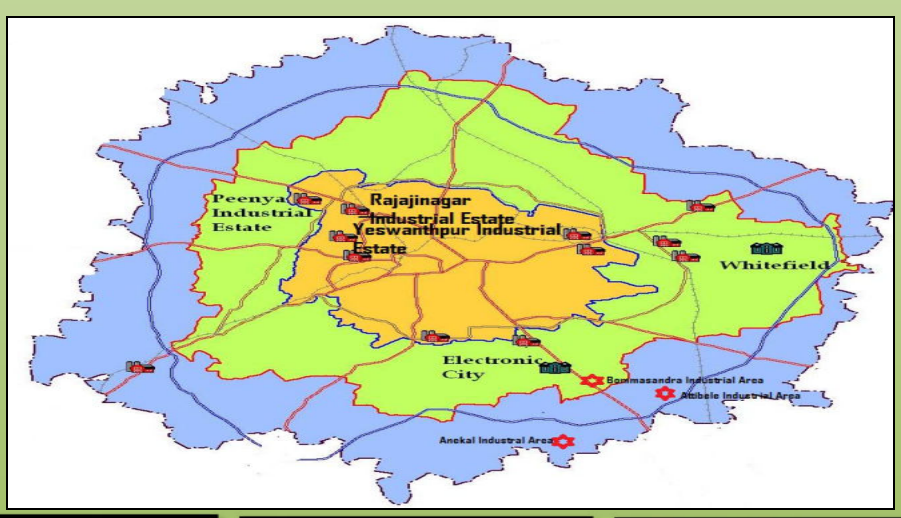
Report on Assessment of Environmental Compliance in Electroplating Units at Bengaluru



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South Zonal Office
Bengaluru-560 079
2014-15

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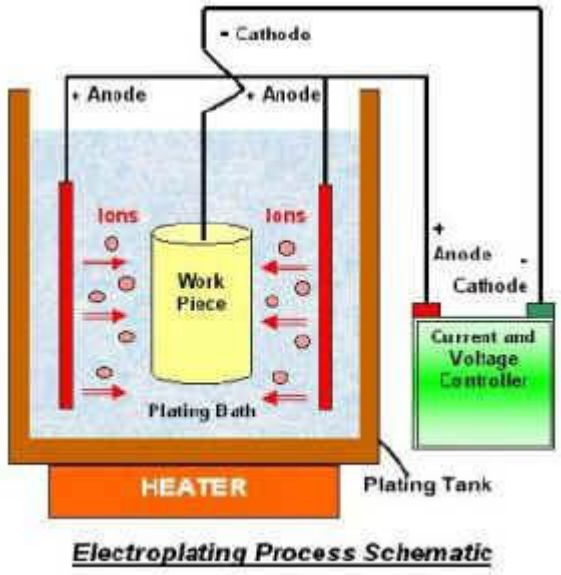
Chapter 1.0
Introduction

1.1 Background

Electroplating is one of the varieties of several techniques of Metal Finishing. It is a technique of deposition of a fine layer of one metal on another through electrolytic process to impart various properties and attributes, such as abrasion & wear resistance, corrosion protection, enhanced surface hardness, lustre, colour, aesthetics, value addition etc.



Electroplating Process Schematic

Electroplating industries are primarily two varieties (i) Primary User and Original Equipment (OE) manufacturer, where electroplating is one of their overall manufacturing activity and (ii) Job work units, who do only plating for a large variety of components for both domestic and export purpose.

Electroplating operations form part of large scale manufacturing plants for e.g. automobile, cycle, engineering and numerous other industries or performed as job-work by small and tiny units. They are spread across the entire country with significant concentration in several states. Electroplating is considered a major polluting industry because it discharges toxic materials and heavy metals through wastewater (effluents), air emissions and solid wastes into the environment.

1.2 Objective and Scope of the Study:

The broad objective is to assess the pollution control measures taken by the Electroplating industries to meet the prescribed standards of SPCB/CPCB. The other specific study objectives are:

- Conducting baseline survey on type of process practised, water consumption, management of process solutions, treatment technologies provided, emission control system provided and management of hazardous wastes generated.
- Identification of major area of concern in the context of environmental management.
- Inventorization of waste generation and its management practises.
- Assessment of status of ambient air quality, surface & ground water quality in the surrounding area where clusters of Electroplating industries are located
- Evaluation of compliance to the existing environmental regulations and norms
- Providing valuable inputs for formulation of environmental management guideline

1.3 Phases of Work

The project is proposed to carry out in two phases in 18 months. The details of the study for Phase I and Phase II are as follows:

Phase **I:** Questionnaire survey in Peenya Industrial area and followed by in-depth monitoring in selected industrial units.

Phase **II:** Questionnaire survey in Bommasandra and other industrial area and followed by in-depth monitoring in selected industrial units.

1.4 Methodology

The list of Electro Plating industries located in Bengaluru was obtained through Karnataka State Pollution Control Board. Identified the units, to obtain preliminary information through questionnaire. Based on the preliminary information provided by the units and in consultation of KSPCB officers 15 units were selected for field visit in Peenya Industrial area, 5 units were

selected in Veersandra industrial area and 5 units were selected in Bommasandra industrial area for detailed monitoring of pollution control measures taken by the units.

The phases of work involved are as follows:

1.5 Questionnaire Design:

A comprehensive questionnaire is designed to collect information from small scale units who are sending their effluent into Common Effluent Treatment Plant and Big scale units who are having their own ETP to treat their effluent. The designed questionnaire to obtain first handed information is enclosed at **Annexure 1 & 2.**

1.6 Questionnaire Survey:

The Questionnaire was sent to industries to obtain preliminary information about the units. The information received from the units were compiled w.r.t type of electroplating, capacity, Chemical used, water consumption Waste water generation for selection of representative units for in depth study.

1.7 In Depth Study:

After obtaining the information through questionnaire, based on the type of electro plating, capacity and pollution control measures, units were selected for in depth monitoring. In depth monitoring was carried out in the presence of KSPCB officers and industry representatives.

Chapter 2.0
Electroplating Industry – An Overview

2.1 Electroplating Industry in India

Electroplating has a long history in India. Like many industrial activities, electroplating industry also gained importance after the Independence. Modern day electroplating started in early sixties in Mumbai with 'dull Nickel', with 'bright Nickel' following soon after. Since then, the industry has grown steadily and currently they are spread across the country with significant attention. Certain states have large number of units concentrated in some towns/cities such as:

i. Andhra Pradesh-Hyderabad
ii. Delhi
iii. Gujarat-Ahmedabad
iv. Haryana-Faridabad
v. Karnataka-Bengaluru
vi. Maharashtra-Mumbai,Pune, Nasik
vii. Punjab-Ludhiana
viii. Tamil Nadu-Chennai, Madurai
ix. Uttar Pradesh-NOIDA

There are thousands of tiny/small job-work electroplating units operating in various parts of the country. These units which are very small in nature are highly polluting and unable to treat the waste generated due to unfavourable economy of the scale. These units carry out crude plating practices thereby generating large quantity of waste.

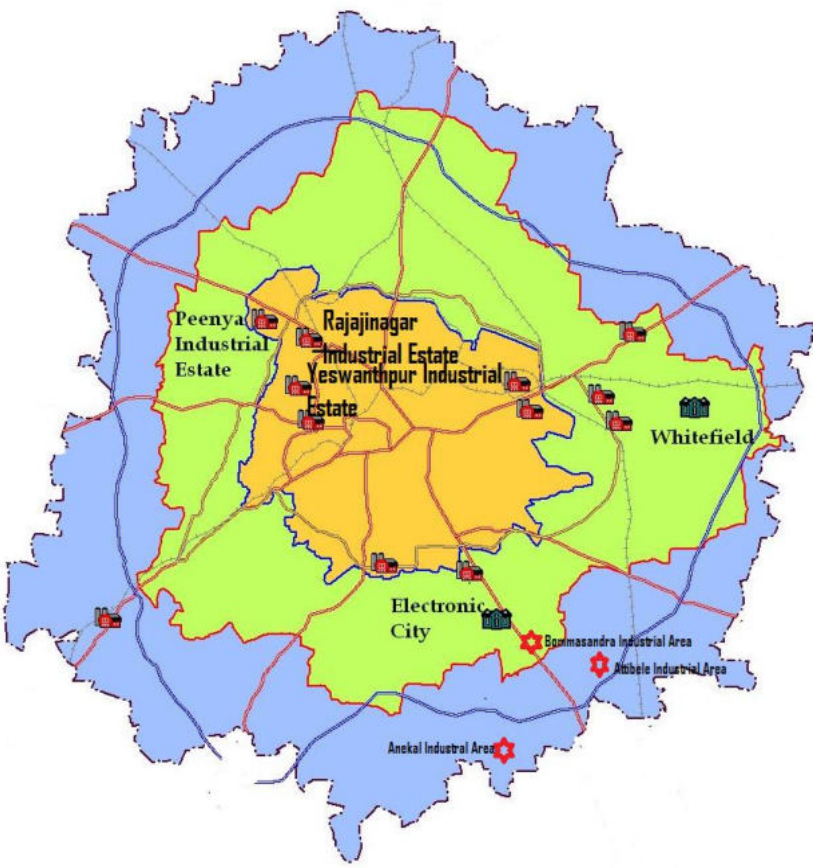
2.2 Electro Plating Industries Scenario in Bengaluru

Bengaluru the capital city of Karnataka occupies and important position not only in the state but also in the country. It is considered as one of the major Industrial, commercial and educational centre in southern India and also as Information Technology and Bio Technology centre. The city has taken dubious distinction of being the fastest growing metropolis in the country.

Though there are no large scale industries in Bengaluru, however there exist a number of small scale industries includes lime kilns, electroplating, battery manufacturing units, textiles mills, dying units etc.. located in some of the earmarked industrial areas in the city.

The electroplating units in Bengaluru is situated in different industrial areas namely Peenya, Rajajinagar, Yeswanthpur the western part of the town & at Koramangala in the south east, at Annekal, Bommasandra, Attibele, Hosur the southern part of the town.

There are around 50-60 electroplating units distributed in each industrial estates.



Map showing different industrial estates at Bengaluru

2.3 Electroplating Process and Chemicals Used

2.3.1 Plating Process:

The basic electroplating system consists of the following:

1. A plating bath filled with water containing a small amount of acid or alkali added to improve its conductivity. Thus baths used for plating are either acid bath or alkaline bath.

   The plating bath is usually contained in metal container lined with acid or alkali resistant membrane. For example: PVC sheet to make it insulated from electric circuit.

2. An anode (positive electrode) - either the plating metal or an inert electrode, this is expended as the process goes on and replenished periodically.

3. A cathode (negative electrode) - the item to be plated, these can be either hung inside the bath or placed in a barrel, which is rotated slowly to make the plating material deposited evenly.

The process involves the application of direct electric current across the bath solution causes the migration of positively charged particles (anions) towards the negative electrode (cathode) and negatively charged particles (cations) towards positive electrodes (anode).

The processes are often exothermic and this leads to elevated bath temperature compared to the ambient temperature. The efficiency of the plating process is influenced by the following:

(i) Concentration of acid and alkali in the solution

(ii) Temperature and

(iii) Voltage applied across the electrodes.

The item to be coated is immersed in the bath solution as the cathode and the coating substance (the anode). However, if an inert electrode is used, the coating substance would be the metal salts in liquid form added to the solution. The metal salts subsequently dissociate into anions and cations, which then deposit onto the items to be plated.

Apart from the bath chemicals and anode material, other chemical agents are used, such as:

- Brightener
- Wetter
- Booster
- Purifier

These chemical agents help to provide desired attributes, such as bright surface finish, improved and even metal deposition, depolarization, faster reaction etc. The chemicals vary according to the process variants and finishing requirements for particular metal plating.

By and large, most metal finishing operations typically involve 3 to 4 principal work steps or process operations, which may occur singly or in combination. These are:

- Surface preparation
- Pre-treatment
- Plating and
- Post-treatment

2.4 Process Details

2.4.1 Surface Preparation/Pre-treatment

The purpose is to prepare and clean the items for plating. The activities involved are as shown in Table 2.1 below:

Table 2.1: Surface Preparation & Pre-treatment

Main Activity	Step	Operation	Function
Surface Preparation	1	Buffing	Smoothening of surface deficiencies by scrapping
Pre-treatment	2	Cleaning	Removal of Oil, grease, dirt, scales from the surface of the items using solvents(often chlorinated hydrocarbons)
	3	Rinsing	Removal of adherent solvent/alkali/acid using water flow

2.4.2 Plating

In the plating process, the items to be plated are placed as the cathode in an electrolytic bath containing metal salts. A Direct Current is passed (at low voltage) through the electrolyte wherein metal ions are plated onto the cathode. The ions in solution are replenished by:

- The dissolution of metal form the anode (the plating substance) or
- Increasing the metal salt concentration of the solution (when using an inert electrode) or bath

After plating, the plated items are rinsed with water. After rinsing the items are dried either normal air drying or hot air drying or in an oven. The operations of plating, transfer from plating

to rinsing tanks (in which bath solution drag-out occurs) and rinsing can either be manual or mechanized (automatic)

2.4.3 Post-treatment

Most Electroplating operations are completed by the plating operation, if the items do not require post-treatment (as in the case of Double Nickel Chrome Plating). The purpose of the post-treatment is:

- To enhance the physical appearance of the item
- To improve the corrosion resistance of the item
- For decorative purposes

There are a varied number of post-treatments:

- Conversion coatings
- Chromating
- Phosphating
- Passivating
- Metal colouring and
- Sealing

Brief descriptions of these are given in the following paragraphs:

(a) **Conversion Coating:** Conversion coating is provided to prevent corrosion and to limit the growth of salts, which may form due to corrosion. Many heavy metals, such as Chromium, Vanadium, Molybdenum and Tungsten in their high valence states have the ability to prevent such corrosion. The most commonly salt such as Potassium di-chromate, called chromate conversion coating or chromating.

(b) **Phosphating:** This is a process of coating a metal surface (usually galvanized iron & steel, aluminium etc.) with a layer of insoluble metal phosphates by treating it with an acidic phosphate containing solution. Zinc, iron and manganese phosphate coatings are common of

which Zinc Phosphate is the most commonly used salt. Phosphating is done as an excellent base for receiving paints, oils and cold-forming lubricants

(c) Sealing: Anodic coatings are usually porous and are sealed and are sealed to improve colour durability and resistance to staining and corrosion. Sealing is done by immersion in hot water during which amorphous alumina surface of the anodic coating is converted to crystalline alpha alumina hydrate, which increases the volume and closes the pores.

(d) Metal Coloring: In this process a colour is formed on the surface of metals. This is quite an old process, which is not much used at present. However, Aluminum coloring in vogue.

2.5 Process Chemicals

A wide variety of chemicals and substances are used, depending upon the surface properties of the objects to be electroplated, plating and finishing requirement as well as the technology/ facility offered by the platers. It is very difficult to provide full detail of all those used; because there are more than one commonly used process for certain metals. Hence a general description will be covered in this section.

2.5.1 Brass Plating

In brass plating, generally a cyanide bath is used, which comprises, $Cu(CN)_2$, NaCN, $Zn(CN)_2$ and Na_2CO_3. The anode is non-consuming conductor.

2.5.2 Bronze Plating

Bronze being a combination of Copper and Tin, the bath salts comprise $Cu(CN)_2$. NaCN, Na SnO_2 and NaOH. Bath is therefore cyanide alkaline. Anode is non-consuming conductor like in brass plating.

2.5.3 Cadmium Plating

Cadmium plating also uses an alkaline cyanide bath comprising bath salts like $Cd(CN)_2$ NaCN, Na_2CO_3 and NaOH.

2.5.4 Chromium Plating

There are variations of Chromium plating – ordinary chrome, hard chrome and bright chrome. Generally, chromic acid bath is used comprising bath salts like H_2CrO_4, H_2SO_4 and NaF. NaF is used to improve the conductivity of the electrolyte.

2.5.5 Copper Plating

Three types of bath are used – (i) Cyanide Copper bath, (ii) Copper pyrophosphate bath and (iii) Acid Copper bath. As the name suggests, the bath in the third is acidic, while the first two are alkaline. Bath constituents for Cyanide Copper bath are: $Cu(CN)_2$, NaCN, $Na_2\ CO_3$ and NaOH. For Copper pyrophosphate, $Cu_2P_2O_7$, NH_4 OH and $K_4P_2O_7$ are used. In acid copper process, a mix of $CuSO_4$ and H_2SO_4 is used.

