

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The Company “Chandrasahni Ispat Ltd. (Billet & TMT Division)” is a Private Ltd. company incorporated under Companies Act 1956 with the object to setup Mini Steel Plant.

M/s. CIPL is proposed to install Induction Furnace (132000 TPA M.S. Billets) with CCM and Rolling Mill (118000 TPA Rerolled steel) with Online Hot Metal Charging Facility at Village-Gerwani, Tehsil and District Raigarh (CG).

1.1 Identification of Project

As per Environmental Impact Assessment Notification dated 14th September, 2006, the proposed project falls under “Category B”, Schedule 3 (a) requires Environmental Clearance (EC) to be obtained from Chhattisgarh State Expert Appraisal Committee.

1.2 Location of the Project

M/s CIPL is located at Village-Gerwani, Tehsil and District Raigarh, state Chhattisgarh with North latitude between 21°59’59.5” to 22°00’06.1” and east longitude 83°22’03.1” to 83°22’9.5”. The nearest town/city is Raigarh which is around 11 km in south-south-east direction, nearest airport is Raipur which is around 220 km in south-south-west direction. The nearest roadway is SH-1 which is about 0.8 km in east direction. The study area map 10 km radial distance is shown in **Figure 1**.

1.3 Draft EIA/EMP Report

Environmental monitoring with respect to various environmental components was carried out during Post Monsoon 2015. This EIA report is prepared based on the TOR conditions recommended by SEAC, Chhattisgarh, project related technical details provided by M/s. Chandrasahni Ispat Pvt. Ltd. (Billet & TMT Division) and 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. The observations of the studies are incorporated in the draft EIA/EMP report. Impacts due to proposed project activities during construction and operation stages were identified alongwith the mitigation measures to be taken to control / mitigate the impacts. Environmental Management Plan (EMP) along with environmental monitoring is also suggested for implementation during the course of operation of the project.

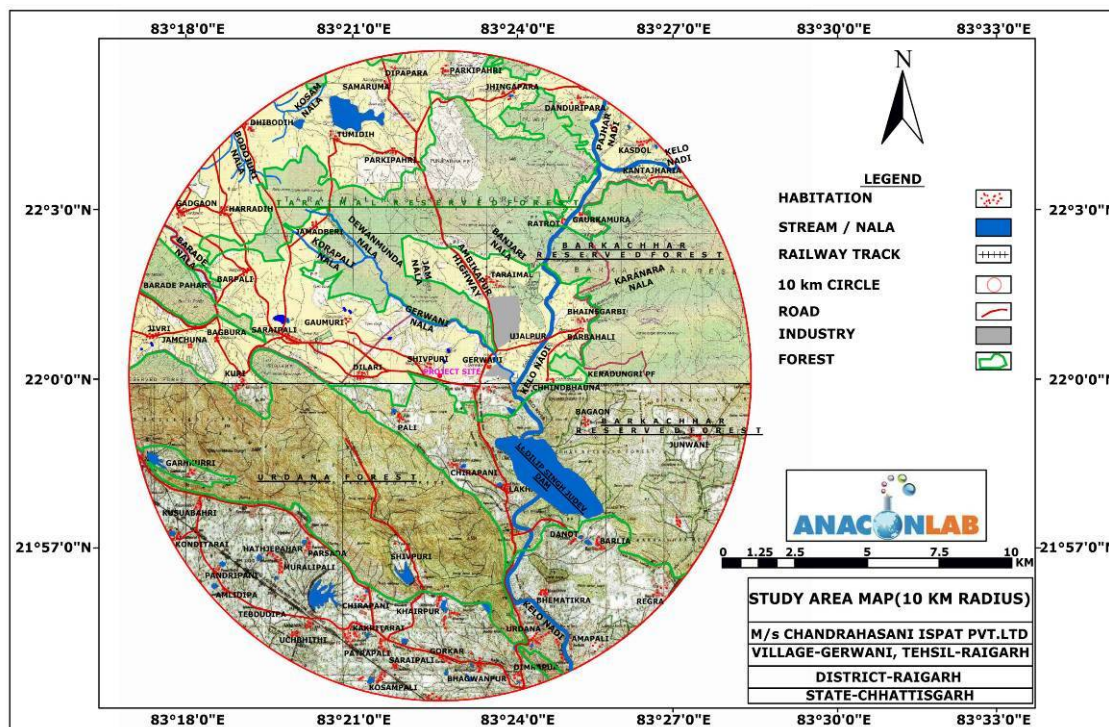


FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)

2.0 PROJECT DESCRIPTION

A salient feature of the project site is given in Table 1.

TABLE 1
SALIENT FEATURES OF THE PROJECT SITE

Sr. No.	Particulars	Details
1.	Project Location	Village-Gerwani, Tehsil and District Raigarh state Chhattisgarh, Pin code-496 001
2.	Coordinates	Latitude : 22°00'2.8" N , Longitude: 83°22'8.7" E
3.	Toposheet No.	64 N/8 & 64 O/5
4.	Climatic Conditions	Mean annual rainfall is around 1394.70 mm. In summer, the highest temperature is 41.4°C & Min 20.5°C. Source: IMD Raigarh (Climatological Normals 1981-2010)
5.	Nearest IMD station	Raigarh, 11 km (SSE)
6.	Land use of proposed project site	The land use previously non-industrial barren land which is converted to Industrial use.
7.	Site topography	Flat Terrain having contour ranging from 240 m to 260 m (MSL) of the 10 km radius of study area. Project site located at 256 m MSL
8.	Nearest roadway	~0.80 Km, SH 1 (East)
9.	Nearest Railway Station	Raigarh about 11 KM in SSE direction
10.	Nearest Air Port	Raipur about 220 Km (SSW)
11.	Nearest Port	NA
12.	Nearest lake	NA
13.	Nearest State/National Boundaries	Odisha (more than 15 km)
14.	Nearest major city with 2,00,000 population	Raigarh ~11 km (SSE)

Sr. No.	Particulars	Details
15.	Distance for sea coast	NA
16.	Hills/valleys	NA
17.	Nearest Reserved/Protected forests	Kharidungri PF ~1.9 km (E) Barkachhar RF ~1.4 km (ENE) Urdana RF ~3.7 km (SW) Lamidarhi PF ~8.7 km (SSE) Lakha PF ~1.1 km (S)
18.	Nearest water bodies	Kelo River ~3 km (E) Kelo Dam ~ 6 Km (SE)
19.	Seismic zone	As per the 2002 Bureau of Indian Standards (BIS) map, Zones III.

