



EXECUTIVE SUMMARY



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1.0 INTRODUCTION

M/s. Prime Ispat Ltd. (hereafter referred as PIL) already has two operating units working since year 1995. One of which is having installed capacity of 33600 TPA MS Ingots/Billet unit through Induction melting Furnace and the other one is having 108000 TPA re rolled steel like MS Joist, MS Beam, MS angle, MS channel and other steel re rolled products, through Billet Reheating Furnaces and Re Rolling Mills. Now it is proposed to increase the production capacity of steel Melting Furnaces from 33600 to 141600 TPA of MS Ingot/Billet unit and integrate it portion of existing rerolling mills, through a portion of it hot charging process so as the total production of re rolled steel is increased from 108000 TPA re-rolled steel to 134600 TPA MS Joist, MS Beam, MS angle, MS channel and other steel re rolled products to develop its trade in steel sector. But at the same time the production from existing billet reheating furnaces based re rolling mills is proposed to be reduced from 108000 TPA to 90000 TPA. The purpose of this adoption of clean technology is to reduce the total pollution load from existing levels and reduce the GHG emission from re rolling mill sector and achieve higher energy efficiency through adoption of more efficient technology. Salient features of contingent advantage of proposed expansion are discussed separately in this report.

As per Environmental Impact Assessment Notification dated 14th September, 2006 and subsequent amendment thereof. The proposed project falls under “Category B1”, Schedule 3 (a) and requires Environmental Clearance (EC) to be obtained from SEAC/SEIAA, Chhattisgarh.

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 expansion project.

The online application for prior Environmental Clearance (Form-1) was submitted to SEIAA/SEAC, Chhattisgarh on Dated 14/08/2017 for proposed expansion project. The proposal was considered by the State Expert Appraisal Committee (SEAC) during its meeting held on 08th September 2017. The SEAC has suggested standard Terms of References (ToR) (Vide Letter no. 602/SEACCG/SIA/CG/IND/631 dtd. 30.10.2017) for preparation of the EIA Report.

Environmental baseline studies carried out during in Post Monsoon Season 2017. This EIA report is prepared based on the ToR conditions recommended by SEAC, Chhattisgarh and project related technical details provided by Prime Ispat Ltd.

1.1 IDENTIFICATION OF PROJECT

The company has proposed expansion of existing Induction Furnace based Semi-Finished steel Production and Rerolling Mill with following production capacity:

Facility Name with Product details	Existing Capacity	Proposed Expansion	Proposed capacity after expansion
Induction Furnace with CCM to produce : “MS Ingot/Billet”	33600 TPA	108000 TPA	141600 TPA
LRF/AOD/VOD 20 Ton Capacity: Liquid steel refining	-	20 MT	20 MT



Facility Name with Product details	Existing Capacity	Proposed Expansion	Proposed capacity after expansion
Rolling Mills to Produce Rerolled Steel products			
a) Billet Reheating Furnace fired on Coal/F.O. for Billet Reheating	108000 TPA	-18000 TPA	90000 TPA
a) Online Hot charging Rerolling Mill	Nil	44600 TPA	44600 TPA
Total : Rerolling Mill Facility	108000 TPA	26600 TPA	134600 TPA ^[1]
Fabrication of Railway track items like "Fish Plates" etc Involving of 1 object Reheating up to 900 C and 1 Annealing/tempering through Furnace up to 850 C and subsequent fabrication by drilling ; shaping; forging etc.	-	36000 TPA	36000 TPA
Emergency DG set: Electrical Energy	750 kVA	-	750 kVA

Out of this 44600 TPA Rerolled steel will be produced through Online hot charging Rolling Mill attached to Induction Furnace and CCM, remaining 90000 TPA Rerolled steel will be produced thru existing conventional rolling mills based on Billet reheating furnaces.

Note:

- The proposed project is backward and forwards integration of coal fired steel re-rolling mill capacity integration with Induction Melting based MS Ingot infrastructure by setting up a Direct Hot Charging based Steel Rolling Mill to the extent of 44600 TPA.
- The facility will produce 141600 TPA Ingot or Billet, by processing of this Steel Rerolled product of 134600 TPA will be produced.
- The existing re rolling mill of 1,08,000 TPA is based on Coal Firing will be reduced to 90000 TPA and new re rolling mill will be based on Direct Hot Charging.
- The fabrication unit For Rail track components and other engineering components such as fish plate with Reheating furnace and Annealing/Tempering Furnace is also proposed to be installed.
- One LRF/AOD/VOD of 20 tons is proposed for refining of Liquid metal.
- General Fabrication facility and work shop are available
- It is important to note that specialised raw material having capacity 36000 TPA for Fabrication of Railway track items like Fish Plates etc. will be procured from outside.

1.2 LOCATION OF THE PROJECT

Plant is located at Bana village Via Hirapur, Tehsil & District Raipur of Chhattisgarh. The study area of 10 km radial distance from the project site is shown in **Figure 1**.

