EXECUTIVE SUMMARY

1.0   INTRODUCTION

M/s. Laxmikripa Steels and Power (P) Ltd. (LKSPL) has proposed production of mild steel billet 200000 TPA and rerolled steel product 190000 TPA at village sondra, Tehsil and District Raipur (CG). The estimated cost of project is Rs. 4775.00 Lakhs.

As per Environmental Impact Assessment Notification dated 14th September, 2006 and subsequent amendment thereof, the proposed project falls under "Category B", Schedule 3 (a) and requires Environmental Clearance (EC) to be obtained from SEIAA – Chhattisgarh.

The online application for prior Environmental Clearance (Form-1) was submitted through MoEF & CC portal for proposed project on 29th Dec. 2015. The proposal was considered by the State Expert Appraisal Committee, Chhattisgarh during its meeting held on 16th February 2016. The SEAC has suggested specific Terms of Reference (ToR) for preparation of the EIA Report, vide Letter No. 91/S.E.A.C.C.G./IND/Raipur/250A dated 13th April, 2016.

Environmental baseline studies were carried out during pre-monsoon season 2016. This EIA report is prepared based on the TOR conditions recommended by SEAC, Chhattisgarh and project related technical details provided by M/s. Laxmikripa Steels and Power (P) ltd. (Now referred as M/s. LKSPL).

The Draft EIA/EMP is prepared as per the TOR issued by SEAC, Chhattisgarh and the report is submitted for public consultation process as per the provisions of EIA Notification 2006 and amendments thereof.

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

1.1   Identification of Project

The Company "Laxmikripa Steel & Power (P) Ltd. (Billet & TMT Division) incorporated under Companies Act 1956 with the object to setup Mini Steel Plant.

The company is proposed to install Induction Furnace and Rerolling mill with following production capacity:

Product	Facility	Capacity
M.S. Billets	Induction Furnace 12 MT X 4 Nos. With CCM	200000 TPA
"Rerolled Steel" Product i.e. round structure and TMT Bars, etc.	Rerolling Mill with online hot charging of semi-finished steel i.e. (M.S. Billet)	190000 TPA

1.2   Location of the Project

The proposed project is located at village Sondra, Tehsil and District Raipur of Chhattisgarh. The project area and 10 km radius study area fall in Toposheet no. F44P11 (old 64 G/11) on scale 1:50000. The unit is situated at Latitude: $21^0 22'21.67''N$ and Longitude: $81^0 38'24.12''E$. 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 pre-monsoon season (summer season) 2016 i.e. **March 2016 to May 2016** 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.
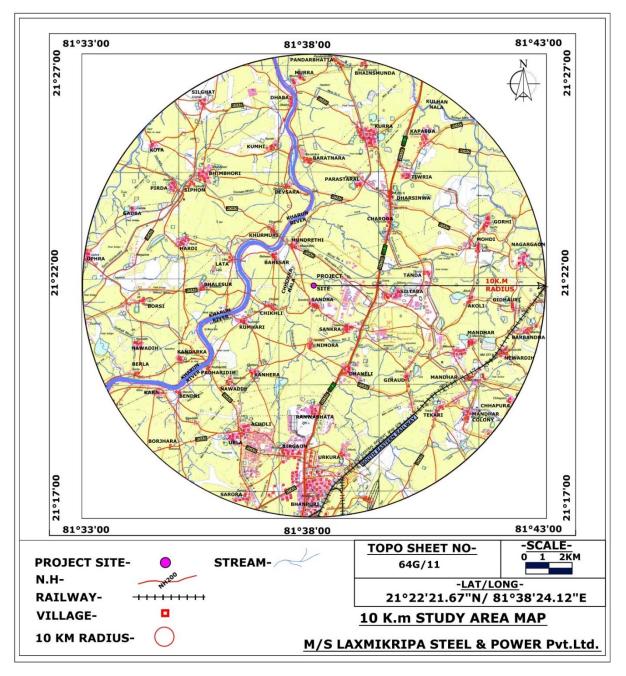

FIGURE 1: STUDY AREA (10 KM RADIAL DISTANCE)