2.1 Process Description

Manufacturing process of Steel Melting Shop with CCM

In order to achieve high energy efficiency, four numbers of 10 MT capacity Induction Furnaces with higher power input capacity of 7.5 MVA each will be setup with completely automatic charging facility as well as power sharing panel also. Electronic software will be installed to monitor the input power and maintaining power factor to almost unity level.

The melting process involves taking sample of Sponge Iron & Pig Iron; Iron Powder and mild steel scrap, end cuttings from rolling mills or scraps from user units are taken from raw material storage and tested for their chemical composition. Before preparation of charge, necessary ingredients like Ferro Manganese, Ferro Silicon etc. are added by weight, Flux is taken up in crucible and then charge is put into it. Melting of steel along with other alloying element is accomplished in the crucible of coreless M.F. Induction Furnace. The high A.C. current is passed through the copper oil wrapped around the outer periphery of crucible. By transformer action, the A.C. current induces much higher secondary current at 1000 hertz in charge through the coil. Enormous heat thus developed by resistance which causes the melting of charge. As soon as the molten pool is formed, very pronounced stirring action in the molten metal takes place which helps in accelerating the melting. Deoxidizing agents and sometimes specific alloying elements are also added at suitable intervals during melting. Melting of homogenous mass occurs at 1600 °C. If necessary superheating up to 1650 °C is done for specific time. After completion of melting cycle of an hour, the homogeneous molten mass is poured hydraulically into the ladle.

LRF (Ladle Refining Furnace)

Subsequent to the production of molten steel, the production of quality requires refining of the same for which one Ladle Refining Furnace will be setup with three electrodes arcing facility with complete provision to carry out de-sulphurization, and de-phosphorization if required.

The liquid steel containing in the ladle will be brought to LRF and after due processing of the liquid steel, the ladle will be transferred to CCM. The slag generated during the melting as well as refining is removed manually through BELCHAS (Steel Spatulas). Accumulated Slag is used for land fill.

CCM

The ladle containing liquid steel will be placed on the CCM platform and continuous casting of hot billet will be carried out in the same for which one 2 strand CCM with 4 mtr x 8 mtr radius will be setup, the casting will be done through a highly automated controlled cooling software governed mechanism by which the casted billet will be so cooled that the temperature of billets do not fall below 1050°C. The case formation in the CCM mould starts with drop in surface temperature below 1520°C,

the liquid metal inside the case contains enough energy for maintaining the overall temperature of billet for hot online rolling. In the CCM section, hot billet shearing machines will be installed with each casting strand, so as to facilitate the cutting of billets to proper length for feeding in to the rolling mill.

Manufacturing Process of Rerolled Steel through Rolling Mill

1. Raw Material i.e. Billet coming from CCM in red hot condition is cut either by Gas Cutting or automatic hot billet shearing machine. In the proposed plant automatic hot billet shear machines are going to be installed with each strand. The gas cutting facility will be maintained as a backup to the hot billet shearing machine,
2. After the Billet is cut into required length, then pushed out to rolling stands for re-rolling. Steel Pieces are rolled through all stands in order to get required shape of finished goods i.e. TMT/Wire rod/ Bars. It is proposed to produce TMT bars at present; however in future, the Mills may be used to produce Wire Rod or Structure also.
3. In case of production of TMT, the rolled bars will be passed through the TMT quenching machine and then after quenching of TMT, transferred to Cooling Bed for Cooling.
4. After Cooling, Wire rod Coils/TMT /Bars will be shifted to De-coiling machine and after inspection, bundles will be ready for dispatch.
5. The rerolling capacity of the proposed mill assessed around 20 MT per hour and based on 1 hours availability of liquid metal / hot billets, the estimated daily production capacity will by 300 MT per day

2.2 Details About Resources Availability

Land Requirement

The TMT & Billet (mini integrated steel) plant is proposed on the existing land. Total land will be 8.45 Acres land; this land is already acquired by the company, having Khasara No. 4/4 and 4/5. The proposed site comprises of non-cultivable land with thin vegetative cover from trees, and mainly grasses (**Table 2**).

TABLE 2
AREA STATEMENT FOR PROPOSED PROJECT

S. No.	Particulars	Acre
1	Total Plot Area	8.45
2	Total Constructed Area Factory and Office Building	3.50
3	132 kv Sub-station	0.50
4	32 kv Sub- station	0.20
5	Green Belt Area	2.75
6	Open Area (Including parking; Overhead and underground water storage and Road)	1.50
	Total	8.45

Raw materials and transportation

The list of raw materials required and their sources along-with mode of transportation for proposed project are given **Table 3 & 4**. The main raw materials to be used are sponge Iron, pig iron, heavy scrap, pet coke, hot metal etc. Raw materials are available locally. This will be procured from organized markets.