1.3 EIA/EMP REPORT

In line with the approved ToR obtained from SEAC, Chhattisgarh, baseline environmental monitoring was carried out during post-monsoon season (October 2017 to December 2017) 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 draft EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the draft 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.

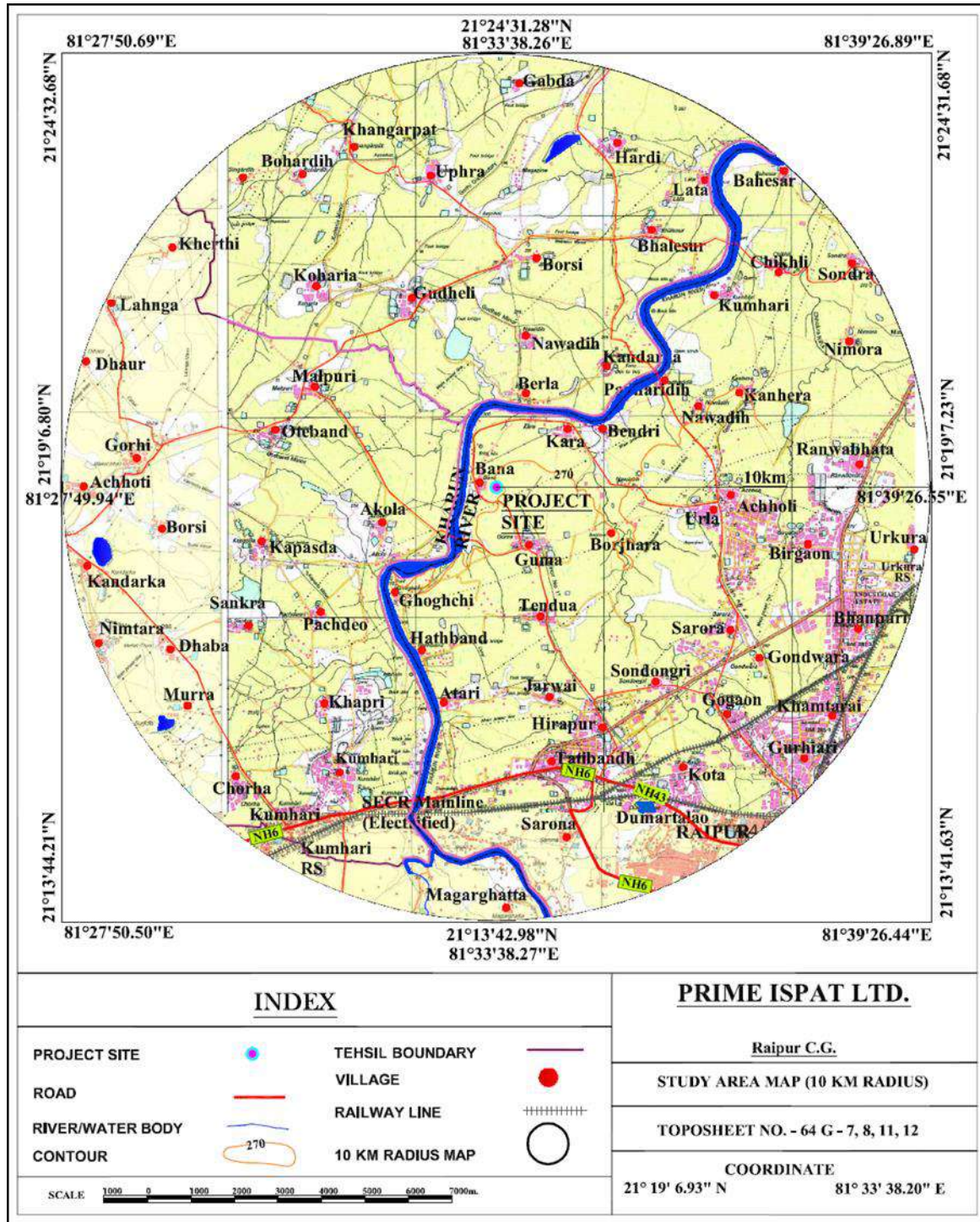


FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)



