important nutrient for plants and algae. Because phosphorus is in short supply in most fresh waters, even a modest increase in phosphorus can cause excessive growth of plants and algae that deplete dissolved oxygen (DO) as they decompose. PO_4 concentration was found to be in the range of 0.19 – 0.35 mg/l. COD ranges from 12.34 – 74 mg/l and BOD ranges from 2.39 – 3.56 mg/l.

C. Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. All surface water samples were found to be bacteriologically contaminated. Presence of total coliforms in surface water indicates that a contamination pathway exists between any source of bacteria (septic system, animal waste, etc.) and the surface water stream. A defective well can often be the cause when coliform bacteria are found in well water. For surface water, treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose. Groundwater samples were not found to be bacteriologically contaminated.

LOCATION WISE WATER QUALITY ASSESSMENT

S. N.	Locations	WQI	Quality	Remark
1.	Project Site	51.92	Good	**Assessment of water quality based on the above physico-chemical parameters revealed that the quality of groundwater samples was good.**
2.	Dumabahal	55.11	Good	
3.	Natwarpur	54.74	Good	
4.	Patrapali	56.12	Good	
5.	Tilga	62.05	Good	
6.	Badpali	59.91	Good	
7.	Deobahal	58.26	Good	
8.	Jhargurha	58.19	Good	

3.5 LAND USE LAND COVER CLASSIFICATION

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-1 (IRS-P6), sensor-LISS-3 having 23.5m spatial resolution and date of pass 25th January 2024 satellite image with reference to Google Earth data. In order to strengthen the baseline information on existing land use pattern, the following data covering 10 km radius is approximate about 21°51'6.48"N to 22°2'16.77"N latitude and 83°24'6.52"E to 83°35'50.56"E longitude and elevation 195 to 436 meters are used as per the project site confined within that area.

The Land Cover classes and their coverage are summarized in **Table 9.**

TABLE 9: LU/LC AND ITS COVERAGE WITHIN 10 KM RADIUS

LU/LC Classification System				
S. No.	**Level-I**	**Level-II**	**Area (Sq. Km²)**	**Percentage (%)**
1	Built-up land	Settlement	5.91	1.76
		Industrial Settlement	1.14	0.34
		Road Infrastructure	2.42	0.72
		Railway Line	0.64	0.19
2	Agricultural Land/ Crop Land	Single Crop	76.08	22.63
		Double Crop	24.14	7.18
3	Forest Area	Reserved Forest	105.96	31.51

LU/LC Classification System				
S. No.	**Level-I**	**Level-II**	**Area (Sq. Km²)**	**Percentage (%)**
		Protected Forest	27.92	8.30
		Fairly Dense Jungle	25.48	7.58
		Dense Mixed Jungle	23.53	7.00
		Open Jungle	14.52	4.32
4	Scrubs/Wastelands	Open Scrub	18.53	5.51
		Barren Land	2.32	0.69
5	Waterbodies	River/Nala/Stream	4.28	1.27
		Dam/Pond/Lake	3.37	1.00
Total			**336.24**	**100**

3.6 SOIL QUALITY

The project site and its terrain consist of flat to moderately steep slopes. The terrain is characterized by forest, agricultural land, land, various settlements, waterbody and open scrub/wasteland. It is also observed that the open scrub area and barren land are dominant in North and North West Portion of the study area. The following observations are as follows:

Parameters	Unit	Results	Fertility Status
pH	-	6.41 – 6.74	Neutral
Organic Carbon	%	1.19 – 2.44	More than sufficient
Nitrogen	Kg/hec	224.51 – 372.79	Better to sufficient
Phosphorus	Kg/hec	30.48 – 68.18	Medium to average sufficient
Potassium	Kg/hec	107.92 – 217.73	Less to medium
Sodium Absorption Ratio	-	2.52 – 3.23	Excellent (Little or No Hazard)

3.7 BIOLOGICAL ENVIRONMENT

Floral composition in Study Area:

Total 170 plant species were enlisted within the study site out of which habitat wise details are given as follows: Trees: 79, Shrubs: 33, Herbs: 14, Climbers: 19, Grasses & Bamboos: 23, and Parasite: 2 species observed in the study area.