TABLE 3
QUANTITY OF RAW MATERIALS AND MODE OF TRANSPORTATION
(Steel Melting Shop Induction Furnace)

Sr.no.	Raw Material	Total quantity Required per annum (in MT)	Mode of Transportation
1.	Sponge Iron	138947	By road through trucks
2.	Cl / Pig Iron Heavy Scrap	19800	By road through trucks
3.	Ferro Alloys	1320	By road through trucks
4.	Pet Coke	3300	By road through trucks
5.	Consumable Refractory; Like ramming mass; LRF lining; Tundish Boards etc	600	By road through trucks

TABLE 4
QUANTITY OF RAW MATERIALS AND MODE OF TRANSPORTATION
(ROLLING MILL)

Sr. No.	Raw Material	Total quantity Required per annum (in MT)	Mode of Transportation
1.	Hot metal	132000	By road through trucks

Water Requirement

The project site is situated near to Kelo river about 3 km, a Dam namely Kelo dam is about 6 km and water table is quite high. Central Ground Water Board (CGWB) had categorized this area as ‘Safe Zone’, therefore preferably groundwater (bore well) will be used as main source of water. The daily makeup water requirement in peak situation at 100% capacity utilization is estimated to be 95 KL/day, out of which 5 KL is estimated for human consumption.

Sources

M/s CIPL does not require to obtain water withdrawal permission from Central Ground water Board as the daily water requirement is less than 100 KL per day; and the area falls within the safe zone.

Wastewater Generation

The total water requirement is estimated to be 95m³/d. The wastewater generation from domestic waste is estimated to be 4m³/d and it will be sent to septic tank and soak pit.

Power Requirement & Supply

The total power required for the project will be around 16.67 MW which will be met through electricity board (CSPDCL).

Emergency Power

To meet out the emergency backup on standby DG set of around 3500 kVA shall be kept in ready alert in order to have a higher safety level it is recommended that instead of one DG set, 2 DG Sets of 1750 kVA or 2000 kVA may be setup.

Manpower Requirement

Likely employment due to the proposed project will be approximately 100 including: Administrative Staff 16 persons, and Production Staff 84 persons.

Solid/Hazardous Waste

Total solid waste generated through various processes is about 20400 MT/Yr which mainly comprise of Mill Scale (6600Tons/annum); Slag (13200Tons/annum) and Refractory waste (600Tons/annum). There is no other liquid or solid waste likely to be generated. 100% of Mill scale generated as Industrial Solid waste will be used in the ferro alloys and the Refractory rejects will be sold to refractory units. The hazardous materials like used oil and spent oil will be 3 KL/ year along with marginal quantity of lead acid battery or dry battery will be sent to authorized recycler having authorization from competent authority.

3.0 DESCRIPTION OF ENVIRONMENT

3.1 Baseline Environmental Studies

Baseline environmental studies were conducted for proposed Billets & TMT project within 10 km radius from the project site. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land, Biological & Socio-economic were monitored during post monsoon season i.e. Oct-Dec 2015 in the study area covering 10 km radial distance around the proposed project site.

3.2 Meteorology & Ambient Air Quality

Summary of the Meteorological Data Generated At Site (Oct-Dec, 2015)

Environmental monitoring was carried out during the period Oct-Dec 2015 (Post-Monsoon season) to generate the baseline data of the study area. The predominant wind direction is from East and ENE directions. Daily minimum and maximum temperature varied from 14.0°C to 38.0°C. The relative humidity varied from 15% – 97.0%. The rainfall is 22.1 mm observed during study period.

3.3 Summary of baseline ambient air quality monitoring results

The status of ambient air quality within the 10 km study area was monitored for post monsoon season during Oct-Dec 2015 at 10 locations. The monitoring locations were selected based on the meteorological conditions considering upwind and downwind directions and reference point. The concentration levels of PM₁₀, PM_{2.5}, SO₂, NO_x and CO, Benzene and BaP were monitored. The ambient air quality monitoring results are summarized and given in **Table 5**.

TABLE 5

SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Parameters	Range	Sr. No.	Parameters	Range
1.	PM ₁₀	25-79	6.	Ozone	4 - 10
2.	PM _{2.5}	15-49	7.	HC	ND-0.016
3.	SO ₂	4-22	8.	Benzene	BDL
4.	NO _x	8-34	9.	BaP	BDL
5.	CO	200-750			

Note: All values are reported in µg/m³ except BaP in ng/m³

The concentration levels of heavy metals i.e. Pb, Fe, Mn, Zn and Cu in particulate matter (PM₁₀) were observed in the range of **ND-0.06** µg/m³, **1.03-9.00** µg/m³, **0.05-0.38** µg/m³, **1.48-7.50** µg/m³ **0.02-0.07** µg/m³ respectively and found to be very less and below detectable limits.

The overall ambient air quality with respect to parameters of significance was found to be within prescribed limits of AAQMS by CPCB.

3.4 Ambient Noise Levels

Ambient noise level monitoring was carried out at 10 locations within the study area. The monitoring results are summarized in **Table 6**.

TABLE 6
SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Sr. No.	Monitoring Locations	Equivalent Noise Level dB(A)	
		Leq Day	Leq Night
	Residential Area Range	43-46	33-35
	Commercial Area Range	43-45	32-36
	Silence Zone Range	40-42	30-34
	Industrial Area Range	53-54	42-43

3.5 Water Environment

Water Requirement & Wastewater Generation

The daily makeup water requirement in peak situation at 100% capacity utilization is estimated to be 95 KL/day, out of which 5 KL is estimated for human consumption. Preferably bore-wells will be used as main source of water for Industry purpose. The domestic wastewater generation is estimated to be 4m³/d and it will be sent to septic tank and soak pit. No wastewater will be generated from the process.