**TABLE 1
DETAILS OF ENVIRONMENTAL SETTINGS**

Sr. No.	Particulars	Details
1.	Project Location	Village: Bana, Via Hirapur, Tehsil & Dist. Raipur (Chhattisgarh)
2.	Co ordinate	Latitude : 21 ⁰ 19'6.93"N ; Longitude: 81 ⁰ 33'38.20"E
3.	Toposheet No.	64 G – 7,8,11 & 12
4.	Climatic Conditions	Mean annual rainfall is 1252.8 mm Temperature : Pre monsoon 20.6 ⁰ C (Min.) 41.7 ⁰ C (Max.) : Winter 13.3 ⁰ C (Min.) 31.0 ⁰ C (Max) : Post monsoon 17.3 ⁰ C (Min.) 31.8 ⁰ C (Max.) Source: IMD, Raipur
5.	Nearest IMD station	Nearest city - Raipur ~ 9.83 km, SE
6.	Land Form, land Use and Ownership	Existing Industrial Land.
7.	Site topography	Project site located at 271 m (MSL) ; Flat Terrain
8.	Nearest roadway	Raipur - Chandikhol - (NH-200) road 8.0 km, E (NH-6) road 6.75 km, SSE
9.	Nearest Railway Station	Raipur about 9.83 km, SE
10.	Nearest Air Port	Swami Vivekanand Airport, Mana, Raipur about 23.6 km SE.
11.	Nearest Port	NA
12.	Nearest lake	NA
13.	Nearest State/National Boundaries	NA
14.	Nearest major city with 2,00,000 population	Nearest city - Raipur ~9.83 km, SE
15.	Distance for sea coast	NA
16.	Hills/valleys	NA
17.	Nearest Reserved/ Protected forests	None
18.	Nearest water bodies	Kharun river ~635 Km W
19.	Seismic zone	The proposed expansion project site falls in zone-II as per IS 1893 (Part-I): 2002. Hence, seismically, it is a stable zone.

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION

2.1.1 Manufacturing process of Steel Melting Shop with CCM along with Hot Charging Rolling Mill

- The manufacturing of steel melting of Sponge Iron and Pig Iron through Induction Furnace is process identified for the proposed unit is one which is well established and proven and presently being followed by majority of similar manufacturing units mostly in small or medium scale sector.
- In order to achieve high energy efficiency three numbers of Induction Furnaces with higher power input capacity will be operated 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 cutting from rolling mills or scrap from user units is taken from raw material storage. This is then tested for its chemical composition and noted. 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 is 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 1540°C. It is necessary superheat up to 1650°C for specific time. After completion of melting cycle, the homogeneous molten mass is poured hydraulically into the ladle, which is transported by crane to CCM or LRF as per need.
- **Ladle Refining Furnace (LRF):**
 - One 20 Ton capacity LRF will be set up in order to refine the liquid metal as and when Hi Levels of Sulphur or Phosphorous are found in it. It will be based on the three electrode arc type furnace with the provision for Oxygen lancing if required and dosing of refining inputs like Lime; Dolo Lime; Felspar and carbon addition etc. The electrodes will have slipping arrangements and the fume extraction system attached with Bag Filter. The Basic slag generated in it will be sold to Cement Plants. After the liquid metal is refined then the ladle is transferred to CCM for further processing.
- **Continuous Casting Machine (CCM):**
 - The ladle containing hot metal 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 6 meter x 11 meter 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 mold 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.
- **Online Hot Charging Rolling Mill:**

A portion of Hot Billet will be transferred to the Hot Charging based Rolling Mill.

 - Raw Material i.e. Billet coming from CCM in red hot condition will be 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.



- 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. MS Joist, MS Beam, MS angle, MS Channel and other steel rerolled products.

2.1.2 Manufacturing process of Conventional Rolling Mill

Around 90000 Tonnes of Billet produced internally in cold condition will be transferred to the Billet Reheating Furnace platform for Reheating and Rolling. (in case of production of special quality steel, special quality of billet will be purchased from outside, thus in house produced billet of equivalent quantity will be sold to market)

- Ingot/Billet after proper sizing through Gas Cutting or billet Shearing Machine will be pushed in reheating furnace. The reheating furnace will be fired by F.O./ Coal based producer gas plant. There will be high energy efficiency heat recuperators installed in with it.
- 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. Steel Rerolled products. It is proposed to produce MS Joist, MS Beam, MS angle, MS Channel and other steel rerolled products at present; however in future the Mills may be used to produce Wire Rod or other Steel Rerolled products.
- After Cooling rerolled products are shifted to finished yard, after inspection, are ready for dispatch.

2.1.3 Coal based Producer Gas Plant

- In order to adopt to the clean technology the company has setup two coal producer gas plants which provide adequate producer gas to operate the Billet Reheating furnace for production of 108000 TPA capacity mill.
- The Billet Reheating furnace is backed up with the FO firing.
- In current operation fuel efficiency of Billet Reheating Furnace in terms of coal are assessed @150 kg coal per ton, or in terms of F.O. 50 Liter/ton. The efficiency will be improved to limit the coal consumption to 100 kg/Ton or less, and F.O. to 35 liter/Ton or less

2.2 LAND REQUIREMENT

The expansion project is proposed on the existing land total will be 7.4 Ha. (18.28 Acre) land, this land is already acquired by the company, having Khasara No. 248/1, 248/2, 249/2, 189/1, 190, 191/2, 195/16, 236/2, 240/2, 240/3, 243/1, 245/7, 249/2, 249/3, 244, 245/1, 245/3, 245/5. No additional land is proposed to be acquired for the expansion project. The google image of project site is presented in land schedule of the project site is given in **Table 2**.