Endemic Plants of the Study Area

Among recorded plant species none were assigned the status of endemic plant of this region.

RET (Rare, Endangered and Threatened species) Status

According to IUCN Status report 2024-2 out of total 170 plant species identified with study area. Among the observed species *Tectona grandis* Linn. (Teak) is listed in Endangered (EN). *Aegle marmelos* (L.) and *Swietenia mahagoni (L.)* Jacq. (Indian Mahogany) are listed in Near Threatened (NT) as per IUCN RED list 2024-2. While remaining species belongs to the Least Concern (LC), Data Deficient (DD) and Not Evaluated (NA), as per latest IUCN status report 2024-2.

Fauna Details:

- **As per IUCN RED (2024-2) list**

Among the reported animals, the categorization of species as per IUCN is as follows:

Mammals: *Elephas maximus* – Asiatic Elephant (Endangered), *Melursus ursinus* – Sloth Bear (Vulnerable), *Hyaena hyaena* – Hyena (Near Threatened)
Reptiles: *Python molurus* – Indian Python (Near Threatened), *Varanus bengalensis* - Bengal Monitor Lizard (Near Threatened)
Avifauna: All species are Least Concern as per IUCN.

- **As per Indian Wild Life (Protection) Amendment Act, 2022**

Wild Life (Protection) Amendment Act, 2022, as amended on 20th December 2022, is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country. The Wild life (Protection) Amendment Act, 2022 has come into force since 1st April 2023.

Some of the sighted fauna were given protection by the Indian Wild Life (Protection) Amendment Act, 2022 by including them in different Schedule.

Among the Avifauna; Indian peafowl (*Pavo cristatus*) is protected under Schedule–I; while, rest of the birds observed in the study area are protected in Schedule-II as per Wild Life Protection Amendment Act (2022) and subsequent amendments thereof.

Among mammals; Asiatic elephant (*Elephas maximus*), Sloth bear (*Melursus ursinus*), Jackal (*Canis aureus*), Common mongoose (*Herpestes edwardsi*), Jungle cat (*Felis chaus*), Indian fox (*Vulpes bengalensis*), are protected in Schedule–I. Whereas, Rhesus macaque *(Macaca mulatta*), Wild boar (*Sus scrofa*), Black-Naped Hares (*Lepus nigricollis*) and Common langur (*Semnopithecus entellus*) are protected under Schedule–II animals of Wild Life Protection Amendment Act 2022. Palm Squirrels, Fruit bats & Rats dose not given protection under Schedules of Wild Life Protection Amendment Act 2022.

Among the Herpetofauna; Bengal Monitor Lizard (*Varanus bengalensis*), Indian Python *(Python molurus)*, Indian Cobra (*Naja naja*), and Common Rat Snake (*Ptyas mucosa*) were provided protection as per Schedule-I; While Common Indian Krait (*Bungarus caerulus*), Indian Toad (*Bufo parietalis*) were provided as per Schedule–II of Wildlife protection (Amendment) Act 2022 and as amended**.**

A thick green belt around the periphery of plant site is recommended to provide safeguard for surrounding area in line with project activities.

3.8 SOCIO-ECONOMIC ENVIRONMENT

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data collection from census 2011, District Census hand book 2011 & GeoIQ 2021. Summary of the socio-economic status of the study area is given in **Table 10.** Details regarding education and infrastructure facilities 2011 are presented in **Table 11**.

TABLE 10 (A): SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN STUDY AREA

Total households	11457
Total population	46204
Male Population	23231
Female population	22973

SC Population	5770
ST Population	17111
Total literates	31095
Total Illiterates	15109
Total workers	16705
Total main workers	11992
Total marginal workers	4713
Total non-workers	17116

***Source**: Primary census abstract 2011, District Raigarh State Chhattisgarh*

TABLE 10 (B): PREDICTED POPULATION DETAILS IN STUDY AREA (2021)

Zones	Total Population	Total Male	Total Female
0-2 km	1372	701	671
2-5km	5576	2737	2839
5-10km	50748	25441	25309
10 km	**57696**	**28879**	**28819**
In %	**100%**	**50.05**	**49.95**