TABLE 1
DETAILS OF ENVIRONMENTAL SETTINGS

Sr. No.	Particulars	Details
1.	Project Location	Village: Sondra Tehsil-Raipur , Dist.- Raipur (Chhattisgarh)
2.	Co ordinate	Latitude: $21^0 22'21.67"$N Longitude: $81^0 38'24.12"$E
3.	Toposheet No.	F44P11 (old 64 G/11)

4.	Climatic Conditions	Mean annual rainfall : 1252.8 mm
		Temperature : Pre monsoon 20.6^0C (Min.) 41.7^0C (Max.)
		                 : Winter 13.3^0C (Min.) 31.0^0C (Max)
		                 : Post monsoon 17.3^0 C (Min.) 31.8^0C (Max.)
		Source: IMD, Raipur

5.	Nearest IMD station	Nearest city - Raipur ~10 km, SE
6.	Land Form, land Use and Ownership	Private Industrial Land
7.	Site topography	Flat Terrain having contour ranging from 260 m to 272 m (MSL) of the 10 km radius of study area Project site located at 271 m MSL
8.	Nearest roadway	NH-200 Raipur-Bilaspur-Talchar (odisha) (2.8 km in East)
9.	Nearest Railway Station	Raipur ~13.0 Km, S
10.	Nearest Air Port	Raipur 23 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 ~10 km, SE
15.	Distance for sea coast	NA
16.	Hills/valleys	NA
17.	Nearest Reserved/ Protected forests	None
18.	Nearest water bodies	Chokhar Nala ~1.15 Km (W) Kharun river ~3.0 Km (W)
19.	Seismic zone	The proposed project site falls under zone-II as per IS 1893 (Part-I): 2002. Hence, seismically, it is a stable zone.

2.0 PROJECT DESCRIPTION

2.1 Manufacturing Process

Steel Melting Shop with CCM

The manufacturing 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, four numbers of 12 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 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 herts 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 1600^0C. If necessary superheating up to 1650^0C as 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 – 15 tons)

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, if required, and de-phosphorisation. 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.

Continuous Casting

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 1050^0C. The case formation in the CCM mould starts with drop in surface temperature below 1520^0C, 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.

Rolling Mill

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,
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.

2.2   Land Requirement

The land requirement for the proposed project is 8.44 Acre (3.42 Hect) located in village Sondra. The land is already acquired by the company. The land schedule and area statement of the project site is given in **Table 2**.

TABLE 2
LAND SCHEDULE OF THE PROJECT SITE

Khasra No	33, 34, 35/1, 35/2, 36/1, 36/2, 36/3, 36/4, 38, 39/1, 39/2, 52/1, 52/3, 52/4, 53 and 54	
Land Schedule	Non cultivable land with thin vegetative cover sparse trees and mainly grasses	
SI. No.	Details	Area (Hectare)
1.	Total Constructed Area	1.48
2.	132 KV Sub-Station	0.1965
3.	32 KV Sub-Station	0.046
4.	Green Belt Area	1.19
5.	Open Area	0.502
	Total	**3.42**

2.3   Raw Materials Requirement, Source & Mode of Transport

The total raw materials requirement for the proposed project is around 248526 TPA which includes Sponge Iron, CI / Pig Iron Heavy Scrap, Ferro Alloys, Pet Coke (CPC), etc. will be sourced from the nearby different approved agencies and will be transported by road through covered trucks to the plant site. It is estimated that approx. 3 trucks/hour required for transportation of raw materials and finished products of the plant.

2.3.1 Solid waste generation

Solid wastes will be generated through process of proposed plant is estimated to be about 31000 MT/Yr. which includes generated Miss-rolls/Mill scale 10000 MT/Year, slag 20000 MT/Year and refractory waste and ling material (1000 MT/Year). There are no other liquid or solid wastes likely to be generated from the proposed plant.

2.4   Water Requirement & Source

The project site is situated near to Kharun River about 3.0 KM, and water table was found to be good. The Central Ground Water Board (CGWB) has categorized this area as 'Safe Zone", therefore preferably borewell 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 85 KL/day will be used for cooling purpose in process, 5 KL/day is estimated for human consumption and remaining 5KL/day will be utilized for misc. purposes including gardening.

2.5   Power Requirement & Supply

Power requirement will be around 23.86 MW which will be drawn from Chhattisgarh State Electricity board (CSEB). To meet out the emergency backup on standby DG set of around 3500 kVA shall be always kept of 3500 KVA, ready in order to have a higher safety level, it is recommended that instead of one DG sets, 2 DG Set each of 1750 kVA may be setup.