**TABLE 2
 LAND FORM OF THE PROJECT SITE**

Land Form, land use and ownership	Area In Hectare
The plot is already converted to Industrial use purpose	7.4
Total	7.4

2.3 RAW MATERIALS REQUIREMENT, SOURCE & MODE OF TRANSPORT

The raw material will be transported from local market nearby steel plant, coal will be transported through covered truck, or in case requirement of furnace oil will be transported through tanker. It is estimated that approx. 51 trucks/day required for transportation of raw materials and finished products of the plant



2.3.1 Solid and Hazardous waste generation

Total Solid wastes generation through process is estimated to be about 31337 MT/Yr which includes Miss-rolls, Mill Scale, Slag and Coal ash are 3500 MT/Year, 3500 MT/Year, 21187 MT/Year and Coal Ash 3150 respectively. Waste oil/used oil and tar generated through the process will be 5 KL/Yr and 180 KL/Yr. respectively which are classified as hazardous waste.

2.4 WATER REQUIREMENT & SOURCE

The total makeup water requirement for the project will be about 66 m³/day (12 KL for domestic purpose). This will be met from groundwater.

2.5 POWER REQUIREMENT & SUPPLY

Power requirement will be around 17.24 MW which will be drawn from electricity board (CSEB). An emergency Power Backup DG set of 750 KVA is also proposed.

2.6 MANPOWER REQUIREMENT

The project will create employment generation of approximately 100 persons during operation phase in addition to the existing manpower 400. Thus, the total employment generation by the company will be 500 persons. Preference will be given to local people, depending upon their qualification and skills.

2.7 FIRE FIGHTING FACILITIES

In order to combat any occurrence of fire in plant premises, fire protection facilities are envisaged for the various units of the plant. All plant units, office buildings, laboratories, etc. will be provided with adequate number of portable fire extinguishers to be used as first aid fire appliances.

2.8 PROJECT COST

The project cost for expansion of the project is estimated as Rs. 2220 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 (October 2017 to December 2017).

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated At Site (October 2017 to December 2017)

Predominant Wind Direction	Post monsoon season
First Predominant Wind Direction	ENE (22.0%)
Second Predominant Wind Direction	NE (18.0%)
Calm conditions (%)	0.71
Avg. Wind Speed (m/s)	2.28
Temperature (°C)	18-34

The status of ambient air quality within the study area was monitored for post-monsoon season for at 8 locations covering project site, Bana, Malpuri, Akola, Nawadih, Borjhara, Bendri and Tendua villages. Total 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 (PM₁₀), Fine Particulates (PM_{2.5}), Sulphur Dioxide (SO₂), 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 3**.

TABLE 3
SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Parameters	Range
1.	PM ₁₀	47.0 – 110.7
2.	PM _{2.5}	12.7 – 41.1
3.	SO ₂	5.0 - 21.6
4.	NO ₂	7.9-29.4
5.	CO	0.128-0.307
6.	Ozone	7.1-19.2
7.	Benzene	BDL
8.	BAP	BDL

Note: All values are reported in $\mu\text{g}/\text{m}^3$ except CO in mg/m^3 and BAP in ng/m^3 ; BDL: Below Detectable Limit

From the above results, it is observed that the ambient air quality with respect to PM₁₀, PM_{2.5}, SO₂, NO_x and CO at all the monitoring locations except PM₁₀ value at Tendua (Max. 105.6 $\mu\text{g}/\text{m}^3$) and Borjhara (110.7 $\mu\text{g}/\text{m}^3$) was within the permissible limits specified by CPCB.

3.3 AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 08 monitoring locations; those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 4**.

TABLE 4
SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq Day	Leq Night
Residential Area			
1.	Gudheli	52.3	43.1
2.	Malpuri	54.3	42.4
CPCB Standards dB(A)		55.0	45.0
Commercial Area			
3.	Akola	62.8	50.6
4.	Birgaon	62.4	51.6
5.	Borjhara	61.4	49.8
CPCB Standards dB(A)		65.0	55.0
Silence Zone			
6.	Tendua	49.8	38.2
CPCB Standards dB(A)		50.0	40.0
Industrial Area			
7.	Project Site	71.1	65.3
8.	Bana	64.6	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 Geology, Hydrology and Hydrogeology

The area as a whole represents a gently slope, drained by a number of South-East to North-West flowing rivers which debouche into the one major river i.e. Kharun River present in Western direction from the project site which is about 0.7 km approx. The area as a whole is the basin of Seonath catchment and maximum flow of the water is going towards the Kharun River and again the Seonath confluence into Mahanadi River.