***Source**: GeoIQ website (https://geoiq.io/places/Chhattisgarh/)*

TABLE 11: PERCENTAGE DETAILS REGARDING INFRASTRUCTURE FACILITIES WITHIN 10 KM RADIUS STUDY AREA

Infrastructure facilities	Availability (In percentage) As per year 2011, Census District Raigarh
Educational Facilities	96
Drinking water	100
Road	94
Electricity	100
Communication	85
Transportation	60
Medical	21
Bank & Society	25
Drainage	58
Recreation	67

***Source**: Primary census abstract 2011, District Raigarh State Chhattisgarh*

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

A number of aspects were studied in the villages surveyed for socio- economic studies. Following are the observations found during interviews, focused group discussions and as per the Questionnaire:

1. **Economic Activities and Employment**:

- Agriculture is the primary occupation, supported by allied activities like cattle rearing, dairy farming, and bamboo cultivation.
- Urban areas shift toward non-agricultural work in services, including hotels and tourism.
- Labor wages range from ₹200-₹800 per day, varying by skill level and task.

2. **Agricultural Production**:

- Dominant crops include rice, wheat, pulses, and oilseeds; horticulture and cash crops contribute to income diversity.
- Improved infrastructure and modern techniques are required to boost productivity.

3. **Livestock and Forest Produce**:

- Dairy, poultry, and limited fishery activities complement farming.
- Minor forest products like tendu leaves, mahua, sal seeds, and honey provide additional income sources under government welfare schemes. Govt buys forest produce such as tendu patta at specified rates,

4. **Industrial and Employment Opportunities**:

- Proximity to industrial operations offers potential jobs; however, the lack of vocational training limits local employment in industries.

5. **Social and Public Amenities**:

- **Healthcare**: Uneven distribution of facilities; industrialization has led to health concerns like respiratory and waterborne diseases.
- **Education**: Limited secondary and higher education infrastructure; long commutes to Raigarh pose challenges.
- **Water Supply**: Villages rely on ponds, wells, and hand pumps; improved water management and treatment facilities are needed.
- **Transportation**: Limited public transit; reliance on private vehicles like bicycles and motorbikes.

6. **Cultural and Social Issues**:

- Traditional cuisine and tribal heritage enrich the cultural landscape.
- Social challenges include child marriage, alcoholism, lack of sanitation, and low sports encouragement.
- Migration due to economic opportunities adds pressure to the region's infrastructure.

7. **Development Needs**:

- Strengthening infrastructure (roads, electricity, sanitation), enhancing education and healthcare access, and supporting vocational training programs are crucial for sustainable development.
- Addressing sanitation and public health issues, particularly in rural areas, remains a priority.

8. **Potential for Growth**:

- Industrial expansion (e.g., Brownfield DRI-based Steel Plant) could boost employment and economic development.
- Strategic initiatives focused on skill development, agriculture, and resource management can drive inclusive socio-economic progress.

3.8.1 Awareness and opinion of the respondents about the project

Awareness and Community Engagement: The proposed expansion of the DRI-based steel plant at Natwarpur village has highlighted gaps in community awareness, with many residents unaware of the project's scale, objectives, and potential benefits. Despite this, there is notable

curiosity and interest among stakeholders, particularly regarding job creation, infrastructure improvement, and economic opportunities. However, concerns persist about potential environmental pollution, displacement, and equitable distribution of benefits, demonstrating the need for transparent communication and effective grievance redress mechanisms.

Community Concerns and Suggestions: Local residents have emphasized key issues related to education, healthcare, employment, water availability, and recreational facilities. Suggestions include providing scholarships, strengthening healthcare infrastructure, initiating skill development programs tailored to industrial needs, and introducing piped drinking water systems with water purification units. Additionally, creating recreational spaces and improving social infrastructure are seen as necessary steps toward community well-being.

Opinions on the Project: While many are optimistic about the project's economic and developmental benefits, including employment generation, enhanced infrastructure, and community development, others are concerned about its potential environmental and social impacts. Specific worries include air and water pollution, disruption to agriculture, displacement, health risks, and cultural tensions due to workforce influx.