2.6   Manpower Requirement

The proposed project will need technically qualified personnel for organizing the production and then several skilled workers for operating the unit and for working in workshop, etc. Around 100 employees (Admin staff -16 and production staff - 84) will be required during operation phase.

Preference will be given to local people, depending upon their qualification and skill. The project is expected to create opportunities for indirect employment to about 200 persons.

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, stores, 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 of the project is estimated as Rs. 4775.00 Lakhs.

3.0   EXISTING ENVIRONMENTAL SCENARIO

3.1   Baseline Environmental Studies

Baseline environmental studies were conducted at proposed 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 pre-monsoon season i.e. **March 2016 to May 2016** in the study area covering 10 km around the proposed project site.

3.2   Meteorology & Ambient Air Quality

Summary of the Meteorological Data Generated At Site (March 2016 to May 2016)

Temperature (°C)	21^0C to 43^0C
Relative Humidity (%)	06 % to 86 %
Predominant Wind Direction (%)	1st NNE (20.95%) 2nd WSW (12.1%)
Avg. Wind speed (m/s)	1.91 m/s
Calm wind %	10.34%

The status of ambient air quality within the study area was monitored for pre monsoon season for the period of Mar 2016 – May 2016 at 8 locations covering project site, Sondra, Nimora, Kanhera, Chikhali, Parastarai, Gorhi and Siltara 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 (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,), Oxides of Nitrogen (NO_X) and carbon monoxide (CO), Ammonia, Ozone,Benzene and BAP were monitored. The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 3**.

TABLE 3
SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Parameters	Range
1.	PM_{10}	41-79
2.	$PM_{2.5}$	15-34
3.	SO_2	8-23
4.	NO_x	9-28
5.	CO	0.147-0.324
6.	Ozone	8-20

Sr. No.	Parameters	Range
7.	HC	ND-0.025
8.	Benzene	ND
9.	BAP	ND

Note: *All values are reported in µg/m³ except CO in mg/m³ and BAP in ng/m³; ND – Not Detectable*

From the above results, it is observed that the ambient air quality with respect to PM_{10}, $PM_{2.5}$, SO_2, NOx and CO at all the monitoring locations 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 CPCB Standards dB(A)		**55**	**45**
1.	Parastarai	54	43
2.	Chikhli	54	42
3.	Charoda	51	40
Range		**51-54**	**40-43**
Commercial Area CPCB Standards dB(A)		**65**	**55**
4.	Nimora	62	54
Range		**62-62**	**54-54**
Silence Zone CPCB Standards dB(A)		**50**	**40**
5.	Gorhi	42	38
Range		**42-42**	**38-38**
Industrial Area CPCB Standards dB(A)		**75**	**70**
6.	Project site	65	51
7.	Sondra	69	65
8.	Siltara	71	65
Range		**69-71**	**51-65**

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

3.4 Surface and Ground Water Resources & Quality

3.4.1 Water Resources

The area as a whole represents a gently slope, drained by a number of North West to North East flowing rivers which debouche into the one major river i.e. Kharun River flows in Western direction of the project site which is about 3.0 km approx. The area as a whole is the basin of Seonath catchment and maximum flow of the water is going towards the Seonath River and again the Seonath confluence into Mahanadi River. The area as a whole is the basin of Mahanadi catchment and maximum flow of the water is going towards the Mahanadi River flows in the eastern direction of the project site and about 48 km approx.

Geologically, the area mainly covered by the rocks of Chandi Formation, Raipur Group of Chhattisgarh Super Group of Meso to Neoproterozoic age. Lithologically the formation comprises of limestone and dolomite: reddish brown, fine to medium grained, hard and compact.

Ground water level during pre- monsoon in shallow aquifer at dugwells are from 5.3 to 8.4m while in deep aquifers at borewells are from 11.8 to 14.1mts. was observed within the study area whereas in post monsoon water level in shallow aquifer at dugwells are from 2.05 to 3.2 mts while deep aquifers at borewells are 3.1 to 4.5 mts in the area. Water table contour observed in the study area is from

250m amsl. As per CGWB, 2013 data, the study area falls in "safe" category of Non-Notified area under groundwater development of 64%.

