



EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s. Krishna Iron Strips and Tubes Pvt. Ltd. (hereafter referred as KISTPL) working in steel sector since 1995 and already running the unit with installed 34600 TPA production of Steel Strips, CTD Bar, MS Flat, Steel Tubes, MS Liner Bar, MS Ingot, Hinges, Scaffolding and Galvanizing. Now to expand its business, KISTPL has planned to increase its production capacity from 34600 TPA to 1,20,000 TPA of re-rolled product with its associated facilities at village Sarora in Urla Industrial Growth Centre, Raipur.

This is expansion cum modernization project in which the capacity after expansion will be 120000 TPA Rerolled Steel out of which 108000TPA will be produced through Online hot charging Rolling Mill attached to Induction Furnace and CCM, remaining 12000TPA will be produced through existing conventional rolling mill used to produce MS Pipe and Tubes and thus the ultimate capacity after expansion will be 1,200,000 TPA MS Pipes/Tubes . Produced Pipes or Tube will be further processed in Galvanizing unit to the extent of 34600 TPA, and this Tube and Pipe either in galvanized form or without galvanizing will be further processed in fabrication unit to produce fabricated steel products to the extent of 34600 TPA (as per the existing consent).

The production capacity of Steel Strips, CTD Bar, MS Flat, Steel Tubes, MS Liner Bar, MS Ingot, Hinges, Scaffolding will be increased from 34600 TPA to 1,20,000 TPA. But at the same time the production from existing billet reheating furnaces based re rolling mills is proposed to be reduced from 34600 TPA to 12000 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 09.09.2017 for proposed expansion of existing induction furnace with CCM to produce MS Ingot/Billet. The proposal was considered by the State Expert Appraisal Committee (SEAC) during its meeting held on 12thOctober 2017. The SEAC has suggested standard Terms of References (ToR) for preparation of the EIA Report, vide 677/SEAC, CG/IND/RAIPUR/622 dated 24/11/2017.

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 Krishna Iron Strips and Tubes Pvt. Ltd.



1.1 IDENTIFICATION OF PROJECT

The existing and proposed plant details of M/s. KISTPL are given below:

FACILITY NAME	EXISTING CAPACITY	PROPOSED CAPACITY AFTER EXPANSION
Induction Furnace with CCM to produce MS Ingot/Billet	34600 TPA	120000 TPA
Rolling Mill to Produce MS Rerolled products		120000 TPA*
MS Pipe and Tube Mill		120000 TPA
Galvanizing of pipe and tubes and fabricated items		34600 TPA**
Fabrication Unit		34600 TPA
Emergency DG set	150 KVA(75 X 2 Nos.)	150 kVA

(Note: The proposed project in backward and forwards integration. The facility will generated 120000 TPA Ingot or Billet, by processing of this Rerolled product)

* Out of this 120000 TPA 108000 TPA will be produced through Online hot charging Rolling Mill attached to Induction Furnace and CCM, remaining 12000 TPA will be produced through existing conventional rolling mill used to produce MS Pipe and Tube to the extent of 120000 TPA.

** Produced Pipes or Tube will be further process in Galvanizing unit to the extent of 34600 TPA, and this Tube and Pipe either in galvanized form or without galvanizing will be further processed in fabrication unit to produce fabricated steel products to the extent of 34600 TPA (as per the existing consent).

1.2 LOCATION OF THE PROJECT

Plant is located within Urla Industrial Growth Centre, village Sarora, Raipur District 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 alongwith the proposed management plan to control / mitigate the impacts. Environmental Management Plan is suggested to implement the pollution control in the project.