Socio-Economic Context and Development Needs: Field studies indicate that population growth in the area necessitates robust planning for infrastructure, healthcare, education, and water management. Educational challenges, uneven healthcare access, and the limited availability of clean drinking water highlight the need for focused interventions. Community demands for roads, sanitation, and recreational spaces underline the broader need for inclusive development. By addressing these issues, the project could foster sustainable development and significantly improve the local population's quality of life.

3.8.2 Interpretation

The socio-economic analysis highlights both challenges and opportunities in the project area. Population growth requires robust planning in infrastructure, healthcare, education, and water management to meet future demands. Community awareness about the project is limited, though there is curiosity about its potential benefits, especially regarding employment and development. Educational and healthcare facilities are inadequate, with limited access to quality education and healthcare services. Water resources, though abundant, face issues of accessibility and quality, necessitating conservation and treatment measures. Residents also seek improvements in roads, sanitation, and recreational facilities. Addressing these challenges can drive sustainable development and significantly improve the local population's quality of life.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 AIR ENVIRONMENT

The mathematical Model AERMOD was used for predicting the GLCs, which is entirely in line with the requirement of Central Pollution Control Board, New Delhi. In 1991, the U.S. Environmental Protection Agency (EPA) in conjunction with the American Meteorological Society (AMS) formed the AERMOD. AERMOD is a steady-state plume model aimed at short-range (up to 50 km) dispersion from stationary industrial-type sources.

The impact of a source or group of sources on air quality is evaluated using mathematical models. The widely accepted interpretation models simulate the relationships between air pollutant emissions and its impact on air quality. For the present study, this model is used for the prediction of maximum ground level concentrations.

Presentation of Results

The model simulations are done for the air pollutants due to proposed project. The maximum ground level concentrations (GLCs) for particulate matter and gaseous emission of SO_2, NO_x due to proposed expansion project has been carried out using hourly meteorological data. The short-term modeling results are presented in **Table 12** and for the short-term simulations for point emission sources, the concentrations were estimated around 441 receptors to obtain an optimum description of variations in concentrations over the site in 10 km radius covering 16 directions. The predicted incremental concentrations of above parameters are as follows:

TABLE 12: PREDICTED INCREMENTAL GROUND LEVEL CONCENTRATIONS

Pollutant	Incremental Concentration (µg/m3)	Distance (m)	Direction
PM_{10}	5.17	400	SW
$PM_{2.5}$	1.68		
SO_2	10.02		
NO_x	10.02		

TABLE 13: DETAILS OF AIR POLLUTION CONTROL SYSTEM/ MITIGATION MEASURES

S. No.	Facilities	Air Pollution Control equipment	Emission Level
1	DRI Kiln with WHRB's	i. Dust extraction system, Electro Static Precipitators (ESP) - 4 Nos. (with 4 field) with two Chimney ii. Bag Filters for Product house; Kiln discharge end and transfer points.	PM <30 mg/Nm^3
2	Steel Melting Shop with hot charging rolling mill	Movable suction hood along with Bag Filters with a chimney	PM <30 mg/Nm^3
3	AFBC Boiler	Electro Static Precipitators (ESP) with a Chimney and Bag Filters at Coal conveyors	PM <30 mg/Nm^3
		Lime Dosing	SOx <100 mg/Nm^3
		Low NOx burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided	NOx <100 mg/Nm^3

Additional Measures to reduce/control pollution control

- Roads will be frequently sprinkled with water.
- Most of the materials like Sponge Iron ore, pig iron will be stored under covered shed.
- In case of storage of Sponge Iron, pig iron in open, it will be covered by tarpaulins to prevent spread of dust from it during transportation.
- Regular sweeping of road by using vacuum cleaner will be carried out
- Regular maintenance of vehicles and machineries will be carried out in order to control emissions.
- Green belt development will be taken up all along the roads, plant premises etc.
- Protective appliances will be provided to all the workers exposed in dusty atmosphere.
- Avoiding overloading of the trucks.
- Workers will be equipped with all personal protective devices like Gum Boot; hand gloves; Safety helmet; Safety goggles, earplugs at work place.
- By controlling the speed of the truck.

- Proper gradient of roads to reduce cumulative noise.
- Transportation of materials will be limited to day hours only.