3.4.2 Water Quality

Groundwater and surface water quality was assessed by identifying 8 groundwater (handpump) locations in different villages and 8 surface water samples.

A. Groundwater Quality

The pH ranging from 7.2 to 7.4, this is well within the specified standard of 6.5 to 8.5. The TDS was ranging from 207 to 292 mg/l. Total hardness was found in the range of 79.30 to 98.94 mg/l. The fluoride concentrations were varied between 0.08 to 0.11 mg/l which is within the acceptable limit of 1 mg/l. The nitrate and sulphate were found in the range of 4.83 to 6.94 mg/l and 14.18 to 21.87 mg/l respectively. Calcium hardness varied between 18.75 to 23.40 mg/l. The heavy metals content (i.e. As, Al, Cd, Cr, Cu, Pb, Fe, Mn, Zn) were found to be within permissible limits

B. Surface Water Quality

The analysis results indicate that the pH ranged between 7.15 to 7.45 which is well within the specified standard of 6.5 to 8.5. The TDS was observed to be 121 to 148 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 34.98 to 57.02 mg/l as $CaCO_3$ which is also within the permissible limit of 600 mg/l. The nitrate was found to be in the range of 1.06 to 1.33 mg/l. The levels of chloride and sulphate were found to be in the range of 34.49 to 43.40 mg/l and 4.81 to 8.81 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

Coliform group of organisms are indicators of faecal contamination in water. Water samples were analysed for total and faecal coliform by membrane filtration technique. Bacteriologically, all surface water samples were contaminated and chlorination or disinfection treatment is needed before use for drinking purpose whereas some of the groundwater samples were found to be non-contaminated faecally. Overall, the surface and groundwater within the study area was found to be good physico-chemically, however surface water was found bacteriologically contaminated and need chlorination before use.

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-1 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 CLASSES AND THEIR COVERAGE WITHIN 10 KM RADIUS

LU/LC classes and their coverage in Sq. Km			
Sr. No.	LU/LC Class	Area (Sq.Km²)	Percentage (%)
1.	**Built up Land Rural/Urban)**		
	Settlement	51.52	16.41
	Industrial Settlement	21.98	7.00
	Road Infrastructure	8.16	2.60

LU/LC classes and their coverage in Sq. Km			
Sr. No.	LU/LC Class	Area (Sq.Km²)	Percentage (%)
	Railway Infrastructure	1.58	0.50
2.	**Agriculture Land**		
	Cropland	186.52	59.40
3.	**Water bodies**		
	River/Nala/Stream	5.92	1.89
	Pond/Tank	3.92	1.25
4.	**Scrub/Waste Land**		
	Land with scrub/Open Scrub	30.29	9.65
5.	**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 8 samples within the study area were collected and analyzed.

From the analysis results of the soil samples, it was observed that the soil was medium fertile and having low productivity. The soil in the study area needs additional fertilizers for improving the fertility status and increase in crop productivity. The concentration levels of heavy metals in the water extract of soil was found to be low with a negligible concentration level of cadmium, chromium, lead, cobalt and selenium. Results also indicate the moderate level of micro-nutrient. The organic matter and organic carbon was found in the range of 3.82-5.16% and 1.64-3.09 % respectively indicating high organic content in the soil. Overall, the soil quality in the area was found to be medium fertile with low productivity.

3.7   Biological Environment

Floral composition in Study Area

Floral characteristics within project site, nearby Siltara Industrial area and surrounding areas including various villages were studied during pre-monsoon season. Details pertaining to flora and fauna in the study area were collected from DFO, Raipur Forest Division, Raipur and verified through field observation and discussion with local villagers by M/s. Anacon team.

Total 86 floral species were observed in the study area. The details about the floral composition are as follows.

Trees: Total 46 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.

Aquatic plant diversity: The aquatic plant species belonging to diverse habits and having distinctive characteristics provide perching grounds for various birds. Total 10 aquatic species were identified in the study area

Flora within the Proposed Project Site (3.42 hectares)

Trees: The proposed project site is non-cultivable land with thin vegetative cover, sparse trees and mainly grasses. The tree species include stunted *Acacia nilotica*, *Butia monosperma* and *Azadirachta indica*.