2.5.6 Gold Plating

Four processes are available – (i) Alkaline Cyanide (using $KAu(CN)_2$, KCN, KOH and K_2CrO_7), (ii) Neutral Gold bath (using $KAu(CN)_2$, KCl and K_2HPO_3), Acid Cyanide (using $KAu(CN)_2$, KCl and Citric Acid). It may be noted that the main constituent in all three processes is Potassium Gold Cyanide. The fourth is Flash Gold process using AuCl3 and HCl.

2.5.7 Nickel Plating

Three process are commonly used – (i) Watts Nickel bath (using a mix of $NiSO_4$, $NiCl_2$, H_2SO_4 and H_3BO_3), (ii) Nickel Sulphamate Bath (using $Ni(NH_2SO_3)_2$, HNH_2SO_3), (iii)Wood's Nickel Bath (using$NiCl_2$ and HCl). None of the processes use Cyanide.

2.5.8 Palladium

Being a precious metal, usage is somewhat restricted. Only one process using acid bath is commonly used. Bath constituents are: $PdCl_2$, NH_4Cl and HCl. Sometimes Palladium-Nickel plating is used in which Palladium and Nickel is deposited in one bath. In this process, bath constituents are: $Pd(NH_3)_2(NO_2)_2$, Nickel Sulphamate and NH_4OH.

2.5.9 Platinum

Two processes are available: (i) Alkaline Platinum and (ii) Acid Platinum. In alkaline bath constituents are, H_2PtCl_6, $(NH_4)_3$ PO_4 and NH_4OH. In acid Platinum, bath constituents are: $H_2Pt(NO_2)_2$ SO_4 and H_2SO_4.

2.5.10 Rhodium

Only one process using acid bath comprising Rhodium Sulphate and Sulphuric acid is used.

2.5.11 Silver

Two processes are available, both using Silver Cyanide. Silver Cyanide bath comprises $KAg(CN)_2$, KCN and K_2CO_3. Acid bath uses $KAg(CN)_2$, Na_2HPO_4 and H_3PO_4.

2.5.12 Tin

There are three processes - (i) Alkaline, (ii) Acidic and (iii) Fluoroborate. In alkaline Tin process, principal chemical used are Sodium Stannate and Caustic Soda; Tin Sulphate uses Stannous Sulphate and Sulphuric Acid. In Tin Fluoroborate process, Chemicals used are: $Sn(BF4)_2$, HBF_4, H_3BO_3 and HF.

2.5.13 Zinc

There are three processes available (i) Acid Cyanide, (ii) Alkaline Cyanide and (iii) Alkaline Cyanide Free. Acid Cyanide uses a bath comprising $ZnCl_2$, KCl, NH_4Cl and H_3BO_3. In Alkaline Cyanide, bath constituents are: ZnCN, NaCN, NaOH and Na_2CO_3. In the Alkaline Cyanide Free (ACF) process, bath chemicals are rather simpler, ZnO and NaOH. The latter is gaining popularity as a Cyanide free process.

2.5.14 Anodising

Anodising is mainly used as a pre-cleaning operation but sometimes used as a metal finishing operation. In anodising, the object is made Anode, so that impurities and other metals are removed. Sulphuric acid is mainly used as electrolyte in
the bath.

2.5.15 Phosphating

Phosphating is carried out mostly as post treatment of plating. However, it is often used as undercoat to receive paint on metal. .Bath constituents are Zinc-Calcium Phosphate and Na_3PO_4.

2.5.16 Chromating

This is also a post treatment to plating. Bath constituents are Na2CrO4 and Na2CO3.

2.5.17 Etching

This is used as a pre-treatment to plating and generally uses acidic bath –Ferric Chloride etchant (Ferric Chloride and HCl), Acid etchant (mix of $CuCl_2$, HCl and H_2O_2). In Ammoniacal etchant, a mix of Ammonium Chloride, Ammonium Hydroxide and Sodium Hypochlorite) is used.

2.6 Pollution potential

In comparison with other industries, the electroplating industry is considered as major polluting industry because the waste water (effluents) is highly toxic in nature which contains metals such as chromium, highly dangerous cyanide etc.

All metal finishing processes tend to create pollution problems and to generate wastes to varying degrees. Of particular importance are those processes that use highly toxic or carcinogenic ingredients that are difficult to be destroyed or stabilized and disposed of in an environmentally sound manner. Some of those processes are:

- Cyanide based plating, especially zinc, copper, brass, bronze and silver plating.
- Chromium plating and conversion coatings based hexavalent chromium compounds
- Cadmium plating
- Lead and lead-tin plating

2.7 Regulatory Overview

The electroplating industry is regulated under the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981 and the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008. The effluent from

electroplating industry has to be compiled with the new norms notified under Sr.no 9, schedule 1, of the E(P)Act, 1986 which includes additional parameters of Aluminium, Tin, Silver, Fluorides, Phosphates, Sulphides, Sulphates, Trichloroethane, Trichloroethylene and air emission standards in work zone area. Solid waste generated from the industry is required to be disposed off as per the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.

In order to assess Environmental Compliance status of electroplating units at Bengaluru the Central Pollution Control Board South Zonal Office Bengaluru has taken up the project on "Assessment of Environmental Compliance Status of Electroplating units at Bengaluru" since Bengaluru is the city having large number of electroplating units concentrated in different industrial areas.

Chapter 3.0
Questionnaire Survey and In-Depth Study at Various Industrial Areas, Bengaluru

3.1 Study carried out at Peenya Industrial Area

The Peenya Industrial Complex is the biggest and one of the oldest industrial estates in the South East Asia, located in the northern part of Bangalore which is spread over an area of about 40 sq.kms, housing about 5000 small-scale industries and a few large and medium scale industries.

There are around 56 registered electroplating units distributed in different phases of Peenya industrial estates. With the help of KSPCB officials 15 electroplating units were monitored at the first phase of the study. The details of the industries are as follows:

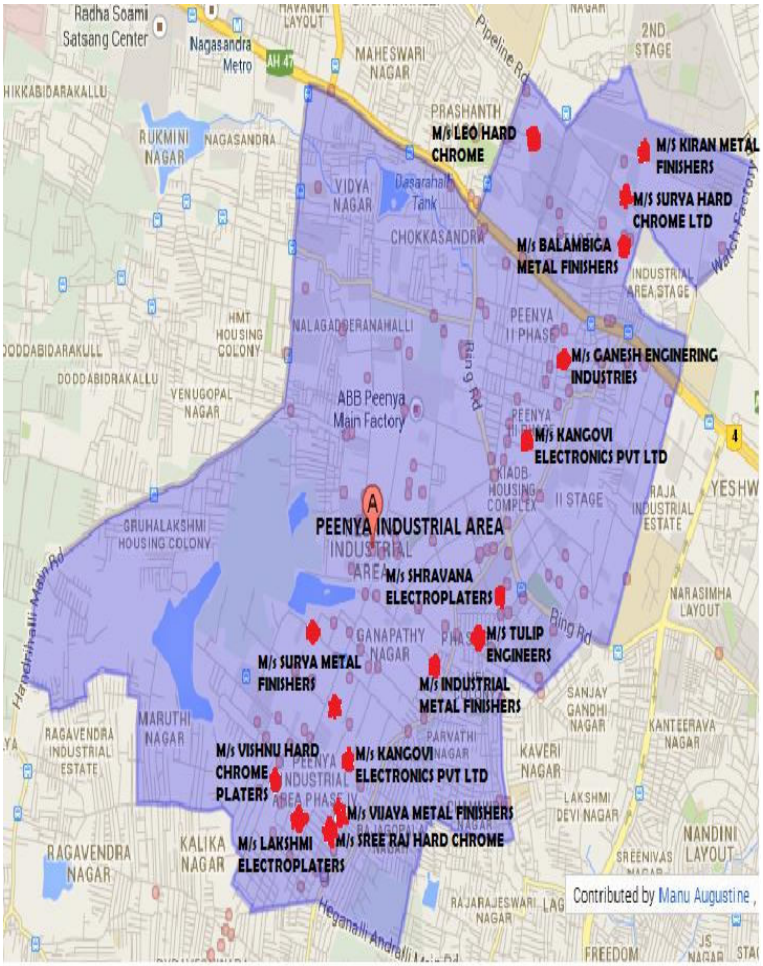


Fig: Map showing the Peenya Industrial Area and monitoring locations

3.2 Preliminary data obtained through Questionnaire

This office has prepared questionnaire to obtain preliminary information about the units. However, out of 47 units only 19 units are provided the information. Detailed field investigations were conducted in 14 industries after obtaining preliminary data from the Electroplating industries. The Compiled information of 19 units which are submitted the filled questionnaires are given in the Annexure **3**.

3.3 General Observations made during field study at Peenya Industrial Area:

1. Presently 56 electroplating industries located in Peenya Industrial area. Out of 19 industries, around four industries were reported closed and other industries were engaged in hard chrome/chrome plating and zinc plating, few units are engaged in copper, tin and nickel plating.

2. All units are engaged in job works to industries viz, Wipro, Mico (BOSCH), ABB, etc.,

3. No proper records are maintained about their production, procurement of different chemicals used in their process.

4. No proper record is maintained about water consumption

5. Out of 15 units only 2 units are having their own ETP and other units are sending their effluent into CETP without any pre-treatment.

6. In the absence of production record and water consumption, estimation of waste water generated by individual unit is not possible, hence the waste water details are recorded based on the figure given by representatives of industry.

7. Discharge of effluent into drains may not be ruled out.

8. Housekeeping and waste water collection found very poor.

9. No proper hoods cum suctions and scrubber are provided to capture fugitive emissions from process and to treat before discharging into atmosphere.

10. No proper monitoring arrangements are made to monitor the source emission to verify the compliance of emission standards.

3.4 Details of electroplating Industries Studied in Peenya

3.4.1 M/s Tulip Engineers, Bengaluru

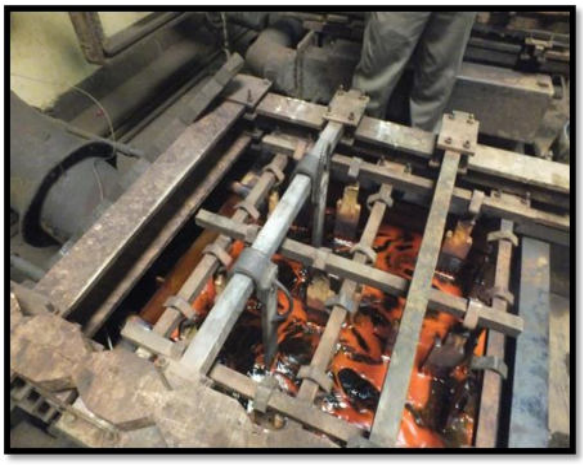
General Information:

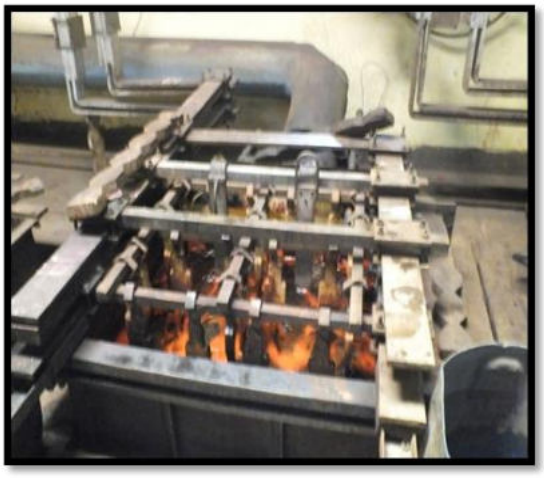
Address of the Industry	:	M/s Tulip Emgineers #249, 3rd cross, 8th main, 3rd phase Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Hard Chrome Electroplating
Working days in a year	:	302
Consented production capacity	:	Not mentioned
Water consumption	:	0.6m^3/day
Waste water generation	:	0.3m^3/day
Solid waste/Hazardous waste generation	:	Used oil: 5.0 litres/annum Plating sludge: 20kgs /annum
Pollution control measures exist to control source emission/fugitive emission	:	The unit has hood system connected to water scrubber to control source emission/fugitive emission

Specific Observation of the unit:

(i) M/s Tulip Engineers, Bengaluru is hard chrome electroplating unit having five baths. The unit is doing job works for Wipro, Tafe access, Precision hydraulics of Chennai.

(ii) The Effluent generated from this unit is approximately 300lt/day which is collected in effluent collection tank and once in fifteen days the effluent is sent to Eco-green CETP through tankers.





Plating bath

Effluent Collection Tank

(iii) The unit informed that they are purchasing the water from outside.

(iv) No proper records are maintained regarding production, water consumption and waste water generated. The electroplating process is carried out by unskilled and untrained workers.

(v) Housekeeping in process as well at effluent collection place was found very poor. Discharge of raw effluent into storm water drain or into sewage drain is not ruled out.

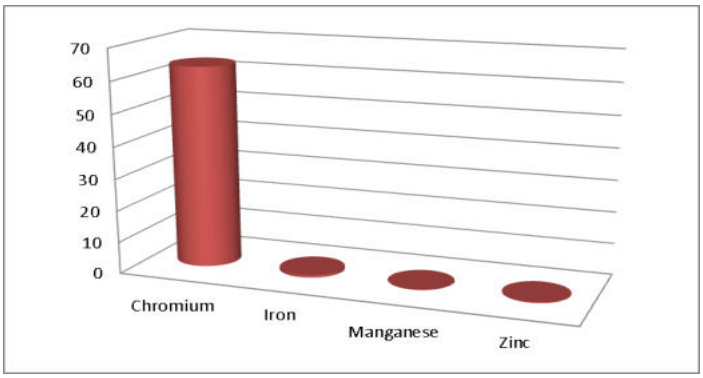
(vi) Hoods and suction pipe provided to capture fugitive emissions in the process area was found inadequate, the unit has water scrubber followed by chimney. The condition of scrubber indicates the poor operation, no proper arrangement or indicator is provided in the scrubber to change or refill of water for efficient operation of scrubber.

(vii) No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

Chimney connected to hood system with water scrubber

(viii)The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	BDL
2.	Cadmium	BDL
3.	Chromium	63.3
4.	Iron	0.759
5.	Manganese	0.031
6.	Nickel	BDL
7.	Lead	BDL
8.	Zinc	0.25
9.	Cobalt	BDL



3.4.2 M/s Sharvana Electroplaters

(i) M/s Shravana Electroplaters is the copper and stainless steel electroplating unit doing job works for local bodies.
(ii) During monitoring the unit was not in operation and informed that the electro plating process was stopped since one month.
(iii) The unit informed that they are doing job work to local customers and no records of production maintained.
(iv) It is informed that during production the effluent generated (200 litre/month) being collected underground tank and the same being sent to CETP.

Plating bath

Storage of chemicals

Waste water stored in plastic container

(v) From the photograph it is under stood that the unit is not serious about environmental compliance and no measures are taken and practising electroplating in unscientific way.

3.4.3 M/s Industrial Metal finishers

General Information:

Address of the Industry	:	M/s Industrial Metal Finishers No. 118, III Phase, Peenya Industrial Area,Bengaluru-560058
Type of Electroplating	:	Zinc, Nickel, Tin and Copper electroplating on Hardware & Automobile components
Working days in a year	:	Not Provided
Consented production capacity	:	43000 square feet per month
Water consumption	:	Not provided
Waste water generation	:	0.63 m^3/day
Solid waste/Hazardous waste generation	:	MSW: 25kg/month
Pollution control measures exist to control source emission/fugitive emission	:	The unit has hood system connected to water scrubber to control source emission/fugitive emission

Specific Observation of the unit:

(i) M/s Industrial Metal Finishers is engaged in Zinc, Nickel, Tin and copper electroplating job works for Bosch, Mico, L&T, ABB etc.,. They unit ia having 13 baths.

Plating bath at M/s Industrial Metal Finishers

(ii) It is informed that they are gnerating effluent in the tune of 630lts/day which is collected in under ground collection tanks and and sent to Eco-Green CETP.

(iii) No records are maintained regarding raw material, chemical procured, production, water consumption to cross verify the gneration of effluent claimed by the unit.