Surface and Ground Water Monitoring

16 water (surface and groundwater) samples were collected from various sampling locations, eight (08) each from groundwater and surface water sources. These samples were collected as grab samples, preserved and analyzed for various parameters. The samples were analyzed as per the procedures specified in standard methods for the examination of water and wastewater published by American Public Health Association (APHA/IS 10500). The physico-chemical characteristics of surface and ground water are shown below:

Physico-chemical Characteristics

Surface water quality		Groundwater quality	
Parameters	Range	Parameters	Range
pH	7.1-7.50	pH	6.95-8.15
TDS	226-291 (mg/l)	TDS	112-279 (mg/l)
Total hardness	142-184 (mg/l)	Total hardness	82.68-168 (mg/l)
Nitrate	3.21-13.4 (mg/l)	Calcium hardness	46-98 (mg/l)
Chloride	22.4-38.4 (mg/l)	Fluoride	0.21-0.38 (mg/l)
Sulphate	14.7-24.8 (mg/l)	Nitrate	1.14 -1.8 (mg/l)
		Sulphate	1.4-16.48 (mg/l)
Heavy metals content (i.e. As, Al, Cd, Cr, Cu, Pb, Fe, Mn, Zn and Hg) were found to be low and within specified standards except iron in some of the surface water samples. The overall surface water quality was found to be mineralized, however safe physico-chemically for drinking purpose but unsafe bacteriologically and need chlorination before use for drinking purpose.		The heavy metals content (i.e. As, Al, Cd, Cr, Cu, Pb, Fe, Mn, Zn and Hg) were found to be within permissible limits except Iron in most of the ground water samples. Overall groundwater quality was found to be highly mineralized with respect to hardness, total dissolved solids, chloride and sulphate. Nitrate concentration in some of the groundwater was found to be high and in a alert position. Heavy metals are found to be within	

Surface water quality		Groundwater quality	
Parameters	Range	Parameters	Range
			permissible limits except Iron. Bacteriologically, some of the groundwater samples were also found contaminated and need chlorination before use for drinking purpose.

3.6 Land Environment

Land Use/Land Cover

The Land cover classes were extracted following a Visual interpretation method or on screen digitization of the Resource Sat-2 Imagery, sensor LISS-4 having 5.6 m spatial resolution image. These were later verified by using SOI toposheet and Google Earth imagery. Polygon layers for each class were digitized and the respective areas were calculated. The Land Cover classes and their coverage are summarized in **Table 7**.

TABLE 7
LU/LC CLASSES AND THEIR COVERAGE WITHIN 10 KM RADIUS

Sr. No.	LU/LC Class	Area (Sq.Km)	Percentage (%)
1	Built up Land Rural/Urban)		
	Settlement	6.65	2.12
	Industry/other industries	3.65	1.16
	Road Infrastructure	5.44	1.73
	Railway Line/Railway Siding	1.12	0.36
2	Agriculture Land		
	Cropland/Current Fallow Land	109.21	34.78
3	Water bodies		
	River/Nala/Stream	12.45	3.96
	Pond/Tank	2.66	0.85
4	Scrub/Waste Land		
	Land with scrub/Open Scrub	23.44	7.46
5	Dense Forest	147.87	47.09
	Forest Plantation	1.51	0.48
	Total	314	100

Soil Quality

Soil quality monitoring was carried out by collecting soil samples from villages and agriculture fields and analysed for their physico-chemical characteristics including fertility status. From the analysis results of the soil samples, It was found to be neutral to moderately alkaline (6.70-7.87) in reaction. Electrical conductivity, a measure of soluble salts in the soil was in the range of 107.6-317.8 $\mu\text{S/cm}$. Organic matter and nitrogen were found in the range of 1.03-1.32 % and 24.47-83.67 kg/ha respectively. This showed that soil was fertile in organic and nutrient contents. It was observed that the soil has low and to moderate productivity & absorptivity.

3.7 Biological Environment

Details about Forest in Raigarh District and in the Study Area

Sal Forest: The eastern part of Raigarh forest division is covered by sal forest. Although, Sal is major forest species in Raigarh District but the trend of availability of sal forest towards the Eastern part of the study area is predominant, however other part of study area is observed to be mixed forest, nearly 25%-30% percent of the forest area is covered under sal forests.

Mixed Forest: The common tree species found in mixed forest are *Madhuca indica* (Mahua), *Anogeissus latifolia* (Dhawda), *Terminalia tomentosa* (Ain), *Diospyros melanoxylon* (Tendu), *Pterocarpus marsupium* (Bija), *Embelica officinalis* (Aonla), *Tectona grandis* (sag), *Bombax ceiba* (Semal), *Boswellia serrata* (Salai), *Buchnania lanzan* (Char), *Zizyphus mauritiana* (Ber), *Zizyphus xylopyra* (Ghont), *Aegle marmelos* (Bel) and *Butea monosperma* (Palash) commonly observed in west part of the study area.

Bamboo Forest: *Dendrocalamus strictus* is only found in Raigarh forest division. Large and dense clumps of bamboo are found in the forest of Raigarh. However, in study area scattered bamboo wares observed in the area.

Floral Biodiversity of the Study Area

Trees: Total 101 Nos. of different species were observed within the study area

Shrubs & Herbs: Total 45 species were observed within the study area

Climbers: Majority of climbers are confined the forest areas as well as moist patches in the study area. Total 28 species of climbers were reported in different patches of the study area

Grasses: Total 38 different species of grasses were observed within the study area

Faunal Biodiversity of the Study Area

For the documentation of the faunal biodiversity of the study area with respect to Mammals, Reptiles, Birds, Butterfly and Fishes species, a baseline survey was conducted during Post-Monsoon Season - 2015.

The fauna observed in the study area included spotted deer, Jackal and wild boar, commonly sighted in the forests of the study area. The common mammalian species were, spotted deer, rabbit, monkey, jackal, fox, barking deer, wild boar, Jungle cat, squirrel, rat, mongoose and bat etc. Sometimes, *Melursus ursinus* (Sloth Bear) was also sighted by many villages. Further, as per the discussion with forest officials and villagers, occasional elephant movement was reported from South –Eastern Part to North eastern part of the study area, however it is not existing now. The common reptiles such as lizard, garden lizard, and different varieties of snakes were seen in the locality.