Shrubs: *Calotropis gigantea* (AakMadar), *Lantana Camera* (Ghaneri)

Herbs: *Parthenium hysterophorus* (Gajar Ghas), *Cassia tora* (Travar), *Tridax procumbens* (Ghamra), *Alternahtera sessilis* (Garundi), *Aerva laneta* (Kapurijadi) and *Elephentopus scaber*.

Vegetation in and around the Siltara Industrial Area

Although, the proposed plant area is not falling under the Siltara Industrial Area, however, the project location is near to the notified industrial area. Hence, the major stress is given to study the composition of vegetation along with faunal attributes in the siltara industrial area. The entire industrial area is partly covered with vegetation. The plantations were observed along the main roadside, periphery of the various companies, private land and nursery.

Trees: The main tree species observed within the industrial area are *Cassia fistula* (Amaltas), *Mangifera indica* (Aam), *Emblica officinalis* (Aawla), *Bauhinia racemosa* (Asta), *Azadirachta indica* (Neem), *Tamarindus indica* (Emali), *Bauhinia variegata* (Katchnar), *Delbergia sissoo* (Sisam), *Syzizium cumini* (Jamun), *Acacia nilotica* (Babul), *Tacoma stans*, *Lucina leaucociphala* (Babul), *Peltophorum pterocapum*, *Samania saman*, *Pongamia pinnata* (Karanj), *Cassia siamea* (Kashid), *Albizzia lebbek*, *Acacia catechu* (Khair), *Phoenix sylvestris* (Khajur Sindi), *Zizyphus xylopyra* (Ghont), *Butea monosperma* (Palash), *Zizyphus mauritiana* (Ber), *Ailanthus excelsa* (Maharukh) and *Asocalongifolia* (Ashok).

Shrubs: *Calotropis gigantea* (Aak Madar), *Lantana Camera* (Ghaneri), *Nerium indicum* (Kanher), *Boganvelia sp.* &*Thevetia peruviana* (Pilli Kaner).

Herbs: *Parthenium hysterophorus* (Gajar Ghas), Xanthium *strumarium* (Gokharu), *Cassia tora* (Travar), *Tridax procumbens* (Ghamra), *Alternahtera sessilis* (Garundi), *Aerva laneta* (Kapurijadi) and *Elephentopus scaber.*

Grasses and Bamboos: *Dendrocalamus stricutus* (Bans), *Eragrostis tenella* (Bhurbhusi) & *Cynodon dactylon* (Durva)

Climbers: *Cuscuta reflexa* (Amarbel) & *Momordica dioica* (Kakad Bel)

Fauna in the Study area:

The majority of land in the study area is under cultivation, followed by industrial settlement. No forest were observed within the study area. The scrubland in the form of a waste patch was much less and therefore possibility of occurrence of any wild mammal in good density was minimum. Apart from the domestic animals, wild animals are confined to the scrub patches belonging to native tree species *Acacia nilotica* and *Butia monosperma*.

Site specific study revealed that very few mammalian species were reported by the locals like Jackal, Monkey, black naped hare and mongooses. Locals also denied the occurrence of other major mammals in study area.

Avifauna:

Birds are the most diverse group amongst the terrestrial higher vertebrates. In the present study, birds were found at all the locations i.e. in the villages, in agricultural fields, at roadside, within plant site/industrial notified area and along the river side and paddy fields.

Reptiles:

Lizards and snakes are the most adaptive groups of reptiles as these are seen living in the very close vicinity of human populations. Lizards are common everywhere, in house, in fields, in wastelands and in wilderness.

Overall faunal enumerations within the study area are:

Mammals: Total 9 wild mammals observed other than domesticated ones from the study area.

Reptiles: Total 6 reptiles were reported within the study area.

Avifauna: Total 46 birds were observed within the study area.

Fauna within the Proposed Project Site (3.42 hectares)
Mammals: *Funambulus pennati*
Reptiles: *Calotes versicolor*, *Hemidactylus domestica*, *Hemidactylus flaviviridis*
Birds: *Corvus splendens* (Common crow) and *Dicrurus adsimilis* (Drongo) sighted during the site visit