4.2 PERIODICAL MAINTENANCE OF PROCESS MACHINERY.

4.3 NOISE ENVIRONMENT

- Day and night sound pressure levels are often used to describe the community exposure. The nearest human settlement Dhumabahal is 0.90 KM (NNW) away from project site and resultant noise level at this village are 52.6 dB(A) & 41.7 dB(A) at day night respectively.
- Full body vibration and hand-arm vibration impacts will be felt by operators sitting in heavy machineries and operating vibrating devices, respectively. Necessary precautions in workplace environment shall be exercised to reduce workplace vibration impacts.

Mitigation Measures

- Dense plantation will help to reduce noise pollution in the following ways –
  - The sounds that are produced by the leaves helps muffle the noise.
  - Hedging makes a thick front of the wall and blocks the noise.
  - Thick tree trunks create a sound-absorbing buffer zone.
  - They help in filtering the noise.
  - The research also concluded that a 20 m dense plantation can give a noise reduction of 6 dB (A).
- Equipment will be standard and equipped with silencer. The equipment will be in good working conditions, properly lubricated and maintained to keep noise within permissible limits.
- Most of the equipment's will be placed in closed room
- Equipment's will be placed on acoustic floor to reduce vibration and noise
- High noise zone will be marked, and earplugs will be provided to the workmen near high noise producing equipment.
- Use of PPES awareness program will be provided to all workers.
- Proper shifting arrangement will be made to prevent over exposure to noise and vibration.
- Silent DG sets will be used site.
- Speed limits will be enforced on vehicle.
- Regular noise & vibration

4.4 IMPACT ON WATER ENVIRONMENT

The proposed expansion may have some impact on the water environment. The impact may be on the source of water in the form of depletion of water resources of the area and in the form of deterioration of quality of natural water resources due to discharge of plant effluent. Total water requirement will be 1548 KLD (510,294 KLA). Total water required for domestic purposes will be 17 KLD. There will be no industrial effluent discharged outside the plant premises due to existing as well as proposed units. Domestic wastewater will be generated treated in STP and treated water will be used for green belt and dust suppression purposes. M/s. Maa Mangla Ispat Pvt. Ltd. will maintain zero discharge condition from the plant all the time throughout the year.

The various control measures that will be adopted are:

Mitigation Measures

- The project will have **85 KLD ETP** including for treat Industrial waste water and **20 KLD** STP for treatment of domestic waste water. Treated Industrial water from ETP will be partly utilised in dust suppression, Fly Ash conditioning and Slag quenching and recycle in the process. Whereas, treated domestic wastewater from STP will be used in green belt. The project site is located in an area classified as '**Safe Zone** as per the guidelines of CGWA, moreover the source of water will be surface water.
- Total 70 KLD treated water will be reused/recycled in process.
- 14 KLD treated domestic water through STP will be used green belt development.
- Garland drain will be provided to all stockyards area to prevent run-off containing suspended solids by routing the storm water drains through catch pits/sediment traps.
- Any spillage of hazardous waste (used oil/spent oil, ETP Slag, etc.) or contamination will be immediately removed.
- Periodic ground water monitoring at project site as well as nearby villages will be carried out.
- All stock piles will be on pucca flooring to prevent for any ground water contamination.
- It is proposed to build 5 nos. of recharge pit.
- **Existing:** Recharge pit – 2 Nos. (1) 10 m(l) X 11 m(w) X 3 m(h) (2) (1) 16.2 m(l) X 14.2 m(w) X 3.5 m(h) has been implemented
- **Proposed:** 3 Nos. RWH structure of 1 m (dia) X 3 m (depth) will be implemented.

4.5 IMPACT ON BIOLOGICAL ENVIRONMENT

Ecology & Biodiversity: Aspect - Impact identification and mitigation measures suggestion for proposed expansion project.