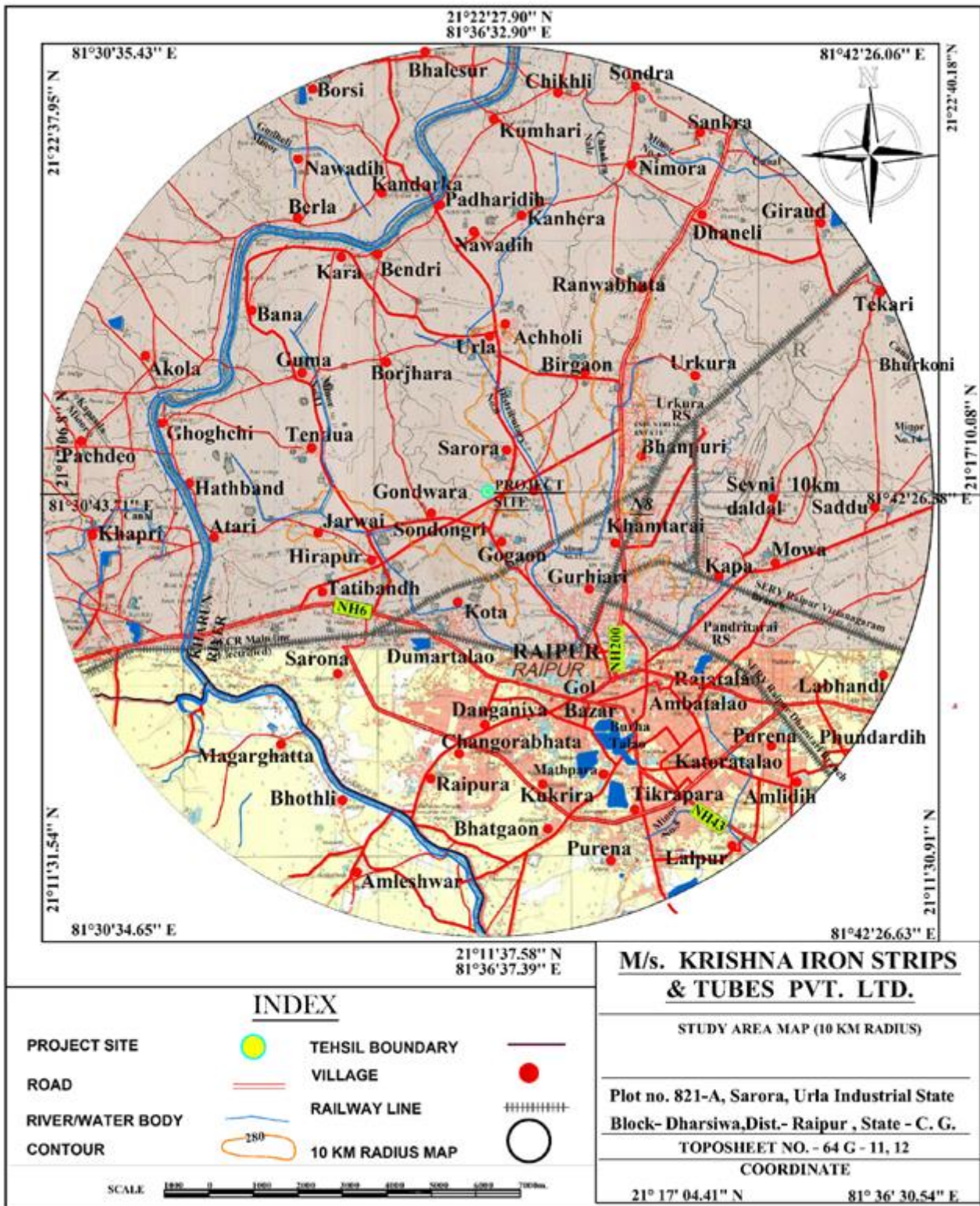


FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)

**TABLE 1
 DETAILS OF ENVIRONMENTAL SETTINGS**

Sr. No.	Particulars	Details
1.	Project Location	Village: Sarora, (Urla Industrial Growth Centre) Tehsil-Raipur , Dist.- Raipur (Chhattisgarh)
2.	Co ordinate	Latitude : 21°17'4.41"N Longitude: 81°36'30.54"E
3.	Toposheet No.	64 G/11 & 64 G/12
4.	Climatic Conditions	Mean annual rainfall is 1252.8 mm Temperature : Pre monsoon 20.6 ^o C (Min.) 41.7 ^o C (Max.) : Winter 13.3 ^o C (Min.) 31.0 ^o C (Max) : Post monsoon 17.3 ^o C (Min.) 31.8 ^o C (Max.) Source: IMD, Raipur
5.	Nearest IMD station	Nearest city - Raipur ~ 3.0 km, SE
6.	Land Form, land Use and Ownership	The land use previously non-industrial barren land which is converted to Industrial use.
7.	Site topography	Project site located at 284 m (MSL) Flat Terrain
8.	Nearest roadway	Raipur - Chandikhol - (NH-200) road 2.85 km, E
9.	Nearest Railway Station	Raipur 3.81 Km, (SE)
10.	Nearest Air Port	Raipur 17.50 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 ~3.0 km, SE
15.	Distance for sea coast	NA
16.	Hills/valleys	NA
17.	Nearest Reserved/ Protected forests	None
18.	Nearest water bodies	Kharun river ~7.0 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 through melting of Sponge Iron and Pig Iron through Induction Furnace is process identified for the proposed unit 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 to superheat up to 1650°C for specific time. If necessary superheating up to 1650°C as done for specific time. After completion of melting cycle of an hour the homogeneous molten mass is poured hydraulically into the ladle.