Effluent Collection Tank

Chimney with water scrubbing system

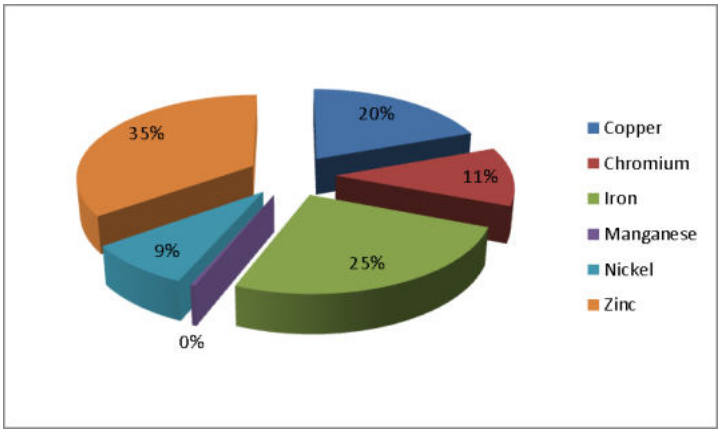
(iii) The unit has provided hoods, suction pipe followed by scruuber and chimeny as air pollution control device to control fugitive emissions generated in the process area.

(iv) During monitoring it was observed that fumes from bath found escaping due to inadequate hood and suction pump which results in eye irritation in the process area.

(v) No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

(vi) The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	19.3
2.	Cadmium	BDL
3.	Chromium	11.3
4.	Iron	25.10
5.	Manganese	0.37
6.	Nickel	8.49
7.	Lead	BDL
8.	Zinc	34.7
9.	Cobalt	BDL



3.4.4 M/s Leo Hard Chrome Services

General Information:

Address of the Industry	:	M/s Leo Hard Chrome Services Shed No B-73, I stage, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Hard Chrome Electroplating
Working days in a year	:	Not Provided
Consented production capacity	:	20,000 Sq. cm/day
Water consumption	:	Not provided
Waste water generation	:	50 lts/day as per consent
Solid waste/Hazardous waste generation	:	Ferrous metal scrap: 250kg/month MSW: 10kg/month
Pollution control measures exist to control source emission/fugitive emission	:	The unit is provided three chimneys attached to Chrome plating bath and water scrubber is provided as pollution control device for source emission/fugitive emission control

Specific Observation of the unit:

(i) M/s Leo hard Chrome is the hard chrome electroplating unit doing job works for Precesion Engg and accessories. The unit is having three baths out of which two are for plating and one for etching.

(ii) It is informed that they generating the effluent in the tune of 50 lts/day. Effluent was collected and sent to Eco-Green CETP.

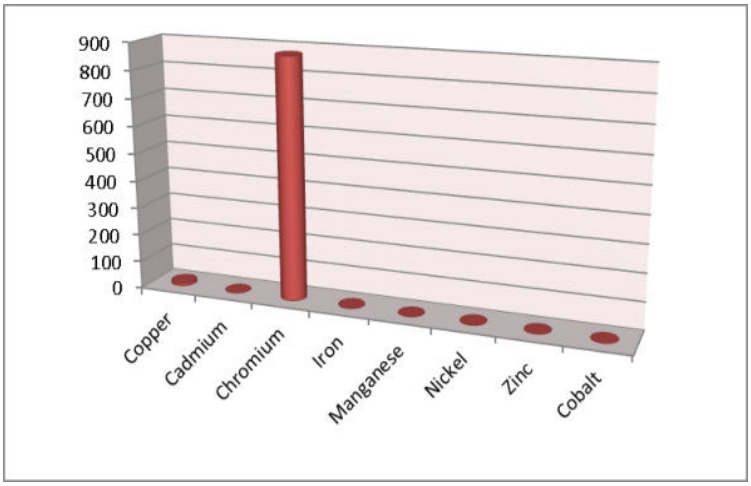
(iii) It is observed that fumes from bath found escaping due to inadequate hood and suction pump which results in eye irritation in the process area.

(iv) No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

(v) Very poor housekeeping was observed.

(vi) The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	10.9
2.	Cadmium	0.066
3.	Chromium	876
4.	Iron	2.39
5.	Manganese	0.305
6.	Nickel	1.72
7.	Lead	BDL
8.	Zinc	0.71
9.	Cobalt	0.394



3.4.5 M/s Kiran Metal Finishers

General Information:

Address of the Industry	:	M/s Kiran Metal Finishers A-370/2, I stage, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Zinc and Nickel Plating
Working days in a year	:	300
Consented production capacity	:	Zinc Plating-150000 to 250000 Sqft/month Nickel Plating-100000 Sqft/month
Water consumption	:	0.52m3/day
Waste water generation	:	0.06m3/day
Solid waste/Hazardous waste generation	:	Chemical Containers: 300 Nos/month
Pollution control measures exist to control source emission/fugitive emission	:	Picking and plating bath attached to common chimney of 3m ARL with scrubber

(i) M/s Kiran Metal Finishers is Zinc and Nickel electroplating unit doing job works for local bodies. The raw materials used in the plating process are HCL, Zinc passivator, Nickel Sulphate, Zinc Brightener and Degreasing

(ii) It was informed by the unit that the effluent generated is approximately 60lts/day which is collected in effluent collection tank and sent to Eco-Green CETP.

Effluent collection tank

(iii) During monitoring it is observed that fumes from bath found escaping due to inadequate hood and suction pump which results in eye irritation in the process area.

(iv) No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

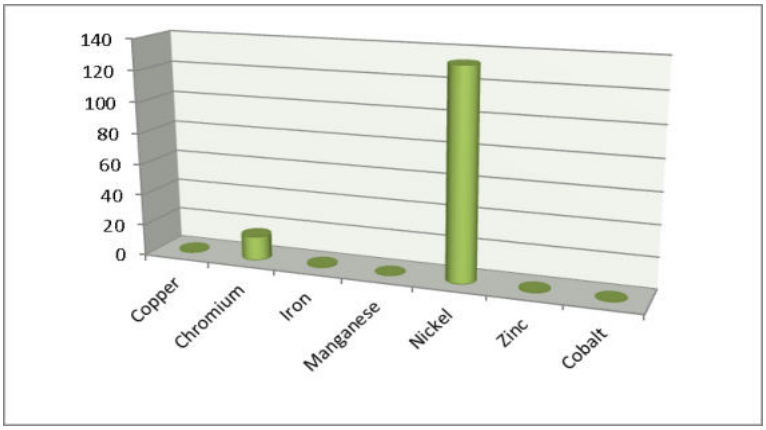
(v) No proper effluent storage tank is provided by the unit.

(vi) No records are maintained regarding raw material, chemical procured, production, water consumption to cross verify the gneration of effluent claimed by the unit.

(vii) The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	0.944
2.	Cadmium	BDL
3.	Chromium	15.6
4.	Iron	1.017
5.	Manganese	0.186

6.	Nickel	133
7.	Lead	BDL
8.	Zinc	0.5
9.	Cobalt	0.079



3.4.6 M/s Balambiga Metal Finishers

General information:

Address of the Industry	:	M/s Balambiga Metal Finishers C-435, I stage, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Zinc plating, Elrctroless Nickel Plating, Blackening and phosphating
Working days in a year	:	302
Consented production capacity	:	180000 Sq.ft/month
Water consumption	:	3.1m3/day
Waste water generation	:	1.5m3/day
Solid waste/Hazardous waste generation	:	MSW: 25Kg/month
Pollution control measures exist to control source emission/fugitive emission	:	Picking and plating bath attached to common chimney of 3m ARL with scrubber

Specific observations:

(i) M/s Balambiga Metal Finishers is Zinc, Electroless Nickel plating & phosphating unit doing job works. The raw materials used in plating process are Zinc salt, Electroless Nickel chemical, Blackening & phosphating salt, HCL, H_2SO_4,HNO_3, Caustic Soda, K_2SO_4.

(ii) It was informed by the unit that the effluent generated is approximately 1500lts/day. Effluent is collected and sent to Green Enviro Systems.

(iii)During the time of monitoring it was observed that the unit is operating with inadequate space.

(iv)The unit has provided hoods, suction pipe followed by scruuber and chimeny as air pollution control device to control fugitive emissions generated in the process area.

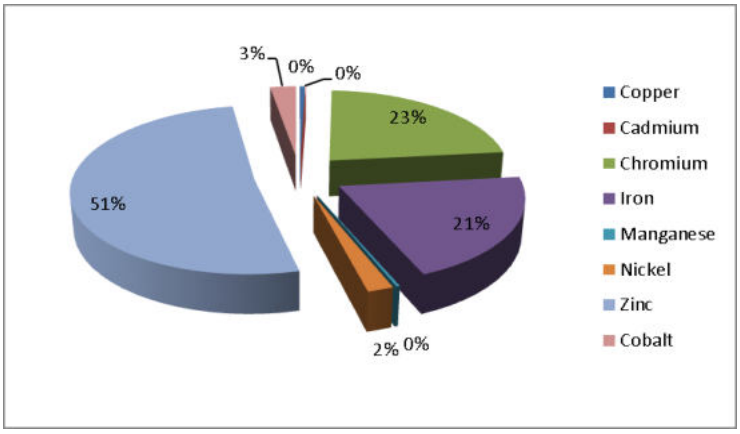
(v)) No proper effluent storage tank is provided by the unit.

(v (vi) No sufficient storage area for storage of chemicals.

(vii) The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

Effluent Collection Tank

S.No	Parameters	Results (mg/L)
1.	Copper	2.64
2.	Cadmium	0.302
3.	Chromium	123
4.	Iron	111
5.	Manganese	1.48
6.	Nickel	10.9
7.	Lead	BDL
8.	Zinc	278
9.	Cobalt	14.2



3.4.7 M/s Surya Hard Chrome Pvt. Ltd.

General Information:

Address of the Industry	:	M/s Surya Hard Chrome P.Ltd S-10, I stage,9th cross, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Hard Chrome Plating
Working days in a year	:	299
Consented production capacity	:	Not mentioned
Water consumption	:	0.5 m3/day
Waste water generation	:	0.25 m3/day
Solid waste/Hazardous waste generation	:	NA
Pollution control measures exist to control source emission/fugitive emission	:	Chrome bath attached to common chimney of 3m ARL with scrubber

Specific observations:

(i) M/s Surya Hard Chrome is the hard chrome electroplating unit doing job works for Wipro. They have three chrome baths.

(ii) It was informed by the unit that the effluent generated is approximately 250lts/day which is collected in effluent collection tank and to Green Enviro Systems CETP.

(iii) During the day of monitoring it was observed that the unit operating with poor infrastructural facilities and inadequate space.

(iv) The unit has provided hoods, suction pipe followed by scruuber and chimeny as air pollution control device to control fugitive emissions generated in the process area

Effluent Collection Tank

Fume extraction system connected to chimney

3.4.8 M/s Kongovi Electronics Pvt. Ltd.

General Information:

Address of the Industry	:	M/s Kangovi Electronics Pvt. Ltd No 30/C, II phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Nickel and Chromium Plating on Plastics
Working days in a year	:	301
Consented production capacity	:	6760 Lakhs DM^2 microns
Water consumption	:	33 m^3/day
Waste water generation	:	29 m^3/day
Solid waste/Hazardous waste generation	:	ETP Sludge: 2250 Kg/month
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Kongovi Electronics is the Nickel and Chromium electroplating unit doing job works for Hyundai, Toyota, Ford etc. The plating is done for plastic materials.

- The unit is operated fully automatically.


- The effluent genertaed is approximately 23000lts/day. Effluent is collected and treated in their own individual effluent treatment plant.

- The unit is having ETP facility in their premises with a treatment capacity of 29KLD. The ETP consits of Effluent collection tank, neutralization tank, precitipitation is also done inorder to recover chromium in the form of chromic acid and followed by filter press.
- It is informed that the treated effluent being utilised for gardenting in their premises.


- The sludge generated is sent to TSDF at Dodaballapur.


Effluent treatment plant

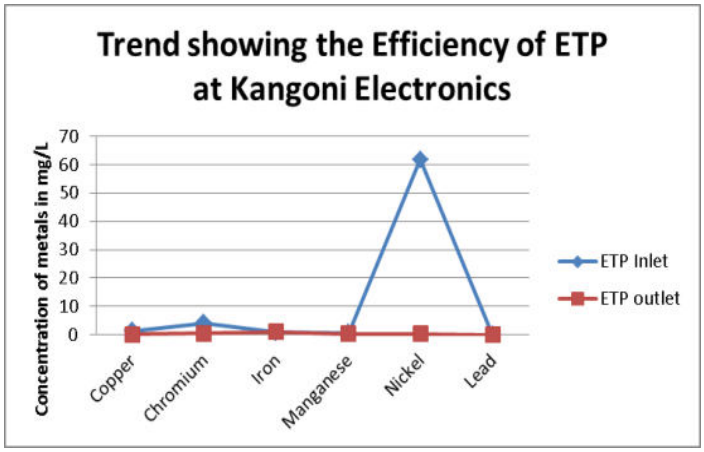
Hood system connected to chimney

Recovered chromic acid

- The unit has provided hoods, suction pipe followed by scruuber and chimeny as air pollution control device to control fugitive emissions generated in the process area which was found to be adequate since no eye irritation and any nuisnace was observed.

- The sample was collected from Effluent collection tank and outlet of filter press to assess the efficiency of the ETP and compliance status for general parameters and heavy metals, the analysis results are as follows:

S.No	Parameters	Effluent collection tank (mg/L)	ETP outlet Results (mg/L)
1.	Copper	1.42	0.088
2.	Cadmium	BDL	BDL
3.	Chromium	4.06	0.454
4.	Iron	0.912	0.943
5.	Manganese	0.726	0.292
6.	Nickel	61.8	0.283
7.	Lead	0.055	0.034
8.	Zinc	BDL	BDL
9.	Cobalt	BDL	BDL



3.4.9 M/s Ganesh Engineerinng Industries

General Information:

Address of the Industry	:	M/s Ganesh Engineering Industries 17i, 1C main road II phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Hard Chrome

Working days in a year	:	300
Consented production capacity	:	On Job work basis
Water consumption	:	0.3 m3/day
Waste water generation	:	0.1 m3/day
Solid waste/Hazardous waste generation	:	Grinding mud & cotton waste
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths and etching tanks attached to common chimney with water scrubber

Specific observations:

- M/s Ganesh Engineering Industries is hard chrome electroplating unit doing job work for BEML, L&T, etc.

- It was informed by the unit that the effluent generated is approximately 3500lts/month which is collected in effluent collection tank and sent to Lidkar Tanners Enviro Control System Ltd.

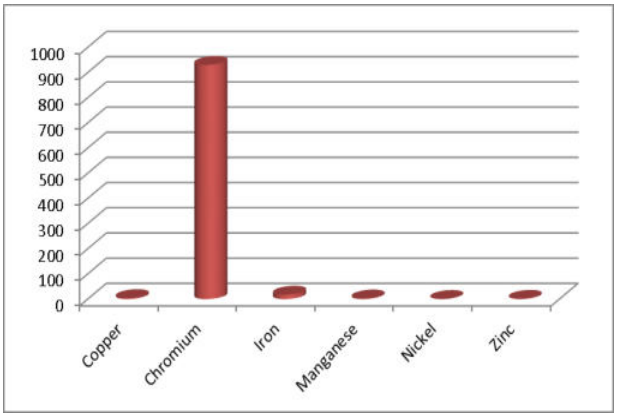
- The unit has provided hoods, suction pipe followed by scruuber and chimney as air pollution control device to control fugitive emissions generated in the process area.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

- No proper effluent storage tank is provided by the unit.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	*Parameters*	*Results (mg/L)*
1.	Copper	3.84
2.	Cadmium	BDL
3.	Chromium	930
4.	Iron	17.5
5.	Manganese	2.28
6.	Nickel	0.46
7.	Lead	BDL
8.	Zinc	1.08
9.	Cobalt	BDL



3.4.10 M/s Kongovi Electronics Pvt. Ltd.

General Information:

Address of the Industry	:	M/s Kangovi Electronics Pvt. Ltd No 377, IV phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Nickel and Chromium Plating on Plastics
Working days in a year	:	301
Consented production capacity	:	16000Sq.mt/month
Water consumption	:	15 m3/day
Waste water generation	:	12 m3/day
Solid waste/Hazardous waste generation	:	ETP Sludge: 3000 Kg/month
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Kongovi Electronics is the Nickel and Chromium electroplating unit doing job works for Hyundai, Toyota, Ford etc. The plating is done for plastic materials.