Birds were observed throughout the study area but mostly seen near forest area, paddy fields and water bodies (Dam and Kelo River). Reptiles and amphibians were also observed in the study area. River Kelo and Rabo Dam are major sources of fresh water fishes within study area.

3.8 Socio-economic Environment

Socio-economic survey was carried out by adopting standard methodology, floating questionnaires to seek opinion and perception regarding proposed projects and interactions with the village Sarpanch, gram panchayat, medical officers etc.

Salient Observation of the Survey/ Study Area

- **House pattern:** Types of housing varied from thatched to pucca houses. 30% houses were in pakka form, 60% in semi pakka and 10% houses were in kaccha form.
- **Employment:** Main occupations in the study area were labour work, small business and private jobs etc. The labours were getting daily wage in the range of Rs. 100-200, depending on type of work they set. During discussion with villagers, it was revealed that employment opportunities were adequate
- **Migration:** Main industries were related to coal washery, power plant, steel industry etc. in the study area. Migratory people from other states eg. UP, Bihar & Odisha for employment purpose was found in the study area.
- **Fuel:** The primary sources of cooking fuel were firewood, cow dung cake, coal etc. Very few villagers were using LPG facility
- **Sanitation:** It was observed that more than 70% of the households were not having toilet facilities in their houses. There was no proper drainage line in the villages. Open defecation was in practice in most of the villages. Although drainage facility was in kaccha form.
- **Drinking water Facilities:** During the survey, it was observed diverse sources of drinking water supply in villages. Major source of drinking water in the study area was ground water (hand pumps and bore wells). Villagers were satisfied with water facility
- **Education facilities:** Most of the villages had education facilities in the form of Aanganwadi and primary schools. Higher education facilities were available in the range of 5-10km. Colleges and other diploma courses were available at Raigarh city
- **Transportation facility:** For transportation purpose, auto & private bus services were available in the study area; however villagers reported that transportation facilities were not frequently available. Private vehicles like bicycles & motor cycles were also used by villagers for transportation purpose. Raipur city bus service started connecting to Raigarh city, through villages.
- **Road connectivity:** Most of the roads were pucca and the few pucca roads were badly in need of repair and maintenance. More than half the households reported that roads they frequently used were semi pucca
- **Communication facilities:** For communication purpose mainly mobile phones, newspapers & post offices were present in the villages
- **Medical facilities:** There were few healthcare facilities available in the study area. In some of the villages sub-health centres were available. Hospitals and other better health centres were available in the range of 5-10 km at town/city place
- **Electricity:** All villages were availing electricity facility for domestic and agriculture purposes. Solar Street lights were seen in some of the villages
- **Gram Panchyat facility:** Most of the villages were having gram panchayat building and Community halls
- **Market facility:** Study area was predominantly rural. In villages, small shops were available for daily need things. Weekly market facility was available in some villages. Wholesale market was available at Raigarh city
- **Recreation facilities:** Television and radio were the main recreation facilities in the study area.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Identified Impacts during construction phase and proposed mitigation measures

Land Environment

Impact on Land form & Mitigation Measures

The possible impact on landform of the area will occur due to land grading, cutting, filling, excavation of earthworks, making roads, boundary wall and plant related civil construction activity. The plant layout is designed considering the slope of the land. No soil will be brought from outside or disposed outside the premises. The excavated soil will be stored at earmarked place with proper slopes and utilized for leveling and landscaping purpose within the plant premises.

Impact on Soil

The proposed construction activities will require to remove top soil from the area proposed for plant establishment and associated infrastructure facilities. Surplus excavated topsoil generated during civil foundations will be utilized in the greenbelt development area.

Mitigation Measures Proposed for Land Environment

- After completion of the construction phase, the surplus excavated material shall be utilized for filling up in low lying areas within the plant premises, the rubbles will be cleared and all un-built surfaces will be reinstated;
- The top soil from the excavated areas will be re-used for the plantation;
- Green belt development and related activities will be taken up so that plantation grows to adequate height by the time of plant commissioning.
- Entire plant area will be aesthetically landscaped and natural gradient will be maintained as much as feasible

Solid & Hazardous Waste Disposal

Solid Waste Disposal

Careful design, planning and good site management would minimize waste of materials such as concrete, mortars and cement grouts. Construction wastes will be segregated as much as possible at site itself to increase the feasibility of recycling concrete and masonry as filling materials and steel pieces as saleable scraps. Litter disposal and collection points will be established around the work sites. Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, solder butts, etc will be disposed through recyclers (locally called kabadis). The construction spoils will be temporarily stored at designated dumpsite located inside the plant premises. Later on, these wastes will be used for landfilling / leveling work within the plant premises.

Hazardous Waste Disposal

The hazardous materials during construction may include marginal quantity of gas in the cylinder for welding purpose and Painting Materials. All these materials will be stored at the site as per the safety standards.

Air Environment

Impact on Ambient Air Quality

Dust will be the main pollutant affecting the ambient air quality of the area during the construction phase. Dust will be generated during excavation, back filling and hauling operations and vehicular movement of trucks, dumpers and construction machinery. Further, concentration of NOx and CO

may also slightly increase due to increased vehicular traffic. However, change in level of ambient concentrations of significant parameters in air will be insignificant and temporary. As most of the construction equipment will be mobile, the emissions are likely to be fugitive.