S. No.	Project Aspects / Activities	Residual Impacts	Mitigation Measures Suggested
1.	Transportation, unloading & storage of Material and Movement of vehicle inside plant, Dust and sound generation due to proposed expansion activities	Impact on nearby vegetation and avifauna in a scale of 3 out of 5 due to proposed expansion activity.	Thick greenbelt will be developed along periphery of the project site in order to provide buffer between plant fugitive emission and nearest vegetation.
2.	Gaseous emission from Stack, Movement of vehicle inside plant and Raw material & finished product transportation, Product manufacturing	Decline in photosysenthetic activities, Stomatal index may be minimized, Crop yield may be reduced.	Air quality modelling outputs study revealed that, the resultant concentrations of particulate matter, sulphur di-oxide and oxides of nitrogen are well within the prescribed limits. In expansion project is proposed at total 29.981-hectare land out of which it is proposed to develop 34.80% (10.434 ha.) area as greenbelt. In the above 10.434 Hectare land it is proposed to develop a greenbelt by total plantation of 26085 Trees. This will be developed within one year time from grant of EC. . As on date 17256 numbers of plants are already planted by the company. Indigenous species for plantation is recommended along the approach road and plantation under CER.

S. No.	Project Aspects / Activities	Residual Impacts	Mitigation Measures Suggested
			Thus, the impact due to proposed expansion project would be minimal as project activity will be carried out within the plant boundary limit with proper control measures.

4.6 IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

Positive Impacts:

Employment and Economic Growth

- The proposed project will significantly enhance local employment opportunities, increasing the workforce from 160 to 362. This will directly improve livelihoods and contribute to the socio-economic upliftment of the local community.
- The project will generate approximately 400 direct jobs, providing a significant boost to local employment.
- Creation of indirect employment through the local community establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores garages etc.
- The introduction of training programs will enhance the skills of the local workforce, making them more competitive in the job market.
- The influx of about 1,000 people into the study area will lead to higher demand for local goods and services, thus stimulating the local market.

Agriculture and Livestock:

The project's infrastructure improvements will streamline the transportation and marketing of agricultural products, benefiting local farmers.

Economic Benefits:

- As demand for goods and services increases, local businesses will benefit from the expanded market, leading to overall economic growth.
- Job creation will result in increased household incomes, directly improving the living standards of local communities.

Infrastructure Development:

- Improved road connectivity will facilitate smoother access to regional markets and services, enhancing the mobility of local residents.
- Upgraded water supply, sanitation systems, and housing projects will significantly improve the standard of living for the local population.

Education and Healthcare:

- The project will generate demand for additional educational facilities, likely leading to the establishment of new schools and colleges.
- Healthcare infrastructure will also see improvements to meet the rising needs of a growing population.

Cultural Integration:

The arrival of workers from other regions may lead to cultural exchange, which could positively influence the local community's cultural dynamics

Negative impacts.

Environmental Pollution: Industrial activities may lead to air, water, and soil pollution, posing risks to the environment and public health.

Social and Cultural Tensions: The influx of workers from other states may result in cultural and social tensions, potentially disrupting local harmony.

Pressure on Infrastructure: The increased demand for housing, healthcare and other essential services may place significant pressure on existing infrastructure, leading to possible shortages and inefficiencies.

Resource Scarcity: The growing demand for local resources such as water and land could lead to competition and strain on these finite resources

Mitigation Measures

Employment and Economic Growth

- Preference for Local Hiring: A policy should be implemented where preference is given to local residents for recruitment, especially for administrative and production staff positions, to maximize the local benefits of the project.
- Regular Monitoring and Feedback Mechanisms: A system for monitoring the employment process and receiving feedback from the local community should be established. This will help identify any gaps in employment practices and ensure fair and transparent recruitment processes.

Pollution Control:

- The implementation of advanced pollution control measures, such as emission reduction technologies, will help mitigate environmental pollution.
- Waste management systems will be designed to handle industrial waste safely, preventing contamination of surrounding areas.

Housing and Infrastructure:

- Adequate housing development for incoming workers will prevent overcrowding and reduce social tensions.
- Investments will be made in expanding healthcare and educational facilities to support the increasing population.

Resource Management:

- A sustainable resource management strategy will be put in place to ensure the equitable distribution and conservation of local resources like water and land.

Community Integration:

- Programs that promote cultural exchange and community engagement will be organized to ease social integration and reduce tensions between local and migrant populations.

Continuous Monitoring:

- Regular monitoring and evaluation of the project's impacts will be conducted, with corrective measures taken as needed to ensure positive outcomes and mitigate any adverse effects.