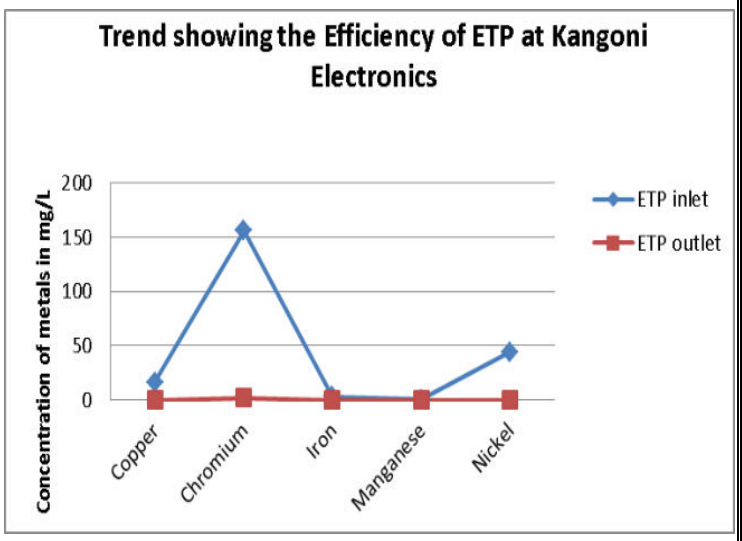
- The unit is operated fully automatically. The hood system provided for fume extraction is adequate enough.

- The effluent genertaed is approximately 12000lts/day. Effluent is collected and treated in their own individual effluent treatment plant.
- The unit is having ETP facility in their premises with a treatment capacity of 16KLD. The ETP consits of Effluent collection tank, neutralization tank, precitipitation is also done inorder to recover chromium in the form of chromic acid and followed by filter press.
- The sludge generated is sent to TSDF at Dodaballapur.
- As air pollution control equipment they are using water scrubber in chimneys.

Chimney with water scrubber attached to the hood system.

- The sample was collected from Effluent collection tank and outlet of filter press to assess the efficiency of the ETP and compliance status for general parameters and heavy metals, the analysis results are as follows:

S.No	Parameters	Effluent collection tank (mg/L)	ETP outlet Results (mg/L)
1.	Copper	16.6	0.03
2.	Cadmium	BDL	BDL
3.	Chromium	156	2.07
4.	Iron	3.2	BDL
5.	Manganese	0.415	BDL
6.	Nickel	44.4	BDL
7.	Lead	BDL	BDL
8.	Zinc	BDL	BDL
9.	Cobalt	BDL	BDL



3.4.11 M/s Vijaya Metal Finishers

General Information:

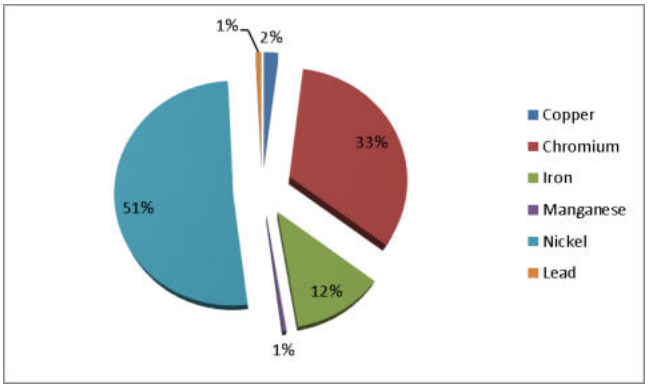
Address of the Industry	:	M/s Vijaya Metal Finishers 365,10th cross, IV phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Anodizing, Powder coating and painting
Working days in a year	:	301
Consented production capacity	:	2500 m2On job work basis
Water consumption	:	0.75 m3/day
Waste water generation	:	0.35 m3/day
Solid waste/Hazardous waste generation	:	DG spent oil: 0.015KLD
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Vijaya metal finishers is the anodizing unit doing job works for Bharat Electronics, Quest, Good Rich, Titan Industries Limited, G Plast, etc. They are doing Anodizing, Powder Coating and Painting of various aerospace components.




- It was observed that the unit has provided hoods, suction pipe followed by scruuber and chimney as air pollution control device to control fugitive emissions generated in the process area.
- The unit is having three effluent collection tank of each 3000 lts capacity. It was informed by the unit that the effluent generated is approximately 350lts/day. Effluent is collected and sent to Pai & Pai Chemicals Pvt Ltd CETP through tankers.
- Very good housekeeping was observed during the day of visit.
- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:



S.No	Parameters	Results (mg/L)
1.	Copper	0.558
2.	Cadmium	BDL
3.	Chromium	9.27
4.	Iron	3.38
5.	Manganese	0.146
6.	Nickel	14.3
7.	Lead	0.22
8.	Zinc	BDL
9.	Cobalt	BDL

3.4.12 M/s Sree Raj Hard Chrome Industries

General Information:

Address of the Industry	:	M/s Vijaya Metal Finishers 388,10th cross, IV phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Hard Chrome Plating
Working days in a year	:	302
Consented production capacity	:	500 Nos/month
Water consumption	:	0.2 m3/day
Waste water generation	:	0.18 m3/day
Solid waste/Hazardous waste generation	:	Packing material and pickling tank sludge: 70 kg/month
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Sree Raj Hard Chrome Industries is hard chrome electroplating unit doing job works for local companies. The raw materials used in plating are Lead anode and Chromic acid.

- It was observed that the unit has provided hoods, suction pipe followed by scruuber and chimney as air pollution control device to control fugitive emissions generated in the process area.

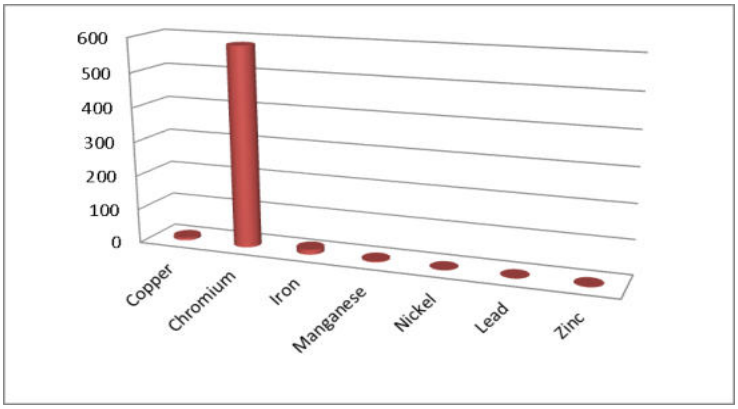
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

- It was informed by the unit that the effluent generated is approximately 100lts/day. Effluent is collected and sent to Pai & Pai Chemicals Pvt Ltd CETP without any primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	8.1
2.	Cadmium	BDL
3.	Chromium	584
4.	Iron	14.5
5.	Manganese	3.1
6.	Nickel	0.2
7.	Lead	0.05
8.	Zinc	0.95
9.	Cobalt	BDL



3.4.13 M/s Vishnu Hard Chrome

General Information:

Address of the Industry	:	M/s Vishnu Hard Chrome industries 338,9th cross, IV phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Hard Chrome Plating
Working days in a year	:	300
Consented production capacity	:	On Job work basis
Water consumption	:	0.07 m^3/day
Waste water generation	:	0.02 m^3/day
Solid waste/Hazardous waste generation	:	MSW: 50kg/annum
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

- M/s Vishnu Hard Chrome is the hard chrome electroplating unit located in 4th phase peenya industrial estate doing job works for local customers. The raw materials used in the plating process are Chromic acid, HCL & H_2SO_4.

- It was observed that the unit has provided hoods, suction pipe followed by scruuber and chimney as air pollution control device to control fugitive emissions generated in the process area.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

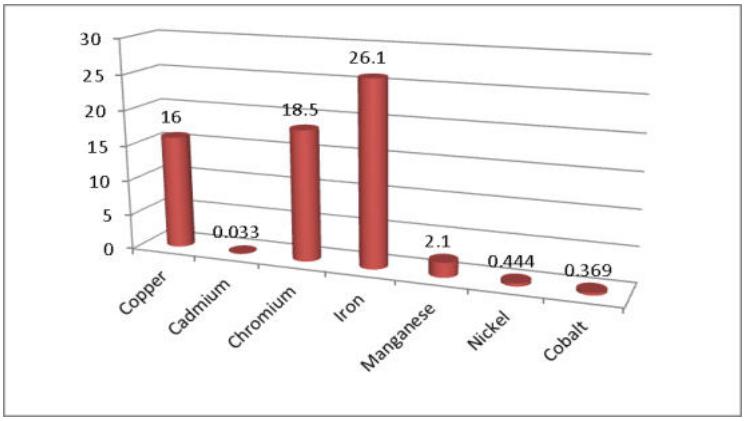
- The unit is operating with poor infrastructural facilities and inadequate space

- It was informed by the unit that the effluent generated is approximately 200lts/day. Effluent is collected and sent to Pai & Pai Chemicals Pvt Ltd CETP without any primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	16
2.	Cadmium	0.033
3.	Chromium	18.5
4.	Iron	26.1
5.	Manganese	2.1
6.	Nickel	0.444
7.	Lead	BDL
8.	Zinc	BDL
9.	Cobalt	0.369



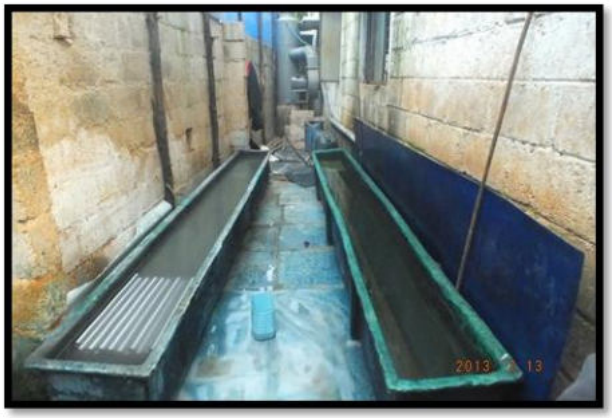
3.4.14 M/s Lakshmi Electro Platers

General Information:

Address of the Industry	:	M/s Lakshmi Electro Platers 338,9th cross, IV phase, Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Zinc Plating
Working days in a year	:	306 days
Consented production capacity	:	On Job work basis
Water consumption	:	0.04 m^3/day
Waste water generation	:	0.04 m^3/day
Solid waste/Hazardous waste generation	:	NA
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

- M/s Lakshmi Electro Platers is Zinc electroplating unit located in 4th phase peenya industrial estate doing job works for local customers.

- The raw materials used in the plating process are Caustic Soda, HCL, Zinc Salt, Zinc Brightner, Blue Passivator, Nitric Acid and Zinc Anode.



- During the day of monitoring it was observed that the unit has provided hoods, suction pipe followed by scruuber and chimney as air pollution control device to control fugitive emissions generated in the process area which was found to be adequate.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

- The unit is operating with poor infrastructural facilities and inadequate space

- It was informed by the unit that the effluent generated from the unit is approximately 40lts/day. Effluent is collected and sent to Pai & Pai Chemicals Pvt Ltd CETP without any primary treatment

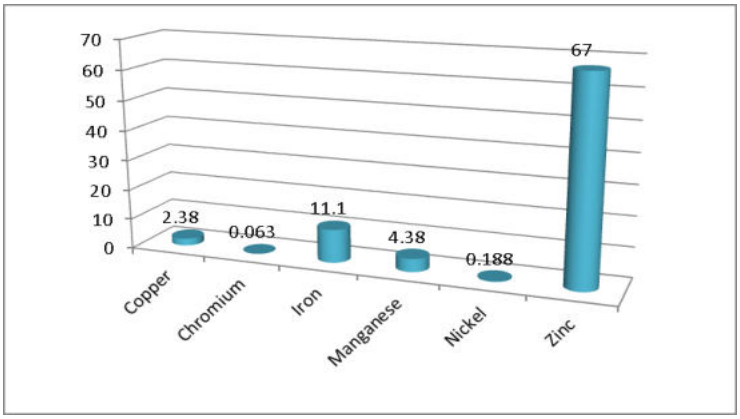
Effluent Collection tank

Water scrubber

- No proper effluent storage tank is provided by the unit as per the KSPCB norms

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	2.38
2.	Cadmium	BDL
3.	Chromium	0.063
4.	Iron	11.1
5.	Manganese	4.38
6.	Nickel	0.188
7.	Lead	BDL
8.	Zinc	67
9.	Cobalt	BDL



3.4.15 M/s Surya Metal Finishers

General Information:

Address of the Industry	:	M/s Surya Metal Finishers P-17, 3rd cross, III stage Peenya Industrial Estate, Bengaluru-560058
Type of Electroplating	:	Zinc Plating
Working days in a year	:	Not provided
Consented production capacity	:	On Job work basis
Water consumption	:	5 m^3/month

Waste water generation	:	1.5 m^3/month
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Surya Metal Finishers is the Zinc based electroplating unit located in 3rd stage peenya industrial estate doing job works for local customers.

- During the visit the unit was not in operation.

- During the day of monitoring it was observed that the unit has provided hoods, suction pipe followed by scruuber and chimney as air pollution control device to control fugitive emissions generated in the process area which was found to be adequate.

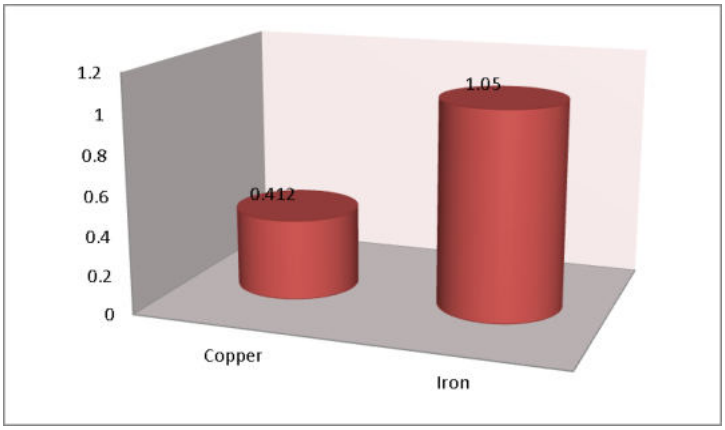
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

- It was informed by the unit that the effluent generated from the unit is approximately 1500lts/month. Effluent is collected and sent to Eco-Green CETP without primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	0.412
2.	Cadmium	BDL
3.	Chromium	BDL
4.	Iron	1.05
5.	Manganese	BDL
6.	Nickel	BDL
7.	Lead	BDL
8.	Zinc	BDL
9.	Cobalt	BDL



3.5 Study carried out at Veerasandra Industrial Estate, Anekal Taluk, Bengaluru

Veerasandra Industrial Estate is small industrial area located at southern region of Bengaluru near Electronic city. Veerasandra Industrial Estate is a house of around 30-35 small scale units.

There are around 14-15 registered electroplating units in Veerasandra Industrial area. Most of the electroplating units are Zinc based electroplating units. These units are member to M/S VIWA Eco Club CETP. Detailed study was carried out in five electroplating units. Out of five electroplating units, four units are zinc based electroplating units and one anodizing unit. The details of the units studied

3.5.1 M/s Accenture Bodtronics

General Information:

Address of the Industry	:	M/s Accenture Bodtronics B-94, Industrial Estate, Veerasandra, Electronic city, Bengaluru-560100
Type of Electroplating	:	Zinc Plating
Working days in a year	:	Not provided
Consented production capacity	:	On Job work basis
Water consumption	:	Not Provided
Waste water generation	:	2000 litres/month
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Accenture Bodtronics is the Zinc based electroplating unit doing job works for local customers.

- During the visit the unit was in operation.