➤ **Continuous Casting Machine (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 8mtr 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.

➤ **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

- 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 MS Black Pipe and Tube

- Steel Pipes Tubes are manufactured from mild steel strips sliced from Hot Rolled Low Carbon Steel coils The strip passes through a series of drive forming and fin rolls and takes the required circular shape and is welded continuously by passage of an electric current of high frequency across the abutting edges.
- The steel pipes tubes thus formed and welded pass through the sizing sections where dimensional deviations if any are corrected before the tubes are cut into required length by automatic cutting machines. The tubes are then end deburred and pressure tested. Thereafter protective surface finishing operations such as hot dip Galvanizing or varnishing is done as per specific requirement. The tubes are offered as plain, beveled, threaded ends or with flanges.

2.1.4 Steel Galvanizing

Following process involved in galvanizing of steel;

- Pickling/cleaning of MS Pipe or Tube to remove surface oxides and impurities
- Mechanical Scraping of the surface
- Annealing of Pipes if required
- Pre-treatment, cleaning and degreasing by special solvent like sodium hydroxide solution and followed by pickling
- Galvanizing of MS Pipes by immersing of Rerolled product/ Pipe or Tubes in the molten bath of Zinc followed by water quenching
- Inspection of Galvanized
- Dispatch to market

2.2 LAND REQUIREMENT

The proposed expansion project is proposed on the existing land total will be 2.66 Hect.) Land, this land is already acquired through Lease by the CSIDC, having Khasara No. 813, 814, 815, 816, 817, 818, 819, 820, 821A, 827, 828, 829, 830, 831,832, 833, 834, 835A, 838. 839, 840, 841, 842, 843, 844, 845, 846, 847, 848A. Total 33% (i.e. 0.9 Ha.) of land will be covered under Green Belt.Land schedule of the project site is given in **Table 2**.

TABLE 2
LAND FORM OF THE PROJECT SITE

Khasra No/Plot no	Land Schedule	Area In Hectare
813, 814, 815, 816, 817, 818, 819, 820, 821A, 827, 828, 829, 830, 831,832, 833, 834, 835A, 838. 839, 840, 841, 842, 843, 844, 845, 846, 847, 848A	Industrial	2.667



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. 44 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 24835 MT/Yr which includes Mill scale, Miss role-end cuttings, Slag and Coal ash are 2400MT/Year, 3000MT/Year, 17100MT/Year and 2335 MT/yr respectively. Waste oil/used oil and tar generated through the process will be 3 KL/Yr, Tar & Tar Sludge 12 MT/Annum, Zinc Dross 150MT/Annum and Zinc Ash 150MT/Annum. respectively which are classified as hazardous waste.

2.4 WATER REQUIREMENT & SOURCE

The total makeup water requirement for the project will be about 98 KL/day per day (9 KL is estimated for human consumption) which will be supply by CSIDC industrial water supply network

2.5 POWER REQUIREMENT & SUPPLY

Power requirement will be around 14.89 MW which will be source from electricity board (CSEB). An emergency backup having DG set of 150 KVA (75 KVA x 2 Nos.) are already in place

2.6 MANPOWER REQUIREMENT

The project will create employment generation of approximately 54 persons during operation phase in addition to the existing manpower 296. Thus, the total employment generation by the company will be 350 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. 715 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