5.0 ANALYSIS OF ALTERNATIVES (SITE AND TECHNOLOGY)

5.1 SITE SELECTION

The proposed expansion project activities will be carried out at total 29.981 Ha land at Village - Natwarpur, Tehsil and District- Raigarh of Chhattisgarh State. The total land area is 29.981 hectares of land out of which 28.075 hectares is owned by the company, while 1.906 hectares have been acquired through a registered long-term lease agreement. The entire land is already diverted for industrial purpose. The Khasra Number of the project are 231/1, 232/1, 233/2, 232/3, 232/5, 233/1, 234/1, 239/2(K), 239/4. Greenbelt area 34.80% (i.e., 10.434 Ha.) will be kept unchanged. The land already sufficient flat land, free from major undulations and sparse vegetation is available within the plant premises.

The project is an expansion of the existing unit on a previously acquired site, hence, no alternative locations is applicable. The existing land was strategically chosen and already possesses the necessary foundational infrastructure, making it the optimal and only suitable site for expansion. Therefore, the current location remains the sole viable option for this expansion project, ensuring continuity, efficiency, and alignment with the original planning and development goals.

5.2 SELECTION OF ALTERNATIVE TECHNOLOGY

The entire project related activities are already discussed in **Chapter 2**. The aspects of the project are dealing with the study of alternative technology in brief involved in each of the proposed products and choice of the technology based on environmental applicability, technical and financial viability. Selection of suitable production process and the capacity of the production units form the nucleus around which the basic concept of a plant is developed. While the selection of a process takes into account factors like type of product, availability of local raw material, process status, specific energy consumption, level of energy required, environment, and pollution etc., the capacity selection of major units would depend on the volume of production, available unit sizes, economies of scale, etc.

5.3 CONCLUSION

The proposal is based on Sponge iron, Induction furnace, CCM, Hot Rolling, Captive power plant (WHRB based). In India more than 200 Units are operated on Coal based sponge iron and 1000 units are operating based on Induction Furnace melting technology. Direct Hot Charged based rolling is also considered as proven technology. No reheating furnace is proposed in this project. Captive power plant facilitates distributed generation of electricity close to the source of use and efficiently minimises losses associated with the transmission of electricity from centralized power plants. All the process to manufacture as well as control the pollution is well tested in India.

6.0 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed expansion project under the control of by General Manager (Plant Head) with a direct reporting to Board of Directors.

The company has proposed to Capital Cost of Rs. 7 Lakhs and Recurring Cost of Rs. 8 Lakhs towards Environment Monitoring Program. NABL/MoEFCC accredited lab (Third party) will engaged to monitor all the environmental components as per CPCB/CECB norms.

7.0 ADDITIONAL STUDIES

7.1 PUBLIC CONSULTATION

The Draft EIA-EMP report for proposed brownfield project is prepared as per the Standard ToR issued by EAC (Industry - I), MoEF&CC, New Delhi and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

After completing the public consultation process, the points raised and commitment of project proponent during the public hearing will be incorporated in the final EIA-EMP report for final submission to Environmental Clearance.

7.2 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The assessment of risk in the proposed project has been estimated for fire, explosion and toxicity and corresponding mitigation measures are suggested in the EIA/EMP report.

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the project site. On the other hand, risk analysis deals with the identification and quantification of risks occurring due to the plant equipment and personnel exposed, due to accident resulting from the hazards in the plant. The occupational and safety hazards and preventive measures, process hazards and their preventive measures, and storage hazards and preventing measures are provided in details in Chapter 7 of the EIA report.

The main objective of the risk assessment study is to determine damage due to major hazards having damage potential to life and property and provide a scientific basis to assess safety level of the facility. The secondary objective is to identify major risk in manufacturing process, operation, occupation and provide control through assessment and also to prepare on-site, off site plans to control hazards.

The assessment of risk in the proposed project has been estimated for material handling, movement of Trucks/Tippers, Dust hazards, Hazards, shock hazards, etc. and corresponding mitigation measures are suggested in the EIA/EMP report.