Major Fauna observed in Siltara Industrial Area
Mammals: *Funambulus pennati*, *Rattus rattus*, *Herpestes edwardsi*, *Macaca mulata* & *Presbytis entellus*.
Reptiles: *Calotes versicolor*, *Hemidactylus domestica*, *Hemidactylus flaviviridis*, *Ptyas mucosa* & *Naja naja*.
Birds: Though the industrial area is covered with sufficient green belt and plantation, however diversity of birds species was observed to be low, might be due to local disturbances, vehicular movement, devoid of agriculture fields and unavailability of water resources, cluster of industries and aggregation, non avaibility of conducive/aesthetic environment within the industrial area for attraction of birds. The common birds observed in industrial area are *Acrido therestristis* (common myna), *Pycnonotu scafer*, *Dicrurus adsimilis* (Kotwal), *Vanellus indicus* (Red Wattled Lapwing), *Passer domesticus* (sparrow), *Corvus splendens* (Common crow), *Dicrurus adsimilis* (Drongo) and *Centropus sinensis* (Bharadwaj), etc.

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 & village directory 2011. Summary of the socio-economic status of the study area is given in **Table 6.** Details regarding education facilities infrastructure and comparative evaluation (2001 & 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	36
No of Towns	2
Total households	38,985
Total population	1,82,270
Male Population	94,686
Female population	87,584
SC Population	22,590
ST Population	7,416
Total literates	1,19,865
Total Illiterates	62,405
Total workers	65,612
Total main workers	55,246
Total marginal workers	10,366
Total non-workers	1,16,658

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
34	04	23	02	06	05	01	01	01

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

TABLE 8
COMPARATIVELY ANALYSIS OF INFRASTRUCTURE FACILITIES IN THE STUDY AREA (2001 AND 2011)

Year	In percentage (%)							
	education	Drinking water	Road	Power	Transportation	Medical	Communication	Bank/ Society
2001	94	100	99	97	90	34	91	16
2011	97	100	100	100	92	39	94	19

Source: Village directory 2001 and district census handbook 2011, District Raipur, state Chhattisgarh

SALIENT OBSERVATION OF THE SOCIO-ECONOMIC SURVEY

Socio-economic survey was conducted by contacting people in the villages, surpanch and local leaders including NGOs to know the existing status related to the facilities available, infrastructure and amenities along with the quality of life and opinion regarding project. The details are as follows:

House pattern: It is noted that nearly 30% of the house type were pakka and 40% houses were observed in semi pakka and only 30% kaccha form in the study area

Employment: Main occupation in the study area was private job and labour work in the industrial area. The labours were getting daily wages in the range of Rs. 150-250, depending on type of work they get

Fuel: The primary sources of cooking fuel were LPG, cow dung and coal etc. Most of the villagers were coal powder and cow dung mix balls for cooking purpose

Main crops: Most of the study area was under industrial area. Agricultural land was less with lack of irrigation facility. The main crop grown in agricultural farm was paddy. Average crop productivity of paddy was 6-7 quintal per acre, the reason behind the low production was lack of irrigation facility, water problem and poor soil fertility. Agricultural activities provide a limited contribution to village economy.

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. was also seen.

Migration from other states: During survey, it was found that local population was 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. The findings of the survey showed that more than 60% of the households were not having toilet facilities in their houses. Open defecation was observed in most of the villages. There was no proper drainage line in most of the villages, open and kachha drainage pattern which was seen in most of the villages. The overall position of cleanliness and hygienic condition was not satisfactory

Drinking water Facilities: During the survey, diverse sources of drinking water supply were observed in villages. Major source of drinking water in the study area was ground water in the form of hand pumps, tap water and dug wells, etc. During discussion, complains regarding water shortage 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 centres 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. Wholesale markets were available at Siltara, Birgoan city etc. Raipur city is the major hub for all types of facilities for the population in the study area.

Recreation facilities: Television and radio were the main recreation facilities in the study area. News-paper/magazine facilities were also used by villagers

4.0   ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Air Environment

The proposed plant will have impact on the air quality parameters like PM_{10}, $PM_{2.5}$, SO_2, NO_X and CO. The raw material handling plant, IF's, steel melting shops will emit dust and fumes. Apart from the

above, there will be fugitive dust emissions due to transportation, storage and processing of raw materials.