Geologically, the area mainly covered by the rocks like Stromatolitic Limestone and Dolomite belongs to Chandi Formation of Raipur Group of Chhattisgarh Super Group of Meso to Neoproterozoic age. Lithologically the formation comprises of Limestone and Dolomite which physically observed as pink, purple, reddish brown, grey, greenish grey, fine to medium grained, hard and compact bedded rock, stromatolitic and at places argillaceous & siliceous & siliceous with purple, friable, splintery and calcareous shale.

The pre-monsoon ground water level in the district varies from 12 to 13 mbgl while the post-monsoon water level varies from 5-6 mbgl The water level trend (for 10 years) for pre-monsoon and post-monsoon period on an average does not show significant change. As per CGWA recent categorization of assessment unit, the study area falls in "Semi-Critical" zone of 'non- notified' category of groundwater development.

3.4.2 Water Quality

Groundwater and surface water quality was assessed by identifying 5 groundwater (Borewell) locations in different villages and 2 surface water samples.

A. Groundwater Quality

The analysis results indicate that the pH ranged between 7.62-7.97 which was well within the specified standard of 6.5 to 8.5. The TDS was ranging from 235-472 mg/l. Total hardness was found to be in the range of 114-153 mg/l. The fluoride concentrations were varied between 0.27-0.61 mg/l which is within the acceptable limit of 1 mg/l. The nitrate and sulphate were found in the range of 6.29-33.25 mg/l and 30.08-73.32 mg/l respectively. The heavy metals content (i.e. As, Al, Cd, Cr, Cu, Pb, Fe, Mn, and Zn) were found to be within permissible limits.

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.65-7.75 which was well within the specified standard of 6.5 to 8.5. The TDS was observed to be 215-221 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 87-89 mg/l as CaCO₃ 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 21.36-26.52 mg/l and 15.10-18.50 mg/l respectively. Heavy metals content (i.e. As, Al, Cd, Cr, Cu, Pb, Fe, Mn, Zn and Hg) were found to be very low and within specified standards. The overall surface water quality was found to be safe for drinking purpose physico-chemically.

C. Bacteriological Characteristics

Bacteriologically all surface water samples were contaminated and chlorination or disinfection treatment is needed before use for alternate source of drinking purpose whereas groundwater samples were not contaminated and suitable for drinking purpose. Present of Sodium into ground water is mainly influenced by Sodium Chloride or table salt. Overall, the surface and groundwater within the study area was found to be good physico-chemically.



3.5 LAND USE LAND COVER CLASSIFICATION

The Land Cover classes for the study area were extracted following a visual interpretation method or on screen digitization of the Resource Sat-2 Imagery, sensor LISS-3 having 23.5 m spatial resolution image. These were later verified by using SOI toposheet, Google Earth imagery and Ground truthing by GPS survey. Polygon layers for each class were digitized and the respective areas were calculated. The Land Cover classes and their coverage are summarized in **Table 5**.

TABLE 5

Sl. No.	Level-I	Level-II	Area Sq. Km	Percentage
1	Built-up land	Settlement	48.97	15.60
		Industrial Settlement	19.85	6.32
		Road Infrastructure	7.19	2.29
		Railway	1.58	0.50
		Brick Kline	2.84	0.90
2	Barren Land	Barren Land	0.98	0.31
3	Agricultural Land	Agriculture land	88.33	59.98
5	Scrubs/Wastelands	Open Scrub	30.29	9.65
6	Water bodies	River	5.92	1.89
		Water bodies	3.92	1.25
		Drainage	2.89	0.92
7	others	Mining/Stone Quarry	1.24	0.39
	Total		314	100

3.6 SOIL QUALITY

For studying soil quality of the region, sampling locations were selected to assess the existing soil conditions in and around the proposed project site representing various land use conditions. The physical, chemical properties and heavy metals concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 15-20 cm. Total 5 samples within the study area were collected and analyzed.

From the analysis results of the soil samples, it was observed soil texture of the soil observed to be silty clay. The overall organic matter, nitrogen, potassium and phosphorus content of the soils were found to be moderate.

3.7 BIOLOGICAL ENVIRONMENT

Floral composition in Study Area

Floral characteristics within project site and surrounding areas including various villages were studied during post-monsoon season. Total 86 floral species were observed in the study area. The details about the floral composition are as follows.

Trees: Total 47 Nos. of different species were observed within the study area

Shrubs & Herbs: Total 25 species were observed within the study area

Climbers: Total 7 species of climbers were reported in different patches of the study area.

Grasses & Bamboos: Total 7 different species of grasses were observed within the study area.

Fauna in the Study area:



Among mammals; *Canis aureus* (Jackal), Common Langur, *Herpestes edwardsi* (Common Mongoose), *Vulpes bengalensis* (Indian fox), are protected in schedule –II. whereas, *Lepus nigricollis* (Black-naped hare), *Funambulus pinnati* (Palm squirrel) protected in Schedule IV and Rats protected in Schedule V

Among the Herpetofauna, Indian Cobra (*Naja naja*), and Common Rat Snake (*Ptyas mucosa*) were provided protection as per Schedule-II of Wild life protection act, (1972) and Common Indian Krait (*Bungarus caeruleus*), Indian Toad (*Bufo parietalis*) were provided as per Schedule – IV of Wildlife protection act 1972 and as amended.