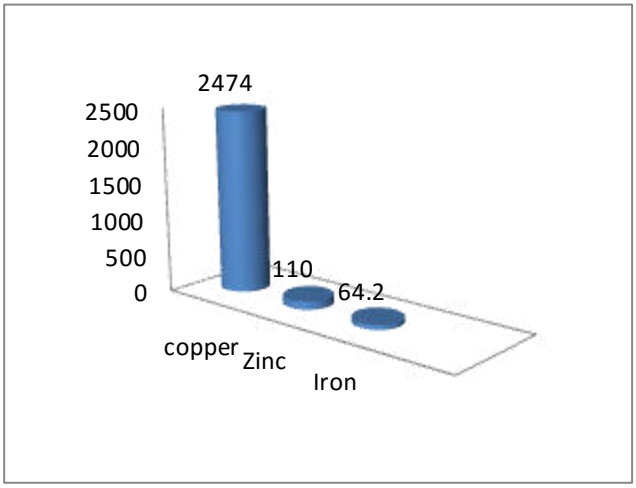
- During the day of monitoring it was observed that the unit has not provided proper hood system.
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

- It was informed by the unit that the effluent generated from the unit is approximately 2000 lts/month. Effluent is collected and sent to Viwa Eco-club CETP through tanker located in the Veerasandra Industrial Estate without primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	2474
2.	Cadmium	BDL
3.	Chromium	1.02
4.	Iron	64.2
5.	Manganese	1.49
6.	Nickel	0.619
7.	Lead	1.49
8.	Zinc	110
9.	Cobalt	BDL



3.5.2 M/s P R Industries

General Information:

Address of the Industry	:	M/s P R Industries SM-104, Industrial Estate, Veersandra, Electronic city, Bengaluru-560100
Type of Electroplating	:	Zinc Plating
Working days in a year	:	Working all days except Sunday and public holidays
Consented production capacity	:	On Job work basis
Water consumption	:	405 litres/day
Waste water generation	:	250-300 litres/day
Solid waste/Hazardous waste generation	:	Not provided

Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s P R Industries is the Zinc based electroplating unit doing job works for Nash products, Rajajinagar.

- During the visit the unit was in operation.

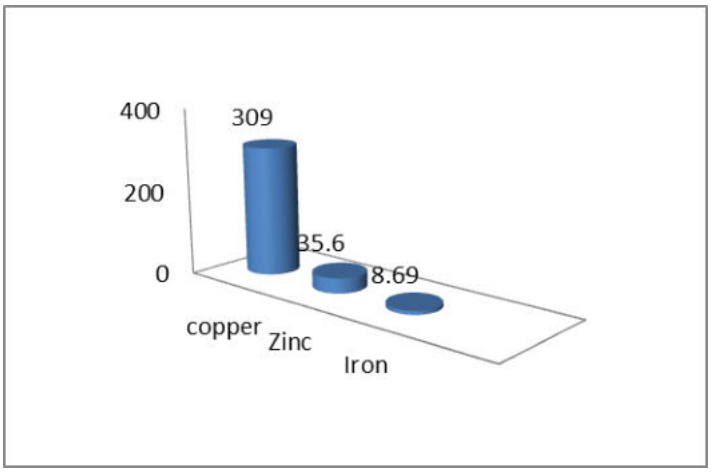
- During the day of monitoring it was observed that the unit has provided proper hood system which is adequate to control fugitive emissions.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

- It was informed by the unit that the effluent generated from the unit is approximately 250- 300lts/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker located in the Veerasandra Industrial Estate without primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.
- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	309
2.	Cadmium	BDL
3.	Chromium	1.58
4.	Iron	8.69
5.	Manganese	0.238
6.	Nickel	0.067
7.	Lead	BDL
8.	Zinc	35.6
9.	Cobalt	0.216



3.5.3 M/s Presswell products

General Information:

Address of the Industry	:	M/s Presswell product, Industrial Estate, Veersandra, Electronic city, Bengaluru-560100
Type of Electroplating	:	Zinc Plating
Working days in a year	:	Working all days except Sunday and public holidays
Consented production capacity	:	On Job work basis
Water consumption	:	300 -400 litre/day
Waste water generation	:	300 – 400 litre/day
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Presswell Products is the Zinc based electroplating unit doing job works for servewell industries.
- During the visit the unit was in operation.
- During the day of monitoring it was observed that the unit has provided hood system which is adequate to control fugitive emissions.

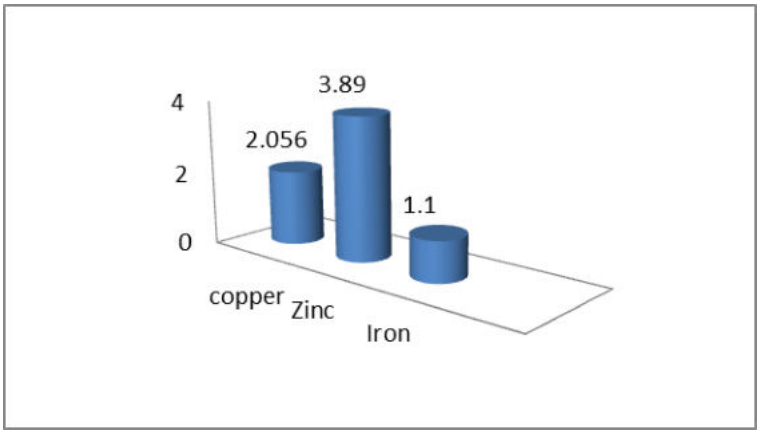
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

- It was informed by the unit that the effluent generated from the unit is approximately 300 -400 litre/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker located in the Veerasandra Industrial Estate without primary treatment.

- Effluent is stored in under ground syntex tank.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	2.056
2.	Cadmium	BDL
3.	Chromium	0.484
4.	Iron	1.1
5.	Manganese	0.432
6.	Nickel	0.206
7.	Lead	BDL
8.	Zinc	3.89
9.	Cobalt	0.056



3.5.4 M/s 3C Components

General Information:

Address of the Industry	:	M/s 3C Components Industrial Estate, Veerasandra, Electronic city, Bengaluru-560100
Type of Electroplating	:	Zinc Plating
Working days in a year	:	Working all days except Sunday and public holidays
Consented production capacity	:	On Job work basis
Water consumption	:	300 -400 litre/day
Waste water generation	:	300 – 400 litre/day
Solid waste/Hazardous waste generation	:	-
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

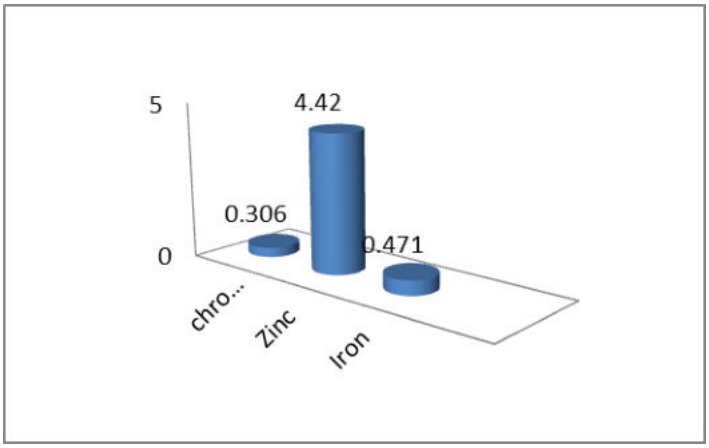
- M/s 3C Components is the Zinc based electroplating unit doing job works for local customers.
- During the visit the unit was in operation.
- During the day of monitoring it was observed that the unit has provided proper hood system which is adequate to control fugitive emissions and is connected to chimney with water scrubber.
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

- It was informed by the unit that the effluent generated from the unit is approximately 300 -400 litres/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker located in the Veerasandra Industrial Estate without primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	0.102
2.	Cadmium	BDL
3.	Chromium	0.306
4.	Iron	0.471
5.	Manganese	0.05
6.	Nickel	0.053
7.	Lead	BDL
8.	Zinc	4.4.2
9.	Cobalt	0.029



3.5.5 M/s Dural Technologies Pvt. Ltd

General Information:

Address of the Industry	:	M/s Dural Technologies Pvt. Ltd B 91, Industrial Estate, Veerasandra, Electronic city, Bengaluru-560100
Type of Electroplating	:	HRD Anodizing Process
Working days in a year	:	290 days
Consented production capacity	:	150 sq.ft/day
Water consumption	:	400 lts/day
Waste water generation	:	100 lts/day

Solid waste/Hazardous waste generation	:	Not Provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Dural Technologies Pvt. Ltd is the hard anodizing process unit doing job works for local customers.

- During the visit the unit was in operation.

- During the day of monitoring it was observed that the unit has provided proper hood system which is inadequate to control fugitive emissions.

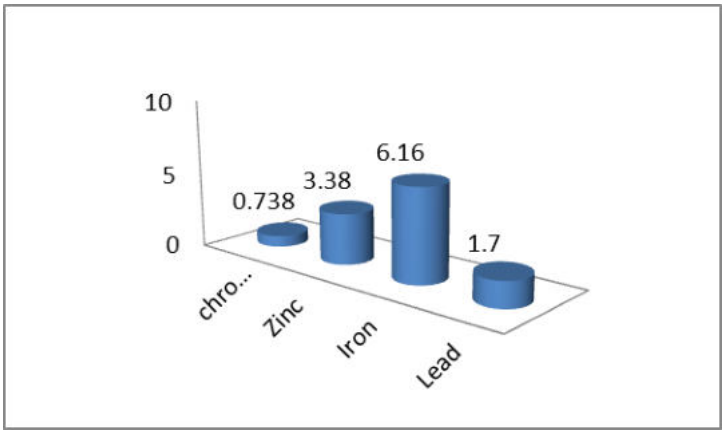
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission

- It was informed by the unit that the effluent generated from the unit is approximately 100lts/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker located in the Veerasandra Industrial Estate without primary treatment.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	0.831
2.	Cadmium	BDL
3.	Chromium	0.738
4.	Iron	6.16
5.	Manganese	0.297
6.	Nickel	0.154
7.	Lead	1.7
8.	Zinc	3.38
9.	Cobalt	0.032



3.5.6 M/s VIWA Eco Club CETP

General Information:

Address of the Industry	:	M/s VIWA Eco Club CETP, Industrial Estate, Veerasandra, Electronic city, Bengaluru-560100
Number of members	:	39
Installed capacity of CETP	:	20 kld
Operating capacity	:	20 kld
Effluent receiving through	:	tankers
Treatment facilities exist	:	2 collection tanks, 2 neutralisation tank, 2 clarifier, 1 semi treated effluent tank and 1 final treated effluent tank.
Chemicals used kg/d	:	Caustic soda – 75-80 kg/d Polyelectrolyte – 100 gm Sodium meta bisulphate – 2 kg
Sludge generated kg/day	:	25- 30 kg/d
Final disposal of treated effluent	:	Treated effluent being utilised for gardening in their industrial estate premises.

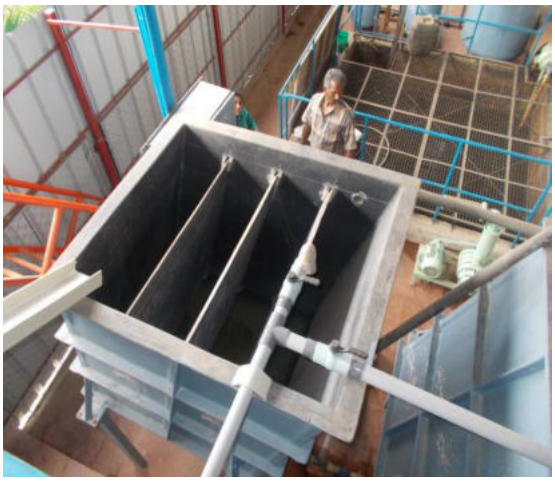
Specific observations:

- M/s VIWA(Veerasandra Industrial Welfare Association) Eco Club CETP was established in 2007 to treat the effluent generated from small scale industries especially Electro

Plating units exists in and around Veerasandra Industrial Area. Around 39 industries were taken membership.

- The CETP has facilities to treat effluent of 20 KLD, Presently the CETP is receiving Chrome based effluent and Acid Base Effluent. The effluent is collected by CETP's own tankers of capacity 750 litre and 1000 litre.

- The CETP has two separate storage tanks of capacity 10 m^3 each to store Chrome based and Acid based raw effluent respectively. The effluents of both stream are being pumped to neutralization tanks of capacity 8 m^3, the pH of chrome based is adjusted between 2.3-2.6 by adding sulphuric acid and Hexavalent chrome is reduced to Trivalent chrome by adding 60% Sodium-Meta-Bi-sulphite (5kg/8 m3) and agitated for 1 hour further caustic soda of around 35-40 kg is added in neutralization tank and allowed for precipitation. Similarly 35-50 kg of caustic is added in acid base effluent neutralization tank and agitated for 1 hour. After completion of neutralization both effluent streams are pumped to lamella clarifiers(2nos), clarified effluent being stored in semi treated tank of capacity 10 m^3. The semi treated effluent further treated through sand filter and pressure filters followed by RO system. The final treated effluent being stored in storage tank of capacity 8 m^3. It is informed that treated effluent is being utilized for gardening in their industrial estate

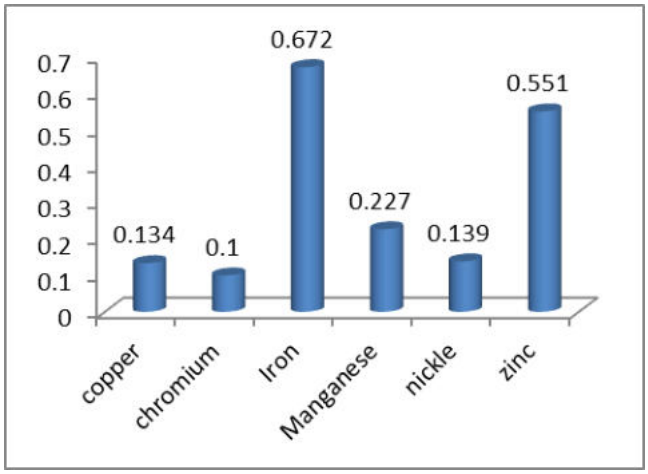


The components of CETP viz. Raw effluent tank, Nuetralisation tanks, Lamella clarifier, semi treated effluent tank, RO system and Final treated effluent tank

- The sludge generated from the lamella clarifier is being taken to sludge drying beds (4 nos) the dried sludge being packed bags and stored in the hazardous waste storage room. It is informed that ETP sludge generated in the tune of 750 – 1000 kg/month and same being sent to M/s Karnataka Waste Management Project(TSDF).

- The sample were collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

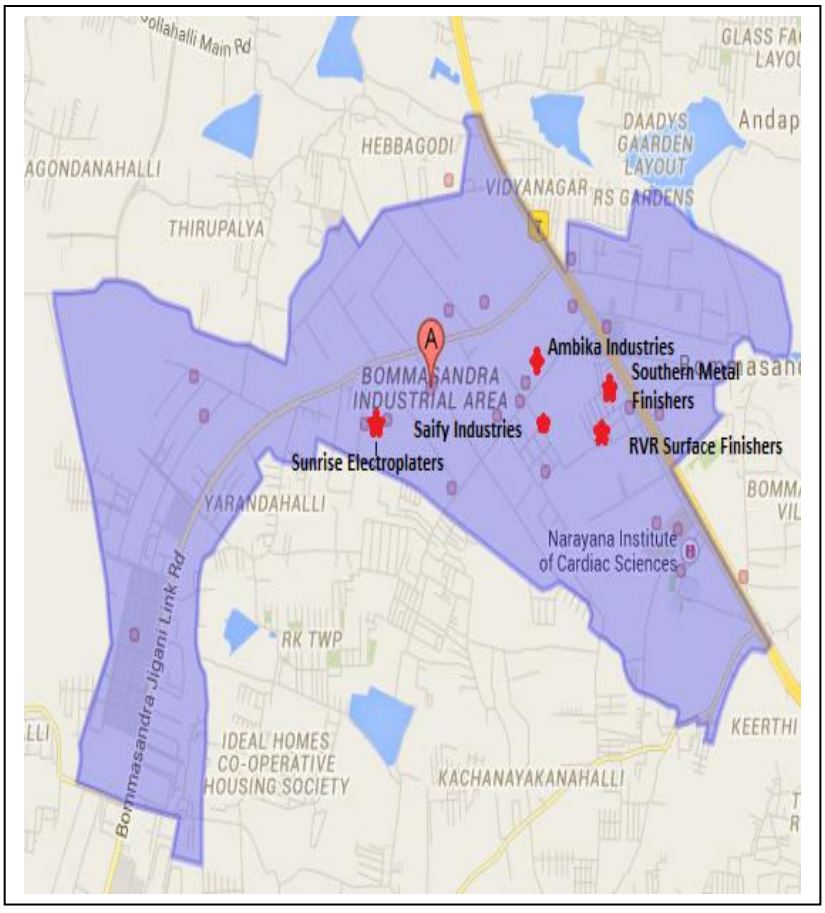
S. No	Parameters	Inlet 1(mg/l)	Inlet 2 (mg/l)	Outlet (mg/l)
1.	Copper	169	5.02	0.134
2.	Cadmium	BDL	0.248	BDL
3.	Chromium	27.8	328	0.1
4.	Iron	383	322	0.672
5.	Manganese	188	3.23	0.227
6.	Nickel	70.7	0.354	0.139
7.	Lead	BDL	BDL	BDL
8.	Zinc	276	1499	0.551
9.	Cobalt	1.21	0.249	0.042



Concentration at out let

3.6 Study carried out at Bommasandra Industrial Area, Anekal Taluk, Bengaluru

Bommasandra Industrial Area is located in the south region of Bengaluru near Electronic city, Bengaluru. Bommasandra Industrial Area housing many small scale industries. It is house of 8-9 electroplating units. All the electroplating units located in the area are Zinc based electroplating units except one or two units. Out of nine electroplating units detailed study was carried out at five electroplating units. The details of the units studied are given below:



Map showing Electroplating units location at Bommasandra Industrial Area

3.6.1 M/s SAIFY Industries

General Information:

Address of the Industry	:	M/s SAIFY Industries 49-A1 Bommasandra Industrial Area, Bommasandra, Bengaluru-560099
Type of Electroplating	:	Zinc and Nickel Plating
Working days in a year	:	275
Consented production capacity	:	25000 Sq ft/month
Water consumption	:	2800lts/day
Waste water generation	:	200-250 lts/day
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Saify Industries is the Zinc and Nickel based electroplating unit doing job works for TVS vendor.