8.0 PROJECT BENEFITS

- M/s. MMIPL will also support social welfare activities under CSR obligation under companies act.
- A provision of Rs. 358 Lakhs is made under CER.
- The project benefits also entail revenue earnings to national and state exchequer through GST
  (Estimated Rs. 181.04 Crores Gross GST), road tax, income by registration of trucks & trailers, income tax, corporate tax, etc.
- The project benefits also entail revenue earnings to national and state exchequer through GST (Estimated Rs. 216.87 Crores Gross GST), road tax, income by registration of trucks & trailers, income tax, corporate tax, etc.
- It is estimated that **202** additional people will get direct employment and indirect employment will be approx. **1000 persons**.
- The project is expected to generate a turnover of approximately Rs 1005.75 Crores, contributing to the GDP, with an estimated Rs 181.04 Crores in gross GST payable to the government. Annual salary and wage payments will exceed Rs 6.79 Crores, and payments

for power to the state grid will amount to over Rs 129.86 Crores. These financial activities will significantly contribute to the growth of the national GDP as well as the local economy.

- Preference will be given to local people, depending upon their qualification and skill. The salary wages payment will be above Rs.6.79 Crores per year.

Proposed Social Welfare Arrangement

The proposed expansion project would provide development of area and consequent indirect and direct job opportunities which would finally result in improvement in the quality of life of people in the central region. Maa Mangla Ispat will carry community welfare activities in the following areas:

- Community development
- Education
- Health& medical care
- Drainage and sanitation
- Roads

The project proponent will comply with its obligation for CSR as per Company's Act too. Corporate Environment Responsibility (CER) value of **Rs. 358** Lakhs will be spent for the social infrastructure development.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan comprising following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.
- Minimization of natural resources and water.
- Ensure effective operation of all control measures.
- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.
- Control of waste generation and pollution.

The company will invest about **Rs. 2212 Lakhs,** capital cost for the Environmental Management Plan and spent about **Rs. 64 lakhs**. recurring cost per year for operation and maintenance.

10.0 CONCLUSION

The proposed expansion project of M/s. Maa mangla Ispat Pvt. Ltd. will be beneficial for the overall development of the nearby villages. In Accordance with the economic policies of the Government of India and the National Steel Policy, it is projected that India will need to establish a steel production capacity of 300 million tonnes per annum, compared to the current capacity of approximately 125 million tonnes per annum. Aligning with this vision, the Government of Chhattisgarh has introduced its Industrial Policy for 2019–2024, which promotes the development of steel projects utilizing local resources within the state.

The proposed expansion project is aligned with these policies, relying on domestic iron ore supplies from NMDC and other mines, coal from SECL, and power sourced from the state grid. The required technology is well-established, with all necessary machinery and skilled manpower readily available within the region. Furthermore, essential infrastructure such as land, water, transport, and labor is sufficiently accessible.

The project adopts environmentally sustainable practices, aiming to control particulate matter emissions to below 30 mg/Nm³, achieve zero liquid discharge, and ensure 100% utilization of solid waste for beneficial purposes. The site is situated in an environmentally safe area, with no critically or severely polluted zones within a 15 km radius.

Approximately 34.80% of the project land will be developed as a greenbelt, and 100% of the rainwater within the project area will be harvested for plant operations and groundwater recharge. Employment opportunities will prioritize local residents, and Corporate Environmental Responsibility (CER) activities will be undertaken based on public feedback. Additionally, Corporate Social Responsibility (CSR) initiatives will align with the priorities set by the district administration and local panchayats.

In conclusion, with the effective implementation of pollution control and mitigation measures, the project is expected to have no significant adverse impact on the environment. Instead, it will contribute to reducing the steel demand-supply gap, foster regional economic development, and provide societal benefits.

11.0 DISCLOSURE OF CONSULTANTS

The environmental studies for the proposed expansion project of M/s. Maa Mangla Ispat Pvt. Ltd. were conducted by M/s. Anacon Laboratories Pvt. Ltd. (ALPL), Nagpur. Established in 1993 as an analytical testing laboratory, ALPL has grown into a leading environmental consultancy firm in Central India, supported by a state-of-the-art testing lab for environmental and food analysis. The team comprises experienced former government scientists and highly skilled young scientists with expertise in various fields. Recognized by the Ministry of Environment & Forests, New Delhi, ALPL is accredited by the Quality Council of India (QCI) for conducting environmental studies, holding Accreditation Certificate No. NABET/EIA/2326/RA 0304_Rev.01, dated March 13, 2024, valid until September 29, 2026.