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.
- Adequate capacity dust extraction measures with swivel hood, ID fan shall be provided at different loading, unloading and transfer points in the raw material handling section.
- Fumes will be evacuated directly from induction furnaces through hoods with swiveling mechanism and ducting.
- The duct carrying fumes from Induction furnaces will join in a mixing chamber from where the gases will be led to the bag house by means of ID fan.
- Clean gases having less than 50 mg/Nm^3 of dust content will be exhausted through a common stack of 30 m height.
- Adequate dust suppression system in the form of water sprinklers shall be provided at raw material yard, temporary solid waste dump site and along the vehicular roads.
- There will be dedicated roads for vehicles carrying raw materials and products.
- Adequate plantation will be undertaken all along the plant boundary and along the internal roads. The organization will bring at least 33 % of the total area under green belt.
- 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 various plants, turbines, compressors, crushers, blowers, purging and blow downs, 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.
- Closed circuit cooling system will be implemented in SMS & Rolling mill. Hence there will not be any waste water generation from process and cooling in the steel plant.
- However, Effluents from the SMS are likely to contain suspended solids and oil & grease. These effluents will be routed to settling pits fitted with oil & grease trap. The clarified water will be reused in the plant.
- Waste water generated through sanitary/toilet activities. This will be treated in septic tank followed by 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.

Biological Environment

M/s. LKSPL proposed to install unit near to the Siltara Industrial Area. Major nearby industries are mainly belonging to the primary and secondary metallurgical (ferrous) industries & power generation, etc. Naturally, there will be cumulative pollution load at higher side but on the other side, there will not be any ecological sensitive area like national park, sanctuary, biosphere reserve, wetland, forest, etc. within 15 km radial distance from the project site. No rare or endangered flora/fauna were recorded in the study area. Thus, the impact on local ecology in surrounding area would be minimum.

On the other side, the impact on the surrounding ecology will mainly occur from the deposition of air pollutants arising out from the proposed project. Air pollution affects the biotic and abiotic components of the ecosystem individually and synergistically with other pollutants. Chronic and acute effects on plants and animals may be induced when the concentration of air pollutants exceeds threshold limits.

The incremental emission of air pollutants will not likely to induce any significant changes in the ecology because the ambient air quality standards will remain within the prescribe limits. However deposition of small amount of pollutants specifically dust may also affect the surrounding ecosystem. The project is therefore planned with most efficient air pollution control systems for achieving dust emission within, so that the impact on nearby ecosystem will be minimized. Most of the fugitive dust emission generation points are also fitted with efficient air pollution control systems (Plant dedusting systems). Water sprinkling system will be used at material handling points to suppress the generation of fugitive dust. These measures are adequate to minimize the adverse impact on nearby ecosystem. In addition to this, plantation will be carried out in 1.19 Ha (33%) @ 2000 sapling/ha within plant premises. These positive steps will serve to develop an ecological layout which will provide nesting, breeding ground and perching land for various native birds in the area.

Socio-economic Impacts:

The impact on the land use is not going to be changed much as the present land is non-cultivable, no settlement involved at project site. Therefore, there will not be any adverse impact on the land use of the proposed plant site and its surrounding area. However the establishment of this proposed project will result industrial growth, which in term will generate direct and indirect opportunities of employment and business in the area.

5.0 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed project under the control of G.M. (Plant Head). The Environmental Management Department (EMD) will be headed by an Environmental Officer 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

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. In line with this CSR policy, M/s LKSPL will carry community welfare activities in the following areas:

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

A budget of Rs. 40.0 Lakh as Capital cost and Rs. 25.0 Lakh per annum as recurring expenses has been proposed for implementation of Socio-economic welfare activities in the nearby villages.

In addition to this, the project will 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 is estimated to be Rs.370 Lakhs. The annual recurring expenses will be Rs.60 Lakhs has been allocated for implementation of the Environmental Management Plan for proposed project.

9.0   CONCLUSION

The proposed secondary metallurgical project of M/s. Laxmikripa Steel and Power (P) Ltd. will be partly beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater, traffic density, etc. will have to be controlled within the permissible norms to avoid impacts on the surrounding environment. Necessary pollution control equipment like bag house, water sprinklers, enclosures, etc., will 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 thick green belt and plantation within plant premises and along transport road, adoption of rainwater harvesting in the plant and in nearby villages will be carried out. The proposed CSR activities to be initiated by the company will 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 project 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 LKSPL 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 vide 44th NABET Accreditation Committee Meeting for Re-Accreditation held on Mar 04, 2015 as category A consultant organization in 14 Sectors including Metallurgical Industries projects.