Predominant Wind Direction	Post monsoon season
Avg. Wind Speed (m/s)	2.28
Temperature (⁰ 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, Sarora, Bhanpuri, Hirapur, Tendua, Sondongri, Kota and Khamtarai 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	62.5 – 145.9
2.	PM _{2.5}	19.4 – 42.9
3.	SO ₂	10.4 – 32.5
4.	NO ₂	15.3 - 30.0
5.	CO	0.173-0.322
6.	Ozone	8.6- 20.0
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 Sarora (Avg. Max.135.5 $\mu\text{g}/\text{m}^3$) and Hirapur(Avg. Max. 145.9 $\mu\text{g}/\text{m}^3$) 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.	Gogaon	57.1	46.4
2.	Khamtarai	52.6	41.3
CPCB Standards dB(A)		55	45
Commercial Area			
3.	Birgaon	62.4	51.6
4.	Barjhara	61.4	49.8
CPCB Standards dB(A)		65	55
Silence Zone			
5.	Gurhiari	48.7	38.5
CPCB Standards dB(A)		50	40
Industrial Area			
6.	Project site	73.8	66.4



Sr. No.	Monitoring Locations	Equivalent Noise Level	
7.	Sarora	70.2	60.5
8.	Gondwara	70.2	59.8
CPCB Standards dB(A)		75	70

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 district is underlain mainly by two distinct geological formations ranging in age from Achaean to recent. The crystalline rocks occupy major parts of the district comprising of granite, granite gneiss, phyllite, and schist. Granites and phyllites intruded by quartz veins form the basement of the basin. The alluvium deposits in the area are mainly confined all along with the flood plains on either side extending 2 km at places. These comprise mostly gravels, coarse to medium sand and silts. It attains a thickness of 10 to 20 m along Kharun and Seonath River.

Lithologically Dharsiwa block is covered by stromatolitic limestone & dolomite with argillaceous intercalations at places/ ferruginous glauconitic arenite & shale.

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 4 groundwater (Borewell) locations in different villages and 2 surface water samples.

A. Groundwater Quality

The analysis results indicate that the pH ranged between 7.65-7.91. The TDS was ranging from 268-321 mg/l. Total hardness was found to be in the range of 69-139 mg/l. The fluoride concentration was found in the range of 0.43-0.63 mg/l. The nitrate and sulphate were found in the range of 13.81-24.22 mg/l and 25.27-65.43 mg/l respectively.

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.65-7.92 which is well within the specified standard of 6.5 to 8.5. pH is a measure of the hydrogen ion concentration of the water. The pH of water indicates whether the water is acid or alkaline. The TDS was observed to be 215-273 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 89-123 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 21.36-25.89 mg/l and 18.50-24.18 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O₂) dissolved in water. Because fish and other aquatic organisms cannot survive without oxygen, DO is one of the most important water quality parameters. The reported value of range of 6.7-7.0 mg/l. Phosphorus (as PO₄) is an important nutrient for plants and algae. Because phosphorus is in short supply in most fresh waters, even a modest increase in phosphorus can cause excessive growth of plants and algae that deplete dissolved oxygen (DO) as they decompose. The COD and BOD was found to be range of 14.0-21.0 mg/l and 2.4-5.4 mg/l respectively. The range of Phosphorus (as PO₄) was found to be 1.0-1.5 mg/l.

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 satisfactory 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

LU/LC Classification System				
S.No.	Level-I	Level-II	Area (Sq.Km ²)	Percentage (%)
1	Built-up land	Settlement	52.63	16.76
		Industrial Settlement	48.94	15.59
		Road Infrastructure	9.54	3.04
		Railway Infrastructure	6.85	2.18
2	Agricultural Land	Cropland	124.88	39.77
		Play Ground	2.43	0.77
4	Scrubs/Wastelands	Barren Land	10.86	3.46
		Land with scrub/Open Scrub	40.96	13.04
5	Waterbodies	River/Nala/Stream	9.88	3.15
		Pond/Tank	2.92	0.93
6	others	Mining/Stone Quarry	1.24	0.39
		Brick Kline area	2.87	0.91
		Total	314.00	100.00

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 4 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 soil 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	34
No of Towns	01
Total households	13020
Total population	64741
Male Population	32989
Female population	31752
SC Population	13425
ST Population	1676
Total literates	40399
Total Illiterates	24342
Total workers	26942
Total main workers	21305
Total marginal workers	5637
Total non-workers	37799