- During the visit the unit was in operation.

- During the day of monitoring it was observed that the unit has provided hood system which is inadequate to control fugitive emissions.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

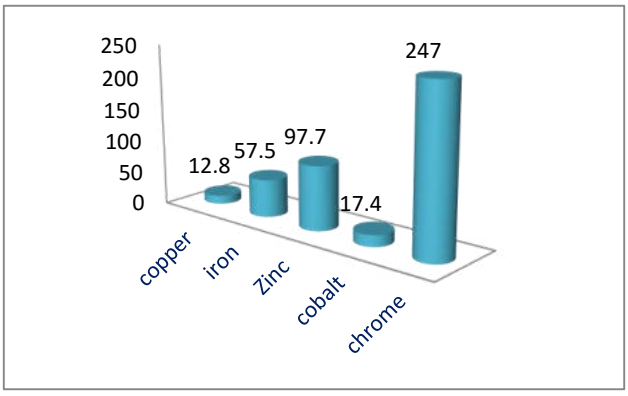
- It was informed by the unit that the effluent generated from the unit is approximately 200-250lts/day. Presently effluent is collected and sent to Eco-green CETP through tanker once in a month.

- The unit has taken permission from KSPCB to establish its own ETP in the industry premises and it is under construction.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	12.8
2.	Cadmium	0.563
3.	Chromium	247
4.	Iron	57.5
5.	Manganese	1.6
6.	Nickel	0.637
7.	Lead	BDL
8.	Zinc	97.7
9.	Cobalt	17.4



3.6.2 M/s Ambika Industries

General Information:

Address of the Industry	:	M/s Ambika Industries No 111, E1, II phase, Bommasandra Industrial Area, Bommasandra, Bengaluru-560099
Type of Electroplating	:	Zinc Electroplating
Working days in a year	:	300
Consented production capacity	:	20 MT/month
Water consumption	:	800 lts/day
Waste water generation	:	500 lts/day
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

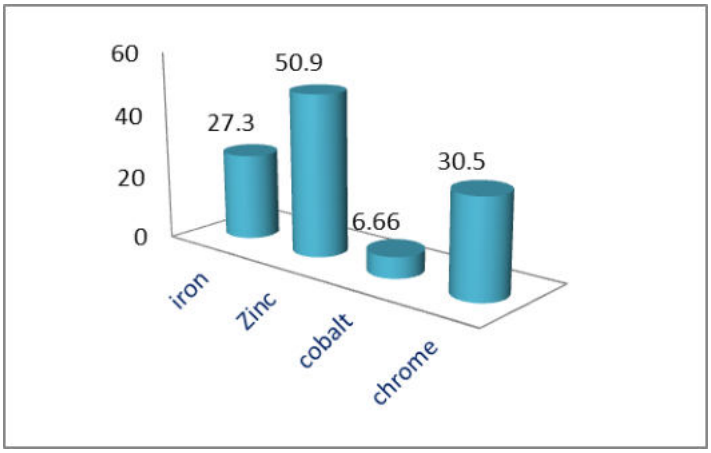
- M/s Ambika Industries is the Zinc based electroplating unit doing job works for local customers. The raw materials used are Zinc anode, Zinc Chemicals, HCl and Brightner.

- During the visit the unit was in operation.




- During the day of monitoring it was observed that the unit has provided hood system which is adequate to control fugitive emissions.
- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.
- It was informed by the unit that the effluent generated from the unit is approximately 500lts/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker for every 3-4 days.
- No proper effluent storage tank is provided by the unit as per the KSPCB norms.
- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	0.926
2.	Cadmium	BDL
3.	Chromium	30.5
4.	Iron	27.3
5.	Manganese	0.438
6.	Nickel	5.72
7.	Lead	BDL
8.	Zinc	50.9
9.	Cobalt	6.6



3.6.3 M/s Southern Metal Finishers

General Information:

Address of the Industry	:	M/s Southern Metal Finishers No B-80, KSSIDC Industrial Estate, Bommasandra, Bengaluru-560099
Type of Electroplating	:	Non- Cyanide Zinc Electroplating
Working days in a year	:	300
Consented production capacity	:	10000 Sq.inch/day
Water consumption	:	1150 lts/day
Waste water generation	:	500 lts/day
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with Acid-alkaline scrubber

Specific observations:

- M/s Southern Metal Finishers is the Non- cyanide zinc based electroplating unit doing job works for Omex Auto and IFB group of industries. The raw materials used are Nickel anode, Zinc Chemicals, HCl and Brightner.

- During the visit the unit was in operation.



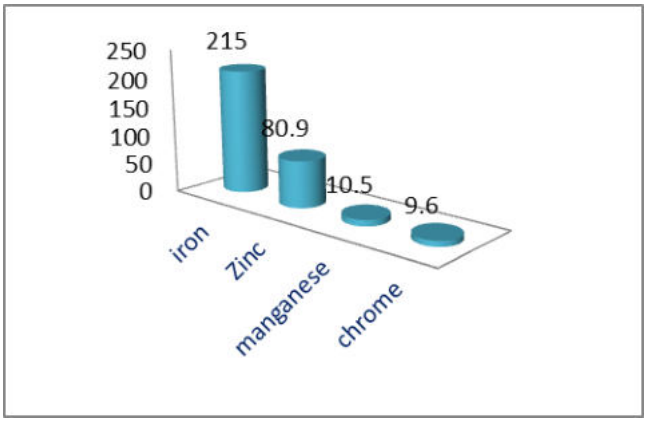

- During the day of monitoring it was observed that the unit has provided hood system which is inadequate to control fugitive emissions.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

- It was informed by the unit that the effluent generated from the unit is approximately 500lts/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker twice in a week.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.
- Very poor house keeping.
- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	1.74
2.	Cadmium	BDL
3.	Chromium	9.60
4.	Iron	215
5.	Manganese	10.5
6.	Nickel	BDL
7.	Lead	BDL
8.	Zinc	80.9
9.	Cobalt	0.414



3.6.4 M/s RVR Surface Finishers

General Information:

Address of the Industry	:	M/s RVR Surface Finishers No C-96, KSSIDC Industrial Estate, Bommasandra, Bengaluru-560099
Type of Electroplating	:	Silver, Nickel, Tin Electroplating
Working days in a year	:	300
Consented production capacity	:	Silver plating-5000 Sqft/day
		Nickel Plating-3500 Sqft/day
		Tin Plating-3500 Sqft/day
		Electroless Nickel Plating-300 Sqft/day
Water consumption	:	400 lts/day
Waste water generation	:	400 lts/day
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s RVR Surface Finishers is Silver, Nickel and Tin based electroplating unit doing job works for Sniders electrical works and Tata power.

- During the visit the unit was in operation.




- During the day of monitoring it was observed that the unit has provided hood system which is adequate to control fugitive emissions.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

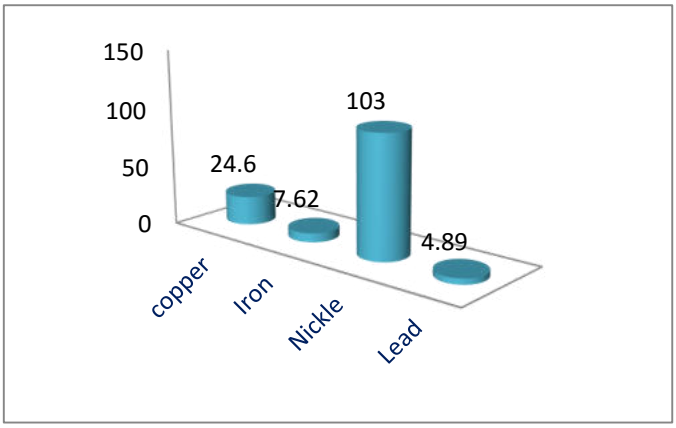
- It was informed by the unit that the effluent generated from the unit is approximately 400lts/day. Effluent is collected and sent to Viwa Eco-club CETP through tanker twice in a week.

- No proper effluent storage tank is provided by the unit as per the KSPCB norms.

- Very poor house keeping.

- The sample was collected from Effluent collection tank for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S.No	Parameters	Results (mg/L)
1.	Copper	24.6
2.	Cadmium	BDL
3.	Chromium	0.173
4.	Iron	7.62
5.	Manganese	0.137
6.	Nickel	103
7.	Lead	4.89
8.	Zinc	6.59
9.	Cobalt	0.061



3.6.5 M/s Sunrise Electroplaters

General Information:

Address of the Industry	:	M/s Sunrise Electroplaters No B-122, Bommasandra Industrial Area, Bommasandra, Bengaluru-560099
Type of Electroplating	:	Nickel Chrome Plating
Working days in a year	:	Not Provided
Consented production capacity	:	1.5 lakh Sq.Mts/Month
Water consumption	:	4000 lts/day
Waste water generation	:	2800 lts/day
Solid waste/Hazardous waste generation	:	Not provided
Pollution control measures exist to control source emission/fugitive emission	:	Plating baths attached to common chimney with water scrubber

Specific observations:

- M/s Sunrise Electroplaters is Nickel chrome based electroplating unit doing job works for local customers.

- During the visit the unit was in operation.

- During the day of monitoring it was observed that the unit has provided hood system which is adequate to control fugitive emissions.

- No proper porthole and plat form is provided as per emission regulation part -III for monitoring of source emission.

- It was informed by the unit that the effluent generated from the unit is approximately 2800lts/day.

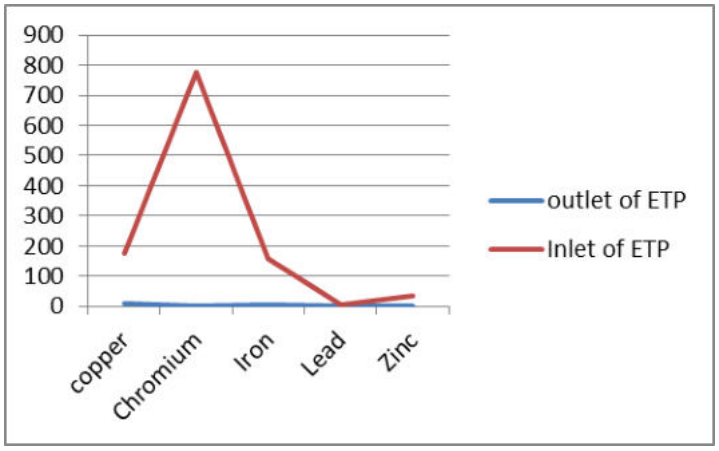



- The unit has its own ETP to treat the effluent generated. The ETP consists of Inlet chamber, Collection cum reaction tank, clarifier, sand drain bed, primary settling tank, ACF and secondary settling tank. The final treated effluent is reused for washing purpose and for gardening purpose.

- The sample was collected from Effluent collection tank and final treated effluent for general parameters and heavy metals in order to analyse effluent characteristics, the analysis results are as follows:

S. No	Parameters	Results (mg/L)	
		Inlet	Outlet
1.	Copper	176	9.15
2.	Cadmium	BDL	BDL
3.	Chromium	778	2.9
4.	Iron	158	4.58
5.	Manganese	10.3	0.106

6.	Nickel	338	0.908
7.	Lead	5.41	BDL
8.	Zinc	37	1.19
9.	Cobalt	0.443	BDL



3.7 Assessment of Ground water quality in and around the electroplating units at Peenya Industrial Area

As a part of the study, ground water sampling was done in and around electroplating units in Peenya Industrial Area at five locations namely Bore well no.1 - Sarvana electro platers premises, Bore Well no. 2 – Inside premises of M/s Kongovi Electronics Pvt., ltd., 2nd phase, Bore well no 3 – Ganesh Engineering industries, Bore well no. 4 - M/s Kongovi Electronics Pvt., ltd., 4th phase and Bore well no. 5 – Avitax textile industry premises in order to assess the ground water quality. These locations were selected in consultation of officials of KSPCB. The analysis results reveals that the contamination of ground water in the area.

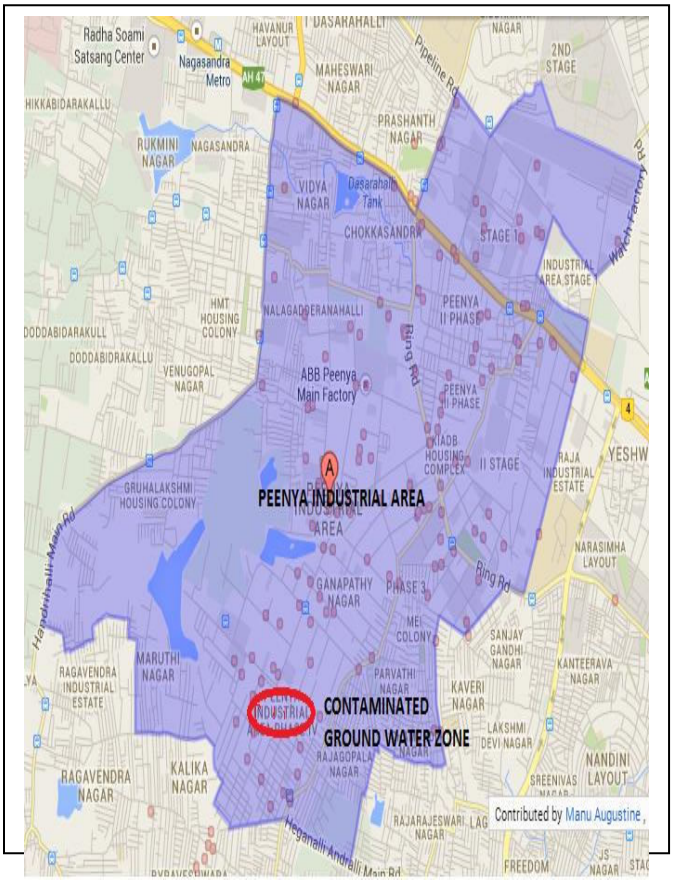


Fig: Map showing contaminated ground water zone in Peenya Industrial Area

3.8 Assessment of Ground water quality in and around the electroplating units at Veerasandra Industrial Estate

As a part of the study, ground water sampling was done in Veerasandra Industrial Estate. The location was selected in consultation with officials of KSPCB. The analysis was carried out for general parameters and heavy metals. As per the analysis results the COD and TDS concentration found exceeding the drinking water standards.