Among the Avifauna: All birds were observed in the study are included in schedule IV as per wildlife protection act.

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. Summary of the socio-economic status of the study area is given in **Table 6**. Details regarding education facilities infrastructure and evaluation 2011 are presented in **Table 7 & 8** respectively.

**TABLE 6
SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA**

No. of villages	26
No of Towns	01
Total households	10557
Total population	53376
Male Population	27198
Female population	26178
SC Population	10750
ST Population	2096
Total literates	33150
Total Illiterates	20226
Total workers	22445
Total main workers	18705
Total marginal workers	3740
Total non-workers	30931

Source: Primary census abstract 2011, district Raipur, Chhattisgarh

**TABLE 7
DETAILS REGARDING EDUCATION FACILITIES WITHIN 10 KM RADIUS STUDY AREA**

Gov. Primary school	Private primary school	Gov. Middle School	Private Middle School	Gov. Secondary School	Gov. Senior Secondary School	Private Senior Secondary School	Gov. Arts, Science Degree College	Pvt. Arts, Sci.& Comm. College
26	03	16	01	06	02	03	01	0

Source: District census handbook 2011, District Raipur, State Chhattisgarh



TABLE 8
COMPARATIVELY ANALYSIS OF INFRASTRUCTURE FACILITIES IN THE STUDY AREA

Yr.	In percentage (%)									
	Education	Drinking water	Road	Power	Recreation	Transportation	Medical	Communication	Bank	Drainage
2011	100	100	100	100	92	77	38	85	77	42

Source: District census handbook 2011, District Raipur, state Chhattisgarh

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

- **House pattern:** It is notable that nearly 70% of the house type was pakka and 20% houses were observed in semi pakka and only 10% kaccha form in the study area
- **Employment:** Main occupation in the study area was in the form of private job and labour work in the industrial area. The labors were getting daily wage in the range of Rs. 250-300, depending on type of work they set
- **Fuel:** The primary sources of cooking fuel were LPG, cow dung and coal etc. Most of the villagers use coal powder and cow dung mix balls for cooking purpose
- **Main crops:** Paddy is main crop within study
- **Language:** Official language was Hindi and mother tongue of the population was Chhattisgarhi. Migration of workers from other states was common; therefore during survey other language spoken population like Odiya, Bengali etc. also found.
- **Migration from other states:** During survey it was found that local population were not migrating for employment purpose, they prefer only local employment, but migration from other states was seen in the study area
- **Sanitation:** Toilet facility is one of the most basic facilities required in a house. There was no proper drainage line in the villages, open and kachha drainage which was not working properly seen in most of the villages. Various villages in study area now actively involved in open defecation free (ODF) in the community level under which toilet facilities developed within several villages. The overall position of cleanliness was near to satisfactory
- **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, tap water and dug wells). During discussion, it was revealed that in summer season water scarcity occurred in most of the villages
- **Education facilities:** Most of the villages had education facilities in the form of Anganwadi and primary schools. Higher education facilities were available in the range of 5-10 km. Colleges and other diploma courses were available at Raipur city.
- **Transportation facility:** For transportation purpose auto, private bus services were available in the study area; transportation facilities were frequently available in the study area and Connecting Raipur city. Private vehicles like bicycles & motor cycles were mostly used by villagers for transportation purpose
- **Road connectivity:** Most of the roads were pucca and connecting fair enough to villages. CC roads were commonly seen inside the villages



- **Communication facilities:** For communication purpose mainly mobile phones, newspapers & post offices were seen in the villages.
- **Medical facilities:** There were few healthcare facilities available in the study area. In some of the villages primary health sub centers were available. Hospitals and other better medical facilities were available in the range of 10-20 km at town/city place
- **Electricity:** All villages were availing electricity facility for domestic use. Very few farmers were using electricity for irrigation purpose
- **Market facility:** Study area was predominantly semi urban. Most of the small towns were converted in Nagar Nigam. In villages, small shops were available for daily need things. Weekly market facility was available in some villages. Raipur city is major hub for all type of facilities for the population in the study area.
- **Recreation facilities:** Television and radio were the main recreation facilities in the study area. Newspaper/magazine facilities were also used by villagers. Internet based Mobile usage has gained the highest popularity. Most of the youth are found to be using the Mobile based applications. At some places video parlors are also seen. Cinema houses are not found in the Rural area. It is only found in Raipur City which is also one of the main sources of recreation. Rural areas also frequently organize the sports and cultural events; like Jas Git; Ramyan Katha; Ramlila; Guru Ghasidass Jayanti. The area has enough resources for recreations.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Air Environment

The proposed expansion project will have impact on the air quality parameters like PM₁₀, PM_{2.5}, SO₂, NO_x and CO. The raw material handling plant, Induction Furnace, Producer Gas Plant, Billet Reheating Furnace, etc. are the sources of emissions in air due to project activities. Apart from the above, there will be fugitive dust emissions due to transportation, storage and processing of raw materials.