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
33	03	15	02	05	01	01	01	01

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

**TABLE 8
 COMPARATIVELY ANALYSIS OF INFRASTRUCTURE FACILITIES IN THE STUDY AREA**

Yr.	In percentage (%)									
	Educ ation	Drinking water	Road	Power	Recrea tion	Transport ation	Medical	Commu nication	Bank	Drainage
2011	97	100	100	100	9	76	35	91	21	38

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

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

- **House pattern:** Types of housing varied from thatched to pucca (pakka) houses 70% houses were in pucca (pakka) form, 20% in semi pakka and 10% houses were observed in kaccha form
- **Employment:** Main occupation in the study area was agriculture and Labour Work its allied activities eg. Cattle rearing, dairy farming etc. Other income generation sources of the area, small business; private jobs etc. The labours were getting daily wags 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:** The principal crops grown in agricultural farm was Paddy. During discussion with villagers/farmers it was revealed that crop productivity of the study area is good.
- **Migration from other states:** During survey it was found that local population were not migrating for employment purpose, they prefer only local employment
- **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.
- **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 were ground water (hand pumps, tap water and dug wells) and canal. During survey people from some villages in core zone reported shortage of water in summer season
- **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 3-5 km. Colleges and other diploma courses were available at Raipur city.
- **Transportation facility:** For transportation purpose auto, jeep and 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.
- **Road connectivity:** Most of the roads were pucca and the very 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, news papers & post offices were present in the villages

- **Medical facilities:** There were healthcare facilities available in the study area. In some of the villages primary health sub 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 and building found well maintained
- **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 Urla, Birgoan city etc. Raipur city
- **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.

Assessment of fuel consumption and volumetric emission in the existing facility compared with after expansion scenario. It is found that total fuel consumption will get reduced. Subsequently flue gas volume and overall pollution load 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 (EXISTING AND AFTER EXPANSION) SCENARIO

Sr.No.	Facility	Capacity (TPA)	Pollution Load			
			Particulate Matter	SO ₂	NO ₂	Total
						g/s
Existing overall Secnario						
1	Rerolling Mill1	12000	0.025	1.36	0.50	1.885
2	Rerolling Mill2	22600	0.047	2.56	0.95	3.557
3	Induction Furnace	34600	0.054	0.000	0.000	0.054
4	Galvanizing unit	34600	0.042	2.29	0.84	3.172
		Total	0.168	6.21	2.29	8.668
Overall After Expansion Scenario (operated with clean technology Coal based Gasifier)						
1	Rerolling Mill	12000	0.012	0.42	0.42	0.852
2	Induction Furnace	120000	0.09	0.00	0.00	0.09
3	Galvanizing Unit	34600	0.014	1.31	0.48	1.804
		Total	0.116	1.73	0.9	2.746



Sr.No.	Facility	Capacity (TPA)	Pollution Load			
			Particulate Matter	SO ₂	NO ₂	Total
			g/s			
Overall After Expansion Scenario (F.O. based Billet Reheating Furnace)						
1	Rerolling Mill	12000	0.01	0.9	0.33	1.24
2	Induction Furnace	120000	0.09	0	0	0.09
3	Galvanizing Unit	34600	0.014	1.31	0.48	1.804
		Total	0.114	2.21	0.81	3.134

The mitigation measures adopted are:

- The primary & secondary emissions from the Induction furnaces 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 30m 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. KISTPL 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.
- Above 33% green belt will be developed within existing 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.
- 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 from IF's with CCM. Moreover, waste water generated from galvanization unit will be treated in ETP.
- 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. Krishna Iron Strips and Tubes Pvt. 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, 33% greenbelt will be developed 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. KISTPL will carry community welfare activities in the following areas:

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

A budget of Rs. 20 Lakh as Capital cost and Rs. 5 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 65 Lakhs. The annual recurring expenses will be Rs.30Lakhs 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 Krishna Iron Strips and Tubes Pvt. Ltd. will not lead to any addition of the existing levels of Pollution in comparison with the existing baseline condition. Moreover, it will be beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater, traffic density, etc. will continue 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 KISTPL 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.