Chapter 4.0
Results and Discussions

4.1 Peenya Industrial Area :

In first phase of the study, around 14 electroplating units at Peenya Industrial Area were monitored and the effluent samples were also collected to analyse effluent characteristics. The results are tabulated in the tables below:

Table: Analysis results of effluent collected from different units of Peenya -- General Parameters

S. No	Parameters / Name of the unit		pH	EC	TSS (mg/L)	TDS (mg/L)	NH_3-N (mg/L)	Sulphate (mg/L)	Phosphate (mg/L)	Fluoride (mg/L)	Oil & Grease (mg/L)
1.	M/s Tulip Engineering		7.2	-	3285	1238	-	-	-	-	
2.	M/s Industrial Metal Finishers		6.86	-	4256	864	-	-	-	-	-
3.	M/s Leo Hard Chrome Plating		3.85	-	4568	3066	-	-	-	-	-
4.	M/s Kiran Metal Finishers		7.33	-	5680	4940	-	-	-	-	-
5.	M/s Balambiga Metal Finishers		1.05	-	3256	4938	-	-	-	-	-
6.	M/s Surya Hard Chrome		7.02	-	5863	1316	-	-	-	-	-
7.	M/s Kangovi Electronic Pvt Ltd (2nd Phase)	Inlet to ETP	2.42	1473	40	1000	BDL	140.5	0.05	BDL	5.0
		Outlet of ETP	9.45	5345	05	3500	BDL	210.6	0.10	BDL	1.0
8.	M/s Ganesh Engineering Ltd		1.8	3333	20	2600	BDL	190	BDL	BDL	0.8
9.	M/s Kangovi Electronic Pvt Ltd (IV Phase)	Inlet to ETP	7.21	113	14	800	BDL	85	BDL	BDL	2.0
		Outlet of ETP	4.95	2609	10	1800	BDL	110	BDL	BDL	1.5
10.	M/s Vijaya Metal Finishers		4.6	1379	25	800	BDL	45	0.25	BDL	BDL
11.	M/s Shree Raj Hard Chrome Industries		2.28	1483	40	1200	1.5	68	0.9	0.05	BDL
12.	M/s Vishnu Hard Chrome Platers		1.93	1786	15	1000	4.5	20	1.7	BDL	BDL
13.	M/s Lakshmi Electro Platers		6.2	1834	24	1000	BDL	96	3	BDL	BDL
14.	M/s Surya Metal Finishers		11.14	20577	55	10700	2	2548	3.6	2.6	5.5

Table: Analysis results for heavy metals

S.No	Parameters / Name of the unit		Copper (mg/L)	Cadmium(mg/L)	Chromium(mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead(mg/L)	Zinc (mg/L)	Cobalt (mg/L)
1.	M/s Tulip Engineering		BDL	BDL	63.3	0.759	0.031	BDL	BDL	0.25	BDL
2.	M/s Industrial Metal Finishers		19.3	BDL	11.3	25.10	0.37	8.49	BDL	34.7	BDL
3.	M/s Leo Hard Chrome Plating		10.9	0.066	876	2.39	0.305	1.72	BDL	0.71	0.394
4.	M/s Kiran Metal Finishers		0.944	BDL	15.6	1.017	0.186	133	BDL	0.5	0.079
5.	M/s Balambiga Metal Finishers		2.64	0.302	123	111	1.48	10.9	BDL	278	14.2
6.	M/s Kangovi Electronic Pvt Ltd (2nd Phase)	Inlet to ETP	1.42	BDL	4.06	0.912	0.726	61.8	0.055	BDL	BDL
		Outlet of ETP	0.088	BDL	0.454	0.943	0.292	0.283	0.034	BDL	BDL
7.	M/s Ganesh Engineering Ltd		3.84	BDL	930	17.5	2.28	0.46	BDL	1.08	BDL
8.	M/s Kangovi Electronic Pvt Ltd (IV Phase)	Inlet to ETP	16.6	BDL	156	3.2	0.415	44.4	BDL	BDL	BDL
		Outlet of ETP	0.03	BDL	2.07	BDL	BDL	BDL	BDL	BDL	BDL
9.	M/s Vijaya Metal Finishers		0.558	BDL	9.27	3.38	0.146	14.3	0.22	BDL	BDL
10.	M/s Shree Raj Hard Chrome Industries		8.1	BDL	584	14.5	3.1	0.2	0.05	0.95	BDL
11.	M/s Vishnu Hard Chrome Platers		16	0.033	18.5	26.1	2.1	0.444	BDL	BDL	0.369
12.	M/s Lakshmi Electro Platers		2.38	BDL	0.063	11.1	4.38	0.188	BDL	67	BDL
13.	M/s Surya Metal Finishers		0.412	BDL	BDL	1.05	BDL	BDL	BDL	BDL	BDL

***Detection limit: Cu-0.03, Cd-0.02, Cr-0.5, Fe-0.3, Mn-0.1, Ni-0.3, Pb-1.0, Zn-0.05 & Co-0.5**

- Out of 56 units in Peenya industrial area, 15 units were selected in consultation with KSPCB officials for detail study. The effluent generated from the electro plating industries found in the range of 20 litres/day to 1500 litres/day in case of industries sending their effluent to CETP whereas in case of units having their own individual ETP, generating effluent in the range of 12000 to 29000 litres/day.

- Based on the study, the estimated effluent quantity is worked out around 16520 litres/day (assuming average effluent generation is around 295 litres/day).
- The effluent generated from units was found highly acidic in nature.
- Most of the units were found engaged in hard chrome plating, copper plating, zinc plating and nickel plating and same is contributing pollution load in terms respective heavy metal in the effluent.
- In raw effluent, concentration of total chromium was found in the range of 0.454 - 930 mg/l, the concentration of copper found in the range of 0.412 – 19.3 mg/l, nickel found in the range of 0.2 – 133 mg/l, iron found in the range of 0.9 – 111 mg/l, manganese found in the range of 0.18 – 4.38 mg/l and zinc found in the range of 34.7- 67 mg/l.
- The quantity of effluent generated in individual unit is less but pollution load in terms of heavy metal was found high in concentration.

4.2 Veersandra Industrial Estate :

In Second phase of the study, around 5 electroplating units and one CETP were monitored and the effluent samples were also collected to analyse effluent characteristics. The results are tabulated in the tables below:

Table: Analysis results of effluent collected from different units of Veersandra Industrial area – General Parameters

S. No	Parameters / Name of the unit		pH	EC	TSS (mg/L)	TDS (mg/L)	NH_3-N (mg/L)	Sulphate (mg/L)	Phosphate (mg/L)	Fluoride (mg/L)	COD (mg/L)
1.	M/s Accenture BODTRONICS		0.9	11880	300	7778	236.9	589	0.02	1.52	3755
2.	M/s P R Industries		11.8	13180	22	7900	17.9	258	0.02	19.5	474
3.	M/s 3C Components		6.0	1597	12	1008	3.4	137.2	0.07	5.8	17.3
4.	M/s Presswell Products		8.1	5850	50	3584	1.7	428	0.06	1.9	19
5.	M/s Dural Pvt. Technologies		3.1	3110	70	2414	1.7	1583	0.08	3.7	29
6.	M/s VIWA Eco club CETP	Inlet 1	1.2	-	54	8718	-	2385	2.4	19.3	913
		Inlet 2	2.3	-	656	9200	-	2551	4.8	-	1022
		Final treated	7.3	2420	04	1612	-	104.2	0.05	0.96	7.0

S. No	Parameters / Name of the unit		Copper (mg/L)	Cadmium(mg/L)	Chromium(mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead(mg/L)	Zinc (mg/L)	Cobalt (mg/L)
1.	M/s Accenture BODTRONICS		2474	BDL	1.02	64.2	1.49	0.619	1.49	110	BDL
2.	M/s P R Industries		3.09	BDL	1.58	8.69	0.238	0.067	BDL	35.6	0.216
3.	M/s 3C Components		0.102	BDL	0.306	0.471	0.05	0.053	BDL	4.42	0.029
4.	M/s Presswell Products		2.05	BDL	0.484	1.1	0.432	0.206	BDL	3.89	0.056
5.	M/s Dural Pvt. Technologies		0.831	BDL	0.738	6.16	0.297	0.154	1.7	3.38	0.032
6.	M/s VIWA Eco club CETP	Inlet 1	169	BDL	27.8	383	188	70.7	BDL	276	1.21
		Inlet 2	5.02	0.248	328	322	3.23	0.354	BDL	1499	0.249
		Final treated	0.134	BDL	0.1	0.672	0.227	0.139	BDL	0.551	0.042

Inlet 1 – Non chrome bearing effluent, Inlet 2 – chrome bearing effluent

- Out of 15 units in Veersandra industrial area, 5 units and one CETP were selected in consultation with KSPCB officials for detail study. The effluent generated from the electro plating industries found in the range of 100 - 400 litres/day, all theses units are sending their effluent to M/s VIWA Eco club CETP.
- Based on the study, the estimated effluent quantity is worked out around 3750 litres/day (assuming average effluent generation is around 250 litres/day).
- The effluent generated from units was found either highly acidic or in alkaline in nature.
- Most of the units were found engaged in Zinc & Nickle plating and only 2 units were engaged in hard chrome & copper plate and same is contributing pollution load in terms respective heavy metal in the effluent.
- In raw effluent, concentration of Zinc was found in the range 0.551 – 1499 mg/l , total chromium was found in the range of 0.1 -778 mg/l, the concentration of copper found in the range of 0.102 – 2474 mg/l, nickel found in the range of 0.053– 70.7 mg/l, iron found in the range of 0.471 – 383 mg/l and manganese found in the range of 0.05 – 188 mg/l.
- The quantity of effluent generated in individual unit is less but pollution load in terms of heavy metal was found high in concentration.
- The CETP was found operating at 20 KLD of effluent, the CETP is separately receiving the chrome bearing effluent and non chrome bearing effluent after neutralisation followed by clarifier the semi treated effluent being treated through RO system the RO permeate being utilised for gardening in their premises.

- As per analysis results the CETP is meeting the prescribed standards of KSPCB.

4.3 Bommasandra Industrial Area :

In Second phase of the study, around 5 electroplating units at Bommasandra Industrial Area were monitored and the effluent samples were also collected to analyse effluent characteristics. The results are tabulated in the tables below:

Table: Analysis results of effluent collected from different units of Bommasandra Industrial area – General Parameters

S. No	Parameters		pH	EC	TSS (mg/L)	TDS (mg/L)	NH_3-N (mg/L)	Sulphate (mg/L)	Phosphate (mg/L)	H.Chromium (mg/L)	COD (mg/L)
1.	M/s Saify Industries		1.8	11210	14	7362	5.6	1182	1.3	-	1048
2.	M/s Ambika Industries		10.2	6870	16	4780	2.8	317	2.2	-	828
3.	M/s Southern Metal Finishers		2.3	13200	450	8952	3.9	454	3.3	-	4736
4.	M/s RVR Surface Finishers		<1.0	4960	10	2548	3.4	701	0.8	-	185
5.	M/s Sunrise Electroplaters	Inlet to ETP	0.6	38520	98	19622	9.0	8663	BDL	1154	-
		Outlet of ETP	11.9	4390	36	2712	1.12	229	4.3	0.28	658

Table: Analysis results for heavy metals

S.No	Parameters		Copper (mg/L)	Cadmium(mg/L)	Chromium(mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead(mg/L)	Zinc (mg/L)	Cobalt (mg/L)
	Name of the unit										
1.	M/s Saify Industries		12.8	0.563	247	57.5	1.6	0.637	BDL	97.7	17.4
2.	M/s Ambika Industries		0.926	BDL	30.5	27.3	0.438	5.72	BDL	50.9	6.66
3.	M/s Southern Metal Finishers		0.926	BDL	9.60	215	10.5	BDL	BDL	80.9	0.414
4.	M/s RVR Surface Finishers		24.6	BDL	0.173	7.62	0.137	103	4.89	6.59	0.061
5.	M/s Sunrise Electro platers	Inlet to ETP	176	BDL	778	158	10.3	338	5.41	37	0.443
		Outlet of ETP	9.15	BDL	2.9	4.58	0.106	0.908	BDL	1.19	BDL

- Out of 9 units in Bommasandra industrial area, 5 units were selected in consultation with KSPCB officials for detail study. The effluent generated from the electro plating industries found in the range of 200 litres/day to 500 litres/day in case of industries sending their effluent to CETP whereas in case of units having their own individual ETP, generating effluent in the tune of 2800 litres/day.
- Based on the study, the estimated effluent quantity is worked out around 3150 litres/day (assuming average effluent generation is around 350 litres/day).
- The effluent generated from units was found either highly acidic or in alkaline in nature.
- Most of the units were found engaged in Zinc & Nickle plating and only 2 units are engaged in hard chrome & copper plat and same is contributing pollution load in terms respective heavy metal in the effluent.
- In raw effluent, concentration of Zinc was found in the range 1.19 – 97.7 mg/l , total chromium was found in the range of 0.173 -778 mg/l, the concentration of copper found in the range of 0.926 – 176 mg/l, nickel found in the range of 0.908– 338 mg/l, iron found in the range of 4.58 – 158 mg/l and manganese found in the range of 0.137 – 10.5 mg/l.
- The quantity of effluent generated in individual unit is less but pollution load in terms of heavy metal was found high in concentration.

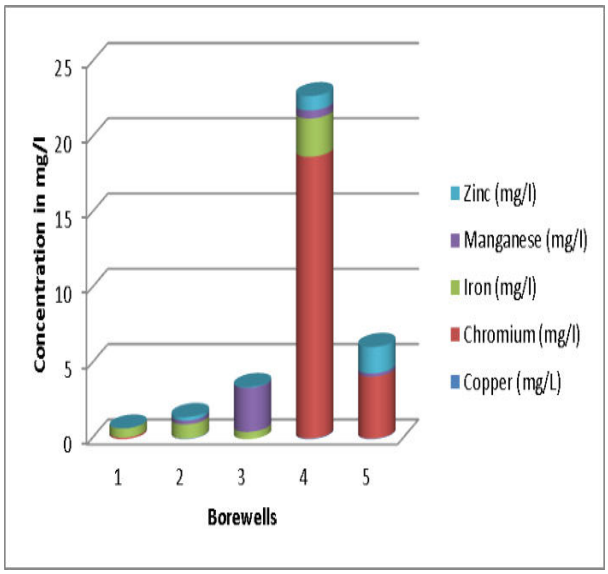
4.4 Assessment of ground water quality:

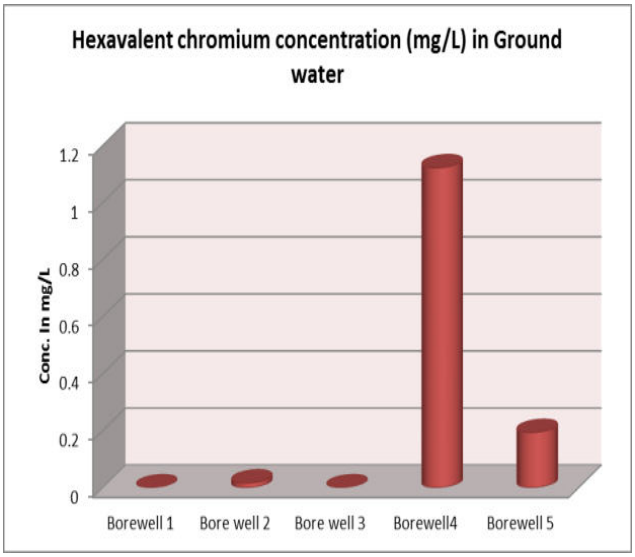
As a part of the study, ground water sampling was done in and around electroplating units in Peenya Industrial Area at five locations namely Bore well no.1 - Sarvana electro platers premises, Bore Well no. 2 – Inside premises of M/s Kongovi Electronics Pvt., ltd., 2nd phase, Bore well no 3 – Ganesh Engineering industries, Bore well no. 4 - M/s Kongovi Electronics Pvt., ltd., 4th phase, Bore well no. 5 – Avitax textile industry premises and Borewell 6- Veerasandra Industrial Estate. The analysis results are as follows:

S.No	Parameters	Borewell 1	Borewell 2	Borewell 3	Borewell 4	Borewell 5	Borewell 6
1.	pH	6.5	6.6	6.6	6.5	6.4	7.1
2.	COD (mg/L)	30	BDL	3.9	BDL	7.8	6.7
3.	TDS (mg/L)	-	942	1162	1371	1219	1600

3.	**Hexavalent Chromium (mg/L)**	**BDL**	**0.0169**	**BDL**	**1.122**	**0.194**	**-**
1.	**Copper (mg/L)**	**BDL**	**0.037**	**BDL**	**0.047**	**0.041**	**-**
2.	**Cadmium (mg/l)**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**-**
3.	**Chromium (mg/l)**	**0.111**	**BDL**	**BDL**	**18.7**	**4.1**	**-**
4.	**Iron (mg/l)**	**0.588**	**0.938**	**0.468**	**2.54**	**BDL**	**-**
5.	**Manganese (mg/l)**	**BDL**	**0.261**	**2.93**	**0.55**	**0.22**	**-**
6.	**Nickel (mg/l)**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**-**
7.	**Lead (mg/l)**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**-**
8.	**Zinc (mg/l)**	**BDL**	**0.229**	**0.05**	**0.938**	**1.75**	**-**
9.	**Cobalt (mg/l)**	**BDL**	**BDL**	**BDL**	**BDL**	**BDL**	**-**

***Detection limit: Cu-0.03, Cd-0.02, Cr-0.5, Fe-0.3, Mn-0.1, Ni-0.3, Pb-1.0, Zn-0.05 & Co-0.5**





- From the above results the presence of COD in bore well no. 1, 3, 5 and 6 indicates the contamination ground water due to mismanagement of effluent generated in this industrial area.
- The high concentration of chromium in Bore well no. 4 & 5 clearly indicates the contamination of ground water due to illegal discharge of electroplating effluent into drains or due to seepage of effluent from underground storage tanks.
- The concentration of Iron in bore well no. 1,2,3 and 4 found exceeding drinking water quality.