As per the assessment of fuel consumption and volumetric emission in the existing facility compared with proposed expansion capacity. It is found that total fuel consumption will get reduced. Subsequently flue gas volume and PM, SO_x, NO_x will get reduced. Thus, proposed expansion is not likely to contribute any additional pollution load to the existing levels. Rather the current contribution will get reduced to proportion of reduced emission. The details are given in **Table 9**.

**Table 9
RESULTANT POLLUTION LOAD COMPARISON DIFFERENT FUEL CHOICE SCENARIO**

S.No.	Scenario	PM	SO _x	NO _x	Calculated Pollution Load
Unit : g/s					
Comparison 1					
1.	Scenario Existing#1 (SE#1)	0.367	5.683	5.145	11.195
2.	Scenario Proposed#1 (SP#1)	0.286	4.525	3.563	8.374
Comparison 2					
3.	Scenario Existing #2 (SE#2)	0.178	9.471	2.115	11.764
4.	Scenario Proposed #2 (SP#2)	0.214	6.893	1.922	9.028



Note:

1. Scenario Existing #1 (SE#1): 108000 TPA Rolling Mill with 150 Kg of Coal per MT+ 33600 TPA Induction Furnace+ 750 KVA emergency DG Set calculated based on emission rate 50 Mg/Nm³.
2. Scenario Existing #2 – (SE#2): (108000 TPA F.O. based Billet Reheating Furnaces (@50 ltr/MT F.O. requirement) + 33600 TPA Induction Furnaces) + 750 KVA emergency DG Set calculated based on emission rate 50 Mg/Nm³.
3. Scenario Proposed#1 – (SP#1) 90000 TPA (45000 TPA + 45000 TPA) Coal based Billet Reheating Furnaces (100 Kg/MT coal requirement) + 141600 TPA Induction Furnaces along with 44600 TPA Hot Charging Rolling Mill + F.O. Operated 24000 TPA Annealing furnace, 12000 TPA Fish Plate furnace in which only 2000 TPA will required to be heated through FO (@ 30 Litre/Ton of FO requirement) and 35 Mg/Nm³ emission rate.
4. Scenario Proposed#2 – (SP#2) 90000 TPA (45000 TPA + 45000 TPA) FO based Billet Reheating Furnaces (FO@ 35 Lit/MT product) + 141600 TPA Induction Furnaces along with 44600 TPA Hot Charging Rolling Mill + F.O. Operated 24000 TPA Annealing furnace, 12000 TPA Fish Plate furnace in which only 2000 TPA will required to be heated through FO (@ 30 Litre/Ton of FO requirement) and 35 mg/Nm³ emission rate.

The mitigation measures adopted are:

- The primary & secondary emissions from the Induction furnaces, LRF and continuous casting machine area will be extracted and treated in a fume extraction system.
- Fumes will be evacuated directly from induction furnaces through hoods with swiveling mechanism and ducting and the gases will be led to the bag house by means of ID fan. Clean gases having less than 50mg/Nm³ of dust content will be exhausted through the stack of 33 m height.
- Fugitive dust emissions are likely in the unloading areas, material transfer point, product separation area, valve and flanges, etc. Fugitive emission in the material unloading areas can be avoided by providing dust suppression system. Fugitive emissions will be regularly monitored in the plant area as per CPCB stipulations and record of the same shall be maintained.
- M/s. PIL involves in the secondary metallurgical operation which includes production of rerolled steel product through melting of Billets/Ingots, transporting, storage and consequently generation of solid wastes.
- During the said operation, there will be fugitive dust emission. The fugitive dust emission at different generation and transfer points will be controlled by the use of various dust extraction system.
- Dust suppression shall be carried out with water sprinkler; water sprinkling for transportation vehicles. All internal roads are black topped.
- The company is already planted 1500 trees of different plant species is being already carried out within plant premises. Moreover, additional plantation will also be carried out onset of upcoming rainy season to cover an area 2.589 Hect, in order to developed plantation is around 33.00% within plant premises. Further, additional plantation will also be developed outside the plant on the approach road as well as available community land, available in the nearby community area. These positive steps will be serves as nesting and breeding ground for local avifauna of the area.
- Stacks will be provided with porthole and working platform so that stack monitoring can be done as per norms of statutory authority



Noise Environment:

During the normal operation of manufacturing process noise will be generated due to Induction Furnaces, Reheating Furnace, rolling mill, Air pollution control devices, storage yard, etc. the ambient noise levels are expected to increase significantly with the attributes of the respective equipment, but these noise will be restricted close to the concerned equipment. The preventive measures are given below:

- Provision for insulating caps and aids at the exit of noise source on the machinery,
- The use of damping materials such as thin rubber/lead sheet for wrapping the workplaces like compressors, generators etc,
- Earmuffs / earplugs will be provided to the workers and it will be enforced to use by the workers.