Air Pollution Control Measures

- By providing suitable surface treatment to ease the traffic flow and regular sprinkling of water will reduce the dust generation.
- Aggregates and sand will be stockpiled at suitable places (after stabilizing the surface), near the boundary wall so that the wall acts as windshield. The stockpiles will be aligned along the predominant wind direction, with slopes stabilised and maximum height will be maintained close to the boundary wall height.
- To prevent dust nuisance from the stockpiles, it will be covered with plastic sheet, wherever required.
- Necessary water sprinkling arrangement will be provided around the stockpiles and used whenever necessary to make them moist. Cement and steel will be stocked inside covered sheds.
- Necessary dust suppression measures like water sprinkling using road tankers will be deployed to mitigate the dust nuisance during road making. The road construction will be done during day-time.
- Construction equipment having 'Pollution Under Control Certificate' will be deployed during the activity to restrict the exhaust emissions.

Noise Environment

Impact on Ambient Noise

There will be noise generation from earth moving equipment and material handling traffic. The major sources of noise during the construction phase are vehicular traffic, construction equipment like dozers, scrapers, concrete mixers, cranes, pumps, compressors, pneumatic tools, saws, vibrators etc. The operation of this equipment will generate noise ranging between 85-90 dB (A) near the source. These noise levels will be generated within the plant boundary and will be temporary in nature.

Noise Control Measures

The construction activity will be carried out mostly during daytime. The construction equipment will undergo preventive maintenance test at routine intervals. Any machinery or equipment generating excessive noise levels (above 90 dBA) will be taken out of service and replaced by new ones. The noise generation will be confined within the surrounding areas of construction site. Greenbelt will be developed from construction stage, noise generation during construction stage will be lower than operation stage; hence its impact will be lower.

Water Environment

Impact on Water Resources and Quality

There will not be any process wastewater generation during the construction phase. The surface run-off during rainy season from the broken up areas containing silt will be washed off and carried to the seasonal streams flowing outside the project area. Domestic waste generation during the construction period will be from the temporary colony and sanitation facilities provided for the workers.

Water Pollution Control Measures

The earth work (cuttings and fillings) will be avoided during rainy season and will be completed during winter and summer seasons. However, storm water drains will be made immediately after starting construction activity. The drains will be properly aligned in conformity with the site drainage pattern so that the alteration is kept to the minimum and flooding or soil erosion does not occur. Sedimentation pits will be provided at appropriate location to trap the silt laden runoff water and prevent excessive silt from going outside.

Septic tank and soak pit will be constructed during construction stage for disposal of domestic effluent from construction workers sheds. No wastewater will go out of the plant premises during the construction stage and contaminate the surrounding water bodies in any manner.

Biological Environment

Impact on Ecology

Proposed project located on non-forest land which was procured by the project proponent in past. The majority of local vegetation in project site is in the form of seasonal shrubs, herbs and grasses only. No forest land involved in the project. Trees like *Butia monosperma*, *Azadirachta indica* and *Acacia nilotica (Babool)*, etc were observed near to plant boundary. No, tree cuttings will involve during the construction phase.

Control Measures for Ecology

Local and fast growing plant species will be planted under greenbelt development programme to enhance green cover in the area as per CPCB guidelines during the construction phase.

Socio-economic Environment

Social Impact

The social impact during the construction stage will be of beneficial nature. About 50-60 people on daily wages basis will get employment during the construction stage. The construction stage will extend for 12-14 months. Local people will be preferred for employment and depending upon their skill and experience they will be allotted jobs.

4.2 Identified Impacts during Operation phase and proposed mitigation measures

Ambient Air Quality

Impacts on Air Quality

The major pollutants from the project will be particulate matter, SO₂ and NO_x. Ambient air quality modelling was carried out to assess the cumulative impacts on air quality due to proposed project. ISCST-3 Dispersion Model was used for assessing air pollution load from plant operations.

The maximum incremental ground level concentrations (GLCs) for particulate matter, SO₂ and NO_x due to proposed activities are predicted. The predicted 24 hourly maximum concentrations for proposed facilities for particulate matter, SO₂ and NO_x are found to be 2.2 µg/m³, 1.6 µg/m³ and 6.5 µg/m³ and occurring at a distance of about 1 & 1.4 km respectively in West and WSW directions with a concentration levels (cumulative) of 81.2 µg/m³, 23.6 µg/m³ and 40.5 µg/m³ respectively which is well within the NAAQS levels prescribed by CPCB. Hence it is inferred that considering cumulative concentration levels, the pollution load exerted due to proposed project will be insignificant.

Details of Air pollution Control System

All the particulate matter emission control system will be designed to achieve Bag Filter outlet concentration of 50 mg/Nm³. For control of SO₂ and NO_x from the process, tall stack has been considered for wide dispersion of the pollutants. The stack height is based on CPCB formulae (wherever applicable) and will also adopt from Good Engineering Practice (Pollution Prevention and Abatement Handbook of World Bank).

Fugitive dust protection or duct reduction technology for workers within 30 m of the plant active areas:

Name of the fugitive dust generation area	Dust protection technology proposed for workers	Dust reduction technology proposed for workers
Raw material unloading area, handling area	Nose mask, face shield, eye goggles, ear plugs	Water sprinkling, scientific handling of fines, and dropping of raw materials, wind break, sheet cover
Stock house, day bins	Nose mask, face shield, eye goggles, ear plugs	Proper ventillation, insertible bag filters, closed conveyors
Work shop and other confined work area inside plant	Nose mask, face shield, eye goggles, ear plugs	Proper ventillation, skylight, exhaust fans, proper illumination
Internal roads	--	Concrete roads, daily sweeping using vaccum machine

Impact on Ambient Noise

The main noise generating sources during operation phase will be from furnaces, rolling mill and DG sets. The noise levels for these units will be ranged from 75-95 dB (A) for steel plant, due to DG sets it will be 75 dB (A).

In order to reduce noise levels, the industry will take necessary steps to reduce/mitigate noise levels at source by isolating these processes at the work environment to meet necessary standards. Hence the maximum noise levels of 90 dB(A) from the TMT and Billet plant are considered for predicting ambient noise levels.