Water Environment:

The proposed project 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.

The various control measures that will be adopted are:

- No pre-treatment of raw water is required. As the water will be used for cooling purpose only.
- No wastewater generation from the process
- Closed circuit cooling system will be implemented.
- Waste water generated through sanitary/toilet activities. This will be treated in septic tank and overflow will be used for plantation purposes or discharge in soak pit.
- All stock piles will be on pucca flooring to prevent for any ground water contamination.

Vehicular Movement

All the major raw materials and finished products will be transported through trucks by road or in case of FO will be transported through tanker.

Biological Environment

There is no ecological sensitive area like national park, sanctuary, biosphere reserve, wetland, forest, etc. within 10 km radial distance from the project site. No rare or endangered flora/fauna were recorded in the study area. Proposed expansion of M/s. Prime Ispat Ltd. will be within the existing plant premises, no tree cutting involved in the project. There will not be any significant increase in pollution load due to proposed expansion project. Moreover, incremental emission of air pollutants is not likely to induce any significant changes in the ecology as the ambient air quality standards will remain within the limits. Thus, the impact on local ecology in surrounding area would be minimum.

In addition to this, about 1500 trees of different plant species is being already carried out within plant premises. Moreover, additional plantation will also be carried out onset of upcoming rainy season to cover an area 2.589 Hect, in order to developed plantation is around 34.99% within plant premises. Further, additional plantation will also be developed outside the plant on the approach road as well as available community land, available in the nearby community area. These positive steps will be serves as nesting and breeding ground for local avifauna of the area.

Socio-economic Impacts:

The land use is not going to be significantly change as the proposed expansion will be carried out within existing plant premises, thus there will be no issue of involvement of any agriculture land or settlement on the contrary there will be positive impact on the socio economic environment of the



area. Increase in direct/indirect job opportunity shall take place. Services in the locality shall be used and accordingly growth in economic structure of the area will take place.

5.0 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed expansion project under the control of Executive Director followed by General Manager. The EMC will be headed by an Environmental Manager having adequate qualification and experience in the field of environmental management. Environmental monitoring of ambient air quality, surface and ground water quality, ambient noise levels, etc. will be carried out through MoEF&CC accredited agencies regularly and reports will be submitted to CECB/MoEF&CC.

6.0 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 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.

7.0 PROJECT BENEFITS

Proposed Social Welfare Arrangement

The proposed 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. M/s. PIL will carry community welfare activities in the following areas:

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

A budget of Rs. 55 Lakh as Capital cost and Rs. 8 Lakh per annum as recurring expenses has been proposed for implementation of Enterprise Social Commitment (ESC) activities in the nearby villages. The company will also comply with its obligation for CSR as per Company's Act too.

In addition to this, the project will be helpful to overcome the demand and supply gap of steel product in the country to some extent. The project will also generate additional revenue for the State government and thereby the Nation. The additional steel availability will boost the infrastructure sector and the overall economic scenario of the country.

8.0 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.

Judicious use of the environmental management plan addressing the components of environment, which will be likely affected by the different operations in the project will be implemented. The capital cost required to implement the EMP for proposed expansion is estimated to be Rs 130 Lakhs. The annual recurring expenses will be Rs. 40 Lakhs has been allocated for implementation of the Environmental Management Plan for proposed expansion project.

9.0 CONCLUSION

As per the assessment of fuel consumption and volumetric emission in the existing facility compared with proposed expansion capacity. It is found that total fuel consumption will get reduced, thus flue gas volume and PM, SO_x, NO_x will get reduced. Thus, proposed expansion is not likely to contribute any additional pollution load, rather the current contribution will get reduced to proportion of reduced emission.

The proposed expansion of M/s. Prime Ispat Ltd. will not lead to any addition of the existing levels of Pollution rather it will be beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater, traffic density, etc. will continued to be controlled better than the permissible norms to avoid impacts on the surrounding environment. Necessary pollution control equipment like bag house, water sprinklers, enclosures, etc., form integral part of the plant infrastructure. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize impacts on the environment and socio-economic environment of the area. Measures like development of green belt and plantation in nearby village and along transport road, adoption of rainwater harvesting/recharging in the plant and in nearby villages will be carried out. The proposed CSR activities to be initiated by the company will be helpful to improve the social, economic and infrastructure availability status of the nearby villages.

Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed expansion project will not add to the pollution level than existing, rather it will be beneficial to the society and will help to reduce the demand-supply gap of steel to some extent and will contribute to the economic development of the region in particular and country in general.

10.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed project of M/s PIL 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 scientist 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 as per QCI-NABET RA – 132nd AC Meeting, dtd. May 30th, 2017.