The incremental noise levels were observed at proposed project site considering 100m x 100m grid intervals over an area of 1 km x 1 km study area. The predicted noise levels at the boundary due to various plant activities will be ranging in between 50 dB (A) to 55 dB (A). The maximum noise level at the nearest human settlement (i.e. Shivpuri) measured is 39 dB(A), which has been considered as background noise level. Noise attenuation effects due to barriers like the enclosure, boundary wall, bushes and trees, air absorption, effect of wind, temperature and humidity, greenbelt were not considered for modeling.

Noise Pollution Management

As per the model results, the noise levels due to the proposed plant will be in the range of 27 dB (A) to 58 dB (A) near the plant boundaries in all directions. The ambient noise levels are within the permissible limits after the commissioning of the proposed facilities.

The criteria for the environmental noise control is that the design of the proposed plant will not exceed, in any continuous mode of operation, the level stipulated by MoEF and /or Pollution Control Board at any point on the site boundary.

Noise Control Measures

- Noise levels due to DG-sets could be reduced by proper siting and control measures.

- Proper routine and preventive maintenance procedure will be followed in consultation with the DG-sets manufacturer.
- Acoustic enclosure at DG-sets will be provided and also a suitable exhaust muffler will be provided.

Water Environment

Impact on Water Resources

The network of storm water drains and wastewater drains will be made separate. The storm water drain will have sedimentation pits and oil – water interceptors located at suitable points. During monsoon, the storm water will be collected in the water reservoir and surplus will be discharged into outside natural nalla. The water management scheme has been designed with recycling and reuse system. No wastewater will be discharged outside the plant premises.

Spent oil and lubricants will be collected from various locations in drums. The drums will be stored in earmarked area with adequate safety facility like fencing, concrete surface, shed, etc. When sufficient amount of spent oil and lubricants are collected, it will be auctioned to authorized re-processors. No oil or lubricant will be discharged into any drains. Therefore the impact of the project operation on the water bodies will be insignificant

Impact on Ecology (Flora and Fauna)

Clearance of Vegetation within project site

The area available for the proposed industrial setup is 8.45 Acre, no forest land involved in the project. However, around 32 nos. of naturally grown trees were observed within the project site, out of which 16 nos. of trees need to be cut for proposed plant establishment. These tree species includes Sal (13 Nos.), Moha (02 Nos.) and Mango (1 No.). Request letter for Permission of tree cutting is being already submitted to DFO, Raigarh, by project proponent. In order to minimize the impact 100 nos. of sapling belonging to Sal, Moha and Mango will be planted within the plant site and nearby areas under greenbelt development.

Greenbelt development

The total area of project site is 8.45 Acre (3.42 Ha.). An area of 2.79 Acre, (33%) within the project premises will be used for plantation activities. Greenbelt with a minimum width of 100 m along the plant periphery, consisting of at least 3 tiers around plant boundary will be developed. Trees will be planted with a density of 1000 trees/Acre. Thus, 2,790 numbers of sapling will be grown along the periphery of the plant area.

Socio-economic environment

The project would create certain impacts which could be beneficial as well as adverse. It is necessary to identify the extent of these impacts for further planning of control measures leading to mitigation of the adverse impact. The impacts due to project on parameters of human interest are assessed and given below:

Impact on employment

Project activities will generate direct and indirect employment opportunities in the form of skilled, semi-skilled and unskilled workers etc. Increased job opportunities will strengthen economic development in the study area.

Impact on places of historical importance

No historical monuments or places of historical importance were available in project area. Hence no adverse impact will be resulted due to proposed project.

Impact on quality of life

Due to employment opportunities, additional infrastructure facilities, development in ancillary business, etc., and quality of life will be improved in the study area.

Migration of workforce

Immigration of workers may overtax community services and cause economic, social and cultural conflicts or displace local populations

Mitigation Measures

In order to mitigate the adverse impact likely to arise in social, cultural and economical aspects in the surrounding region and the proposed project is expected to contribute towards enlistment of local people and improvement in quality of life.

- Ensure local workforce will get employment opportunities from project authority
- Ensure that roads are properly signed, vehicles are well maintained and drivers are well trained and safety conscious
- Supporting community health screenings, especially those addressing potential health impacts related to the project activities
- The project authority shall carry out welfare activities and provide basic amenities to employees and surrounding villagers
- Establishing vocational training programs for the local workforce to promote development of skills required by the project activity
- Cooperative and cohesion approach with villagers through industries/management

Quality of life

Quality of life is a measure to know exact situation of villages/communities, It Includes income, housing, jobs, education, environment, recreation, health, and life satisfaction etc. To know quality of life in the study area, primary data collection through selected villages performed with structured questionnaires. Quality of life existing in the study area is given in **Table 8** and expected change in quality of life is given in **Table 9**

TABLE 8
QUALITY OF LIFE EXISTING (QoL) IN THE VILLAGES SURVEYED

Sr. No.	Villages	QoL (s)	QoL (o)	QoL (c)
1.	Gerawani	0.68	0.72	0.67
2.	Ujalpur	0.58	0.6	0.59
3.	Barliya	0.56	0.56	0.56
4.	Lakha	0.58	0.6	0.56
5.	Pali	0.58	0.6	0.58
6.	Shivpuri	0.58	0.6	0.57
7.	Chiraipali	0.55	0.56	0.54
8.	Gaurmudi	0.54	0.56	0.54
9.	Junwani	0.52	0.52	0.48
10.	Bhuikuri	0.55	0.54	0.53

Sr. No.	Villages	QoL (s)	QoL (o)	QoL (c)
11.	Kanta Jhariya	0.54	0.56	0.52
12.	Delari	0.56	0.58	0.53
Average		0.56	0.58	0.57

Source: Primary data collection (s) = Subjective, (O) = Objective, (c) = Cumulative

TABLE 9

QUALITY OF LIFE (QOLs) AFTER IMPLEMENTATION OF EMP

Sr. No.	Villages	QoL (s)	QoL (s) EMP
1.	Gerawani	0.68	0.70
2.	Ujalpur	0.58	0.60
3.	Barliya	0.56	0.56
4.	Lakha	0.58	0.60
5.	Pali	0.58	0.58
6.	Shivpuri	0.58	0.60
7.	Chiraipali	0.55	0.55
8.	Gaurmudi	0.54	0.54
9.	Junwani	0.52	0.52
10.	Bhuikuri	0.55	0.55
11.	Kanta Jhariya	0.54	0.54
12.	Delari	0.56	0.58
Average		0.56	0.57

Source: Primary data collection

(s) = Subjective, (c) = Cumulative

Socio-Economic Impact Matrix

The assessment of the impact of the general activities on the below parameters of socio-economic indices can be done by establishing a prediction of likely impacts matrix. Predication of likely impacts, on socio-economic environment is presented in **Table 10**.

TABLE 10

PREDICATION OF LIKELY IMPACTS ON SOCIO-ECONOMIC ENVIRONMENT

Parameter	Local	Regional	Direct	Indirect
Employment	+	•	+	-
Income	+	•	+	+
Transport	+	+	+	+
Education	+	•	+	-
Medical facilities	+	•	+	•
Communication	+	•	•	•
Availability of power	•	•	•	•
Sanitation	-	•	-	•
Housing	+	•	+	•
Health	-	•	-	•
Recreation	•	•	•	•
Agriculture	•	•	•	•
Cost of living	-	•	-	•
Business	+	+	+	+
Per Capita Income	+	•	+	•
Pollution	-	•	-	•

+ = Positive Impact, Negative Impact = - • = Insignificant

5.0 ANALYSIS OF ALTERNATIVES (SITE AND TECHNOLOGY)

The proposed project, involves in manufacturing of TMT bars with metal charging facility. Due to rapid urbanization, construction activities are boost-up day by day, consequently the product i.e. TMT bars have in demand in market.

As the proposed project site has good facilities and is adjacent to an industrial belt housing similar and other types of industries, no other site was considered. The plots of site and adjoining areas are being considered by the state govt. for inclusion in the industrial area, which will make the site most appropriate for this project. However, it is to be mentioned here that the site is already selected and all the facilities related to production are available. The proposed plant will be in the acquired land of the company. Choice of the technology, based on environmental applicability, technicality and financially the project is feasible.

6.0 ENVIRONMENTAL MONITORING PROGRAM

Environmental monitoring shall be done as per the guidelines provided by CPCB/SPCB. The methods conducted or applied shall be approved or accepted by the any recognized body or authority i.e. MoEF/CPCB/SPCB. An Environmental Management Cell (EMC) will be established for the proposed project under the control of G.M. (Plant). The EMC will be headed by an Environmental Manager having adequate qualification and experience in the field of environmental management.

7.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

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

A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons, is prepared and incorporated in the draft EIA/EMP report for ensuring safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of Disaster Management Plan, it will be widely circulated and personnel training through rehearsals. Site facilities, procedures, duties and responsibilities, communications, etc. are considered in details in the Disaster Management Plan.

8.0 ENVIRONMENTAL COST BENEFITS ANALYSIS

On overall assessment of the project with technical and financial aspects, it is concluded that the proposed project for production of M.S. Billets with CCM, Shop, Rerolled Steel, is technically feasible and financially highly profitable. The project is of utmost importance as it is going to drastically reduce the GHG emission & promote sustainable development with a great saving in energy consumption. In addition, the project being located away from the urban areas will avoid pollution-addition to the densely populated areas; at the same time promote the growth of the backward area.

9.0 PROJECT BENEFITS

M/s Chandrahasni Ispat Pvt. Ltd. will spend 2.5% of the fixed project cost, i.e. Rs.1.005 crores for various activities towards Corporate Social Responsibilities, socio-economic, community developmental activities and infrastructure. The CSR activities will aim at strengthening the bond between the project authorities and the local population in the vicinity of project area.

The employment opportunities, both direct and indirect, that will be created or generated from the proposed project are direct employment of approximately 50-60 persons on daily wages basis during the construction phase for the period of 12 to 14 months. M/s CIPL in the proposed project will generate about 100 employment during operation phase. Preference will be given to local people, depending upon their qualification and skillness.

10.0 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.

Adequate budgetary provisions will be made available and spent by the project authorities management for construction and operation phases for the implementation of environmental management plan. A provision of Rs.100 lakhs will be made available towards the expenditure as capital investment and Rs. 10 lakhs as a recurring expenditure.

11.0 SUMMARY & CONCLUSION

Based on the studies carried out, it is concluded that due to adoption of the Online Hot charging technology which is also being promoted by UNIDO and Ministry of Steel; the project becomes almost a non-polluting Industry. With the proper implementation of the pollution control and mitigation measures, the proposed project of M/s. CIPL will be beneficial to the society and will help to reduce the demand-supply gap of steel and will contribute to the economic development of the region in particular and country in general.

12.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed project of M/s CIPL are carried out by M/s Anacon Laboratories Pvt. Ltd., Nagpur (M/s ALPL). Anacon established in 1993 as an analytical testing laboratory and now a leading Environmental Consultancy firm backed by testing lab for environment and food in Central India region. M/s ALPL is a group of experienced former Scientists from the Government Institutions and excellent young scientists of brilliant career with subject expertise. It is recognized by Ministry of Environment & Forests, New Delhi for carrying out environmental Studies & accredited by Quality Council of India (QCI) for conducting Environmental studies vide 44th NABET Accreditation Committee Meeting for Re-Accreditation held on Mar 04, 2015 as category A consultant organization in 14 Sectors including Mining projects, coal washery, Mineral beneficiation, Metallurgical Industries and Thermal Power Plant projects, etc.