- The concentration of manganese in bore well no. 3 & 4 also indicates the contamination of ground water.

4.5 Conclusions

- Unplanned growth of this sector is mainly contributed by outsourcing of electroplating work by many corporate sectors (Engineering, Automobile etc.)
- Almost all the units are tiny and small scale units & carrying out job works where finance is a constraint to adopt appropriate pollution control measures.
- Operating in non-industrial areas with inadequate space for pollution control measures, having greater pollution potential and affecting the ground water in the surrounding due to mismanagement of effluent generated.
- Very poor working practices due to unskilled and untrained manpower, insufficient working space and improper layout leading to wastage of chemicals and water.
- Most of the units were found storing their effluent in underground storage tanks. Due to the acidic nature of effluent it may cause damages in the storage tanks & ultimately lead to percolation into ground water.
- The units were found not maintaining records of production, water consumption, hence details of effluent generated and quantity of effluent sent to CETP is not known .The discharge or by pass of effluent into nearby underground drain/ storm water drain may not be ruled out.
- Low awareness and inadequate attention towards handling toxic chemicals and hazardous waste resulting in its poor management.
- Improvement of house-keeping is required in process area as well as effluent storage area
- Adoption of old traditional manual method of plating practices resulting in no control over process, chemicals etc. causing more pollution
- No proper segregation of effluent is practiced and no metal recovery system exists in any unit.
- No proper fume extraction system is provided to capture the acid fumes from the bath and no proper air pollution control devices provided to meet the prescribed standards.

- From the ground water quality assessment study, it reflects that the ground water is contaminated with higher concentration of heavy metals such as Chromium, Iron and Manganese which specifies the illegal discharge of electroplating effluent into drains or due to seepage of effluent from underground storage tanks.

4.6 Recommendations/Suggestions

Karnataka State Pollution Control Board may be asked to implement the following recommendations/suggestions to control the pollution load from electroplating units and to stop ground water pollution further in the Peenya industrial area and other industrial areas where clusters of electroplating units are located and discharging effluent into sewer /storm water drains.

- To control un planned growth of electro plating industries providing job work to other industries viz., automobiles industries, engineering industries and other industrial sectors, KSPCB have to initiate to keep track on production details as well as the job work details to whom they are providing service to make the accountability.
- To make mandatory to obtain consents for both parties i.e. for electroplating industries as well as the units providing job work and in the consent the allowed production capacity should be mentioned.
- Steps are to be taken to relocate the unit's operating in non-industrial areas with inadequate space for pollution control measures and having greater pollution potential and polluting the ground water through illegal discharges to a well designated area having complete facilities for operation of these types of units.
- The electro plating units shall be asked to engage skilled and trained manpower in their process so that to optimise the process which results in reduction of pollution load on environment.
- Units shall be asked to take steps to segregate the waste water from individual bath and to adopt metal recovery system and to recycle the water for rinsing process to reduce the waste water generation as well as heavy metal load on ETP.

- Units shall be asked to adopt cleaner technology options viz., waste minimization techniques, reduction and recycling practices as per CPCB guidelines (Guide to cleaner production in Electroplating sector).
- Units shall asked to provide effluent collection tanks at approachable place and collection tanks should be above the ground level with acid proof dykes(to collect spillage during loading and unloading) to ensure no bypass of effluent into sewer or storm water drain.
- To take initiation to relocation of tiny/small units located in non- industrial area and to provide common effluent treatment facilities to treat their effluent and to reuse the treated effluent in their member units.
- To take initiatives to identify the existing CETP having adequate facilities to treat the effluent generated from the electroplating units and to recycle the treated effluent in their member units till relocation and installation of dedicated CETP meant for the same.
- To take up study visits in consultation with CPCB officials to other states where electroplating units have already implemented cleaner technologies/ relocated to designated place and complying with the norms.
- To take steps for ground water remedial measures through recognised institutions/organisation to reclaim the ground water quality in the Peenya industrial area as well as in other industrial area where clusters of electroplating units are located.

Annexures

Annexure-1

	QUESTIONNAIRE FOR ENVIRONMENTAL STATUS OF ELECTROPLATING INDUSTRIES (Small Scale)	**SOUTH ZONAL OFFICE, Bengaluru**

I.	**General Information**		
a	Name of the Unit	:	
b	Address	:	
c	Name of contact person with designation and Tele/Fax/ Mobile numbers and e-mail.	:	
d	Type of electroplating		
e	Working days in a year	:	
F	Validity of the consent and consented capacity(enclose copy of consent)	:	
II	**Manufacturing Process details :**		
A	Raw Materials Details	:	
B	Brief description of the process	:	
C	Brief description of Pollution control facilities	:	
III	**Water :**		
A	Source of Raw Water supply	:	
B	Water Requirement (m3/day) :		
	Process		
	Cooling water		
	Drinking		
	Other		
	Total		
IV	**Waste Water Management**	:	
i.	Quantity of waste water generated (m3/day)	:	
ii.	Details of treatment system if exists and point of discharge.	:	

iii.	If treatment facility is not exist, provide the details (quantity and quality of effluent) of CETP in which effluent sent	:	
iv.	Quantity of Water recycled	:	
	(a) In %age		
	(b) In m^3/day		
v.	Details of recycling mechanism	:	
V	**Details of Metal Recovery :**		
a.	Type of metal recovery system exist and its brief description		
b.	Efficiency of metal recovery system		
c.	Quantity of Metal recovered per day		
d.	Operating Cost of recovery system		
VI	**Solid waste / Hazardous waste Management**		
i.	Details of solid/Hazardous waste source and quantity generate	:	
ii.	Details of disposal of solid/Hazardous waste	:	
VII	**Source emission Details (D.G. Sets activity).**		
i.	Capacity of DG set, type of fuel used, height of chimney provided	:	
ii.	Details of fugitive emissions (Indicate the points of fugitive emissions and quantities estimated)	:	
iii.	Provided source emission monitoring reports	:	
VIII	**Other details :**		
i.	Source of Energy		
ii.	Energy requirement per day		
iii.	Copy of Environmental statement submitted to SPCB		

Date:
Place:

Signature:
Name:
Designation:

Annexure -2

	QUESTIONNAIRE FOR ENVIRONMENTAL STATUS OF ELECTROPLATING INDUSTRIES	**SOUTH ZONAL OFFICE, Bengaluru**

I.	**General Information**		
a	Name of the Unit	:	
b	Address	:	
c	Name of contact person with designation and Tele/Fax/ Mobile numbers and e-mail.	:	
d	Type of the unit (Large/medium/small)	:	
e	Type of electroplating		
f	Working days in a year	:	
II	**Environmental Setting :**		
A	**Please indicate area earmarked for each of the following in hectares**		
	1. Unit Facilities	:	
	2. Storage (Chemicals)	:	
	3. Storage (Hazardous Waste)	:	
	4. Storage (Hazardous Chemicals)	:	
	5. Storage (water)	:	
	6. Approach Road(s)	:	
	7 . Green Belt	:	
	8. Others (Please specify)	:	
	Total	:	

B.	**Proximity to Infrastructure :**			:
		Rail	Road NH/SH	Nearby city/town
	Distance of site boundary in km			
	Distance of plant facilities in km			

III	**Manufacturing Process details :**					
A	Raw Materials **:**					
	Type of unit	**Type of Electroplating**	**Type of chemicals used**	**Quantity of Chemicals used (tonnes/year**	**Source of material**	**Means of transportation(source to storage site)**
	Large					
	Medium					
	Small					
B	Brief description of the process			:		

C	Material Balance and Flow Sheet		:	
D	Brief description of Pollution control facilities		:	
E	Details of process technology know how/collaboration		:	
IV.	**Water :**			
A	Source of Raw Water supply **:**			
B	Water Requirement (m3/day) :			
	Purpose	**Avg. Demand in** m^3/day	**Type treated/ Untreated/ Fresh/ Recycled**	
	Process			
	Cooling water			
	Drinking			
	Green belt			
	Fire Service			
	Other			
	Total			
C	**Waste Water Management**			
	1. Description of waste water treatment plant with flow chart			
	2. Daily discharge (m3/day) from different sources			
	(a) Process			
	(b) Cooling water			
	(c) Domestic			
	(d) Any other (specify)			
	Total			
	3. Quantity of Water recycled			
	(a) In %age			
	(b) In m^3/day			
	4. Details of recycling mechanism			
	5. Point of final discharge			
	Final Point		**Quantity Discharged in m^3/day**	
	(i) Green belt within the plant/township			
	(ii) Agricultural land/ Fallow Land/ Forest Land			
	(iii) River/Stream/ Lake			
	Total			
V	**Details of Metal Recovery :**			
a.	Type of metal recovery system exist and its brief description			
b.	Efficiency of metal recovery system			
c.	Quantity of Metal recovered per day			
d.	Operating Cost of recovery system			
VI	**Solid waste / Hazardous Waste Management**			
A	Details**:**			
	Source	**Qty (TPM)**	**Form (Sludge/Dry/ Slurry etc.,**	**Composition**
	1. Surface Preparation			

	2. Pre treatment			
	3. Plating			
	4. Post treatment			
	5. Sludge from wastewater treatment			
	6. Others			

B	What are the possibilities of recovery and recycling of wastes?	
C	Possible users of Solid Waste (s)	
D	Method of disposal of solid waste (s)	
	Method	
	i. Landfill	
	iii. Recovery	
	iv. Downstream users	
E	In Case of Landfill	
	i. Is solid waste amenable for landfill	
	ii. Details of Land fill in which wastes were sent/sending	

VII.	**Noise Pollution control & Management :**		
A	Source	:	
B	Level at Source (db)	:	
C	Level at project boundary Capacity (db)	:	
D	Abatement measures (give source-wise details)	:	
VIII.	**Energy Requirement**		
A	Total Power Requirement (MW)	:	
B	Source of Power (MW)	:	

IX. Source Emissions

A — Stack emission Details (D.G. Sets activity). :

	Stack No.	**Height from ground level (m)**	**Internal Diameter (top) in m**	**Flow rate Nm^3/hr**	**Temp. of Exhaust Gases (o C)**	**Exit Velocity (m/sec)**	**Exhaust Gas**		
							SPM (mg/Nm^3)	**SPM (mg/Nm^3)**	**SPM (mg/Nm^3)**

B	Details of fugitive emissions (Indicate the points of fugitive emissions and quantities estimated)	
	Frequency of monitoring	
	Monitoring results	

HCL mist	**H_2SO_4 mist**	**SO2**	**NOx**

X. Storage of Chemicals (Inflammable/explosive/Hazardous/toxic substances

Sl. No.	**Name of the chemicals**	**Physical and Chemical Compostion**	**Consumption in TPD**	**Maximum quantity of storage at any point of time**	**Source of Supply**	**Means of transportation**

XI.	**Occupational Health and Hygiene :**	
A	What are the major occupational healths and safety	

	hazards anticipated (enclose brief note).	
B	Details of personal protective equipment provided to the workers.	
E	Details of fire protection and safety measures envisaged to take care of fire and explosion hazards.	
XII	**Pollution Control Aspects : Details of Pollution control system :**	

S. No.		**Name of Equipment**	**Capacity**	**Input Parameters to Pollution control equipment**
i.	Emissions			
ii.	Water			
iii.	Noise			
iv.	Solid Waste			
v.	Hazardous waste			

XIII.	**Status of environmental Pollution around the industry:**		
A	Ambient Air Quality monitoring status provide the report of current and last two years	**:**	
B	Ground Water Monitoring quality data for last two years.	**:**	
C	Ambient Noise level data for last two years	**:**	
XIV.	**Management Aspects :**		
A	Number of Persons employed	**:**	
B	Details of organizational set up/cell for environmental management and monitoring.	**:**	
C	Clearance letter of State Pollution Control Board if you expanded the capacity	**:**	
D	Copy of Consents under Water Act, Air Act and Hazardous Waste Authorisation	**:**	
XV.	**Expenditure on Environmental Measures :**		
A	. Capital cost of the project (Rs. Lakhs)	**:**	
B	Cost of environmental protection measures (Rs. Lakh)	**:**	

		Recurring Cost per annum	Capital Cost
	Air Pollution Control		
	Water Pollution Control		
	Noise Pollution Control		
	Environment Monitoring and Management		
	Occupational Health		
	Green Belt		
	Others		
	Total		

XVI.	**Other Information :**			
1	EIA Clearance if any	**:**		
2	Copy of Environmental statement submitted to SPCB	**:**		
3	Implementation of Public Liability Insurance (PLI) Act, 1981.	**:**		
4	Onsite /Offsite measures taken	**:**		
5	Details on existing Best available technologies (BAT) and proposed BAT technologies	**:**		

Note : All information may please be given in the format . If needed separate report/ annexure /drawings shall be attached.

Date:
Place:

Signature:
Name:
Designation:

Annexure -3

Table 3.1: Compiled information of the electroplating industries collected through questionnaire survey

Sl. No.	Name of the Industry	Production capacity	Type of Electroplating	Category Small/Medium/Big	Raw material Consumption list
1	Electro Circuit Treatments No. 193/A, 4th Main, 6th Cross, 4th Stage, Industrial Town, Rajajinagar, Bengaluru-560044	0.8 Ton/Month	Gold & Silver	Small	1.Gold-10gms/month 2.Silver-100gms/month 3.Nickel-3kgs/month 4.Zinc-10kgs/month 5.Hcl-10Ltrs/month 6. Sulphuric Acid-5ltrs/month 7.Nitric Acid-5Ltrs/month
2	J.M.J Enterprises No. 21, 5th Main, 5th Cross, Industrial Town, Rajajinagar, Bengaluru-560044	-	Zinc	Small	1. Zinc-30Kgs/month 2. HCl-20Ltrs/month 3.Sulphuric Acid-1Kgs/month 4. Nitric Acid-5Kgs/month
3	VMX Connectors Private Limited #15/C, 2nd Stage Veerasandra, KSSIDC Industrial Estate, Huskur Road, Bengaluru-560099	-	Zinc, Nickel & Cadmium	small	Zinc, Nickel, Cadmium, Aluminium
4	Nagalakshmi Electroplaters No. 5 & 6, 5th Cross Kanteerava Studio Road, Behind F.T.I. Nandini layout, Bengaluru-560096	-	Tin, silver & nickel	Small	Tin, Stannous Sulphate sulphuric acid/ Nickel salt, Nickel/ Silver, Silver salt/ Nitric acid & caustic soda
5	Dural Technologies Pvt. Ltd. B-91, Veerasandra Industrial Estate, Electronic City, Bengaluru-560100	-	Anodizing	Small	Not Provided

6	Sunrise Electroplaters 122-B, Boomasandra Industrial Area, Hosur Road, Bengaluru-560099	Copper,Chrome & Nickel: 1.5lks sq.mt/mth and Zinc, Tin & silver: 1000 units/day	Copper, Nickel, Chrome & Silver	Small	Nitric Acid-500ltrs/mth, Sulphuric Acid-400ltrs/mth, Hydrochloric Acid-300ltrs/mth, Chromic Acid-500ltrs/mth, Nickel Salt-300kg/mth, Tin Salt-200kg/mth, Sodium cyanide-100kg/mth, Copper-200kg/mth
7	Murali Prakash Industry No. 58/10, 4th Cross, 5th Block, SSI Area, Rajajinagar, Bengaluru-560010		Nickel, Copper, Silver, Ncz, Tin	Small	Nickel Salt, Nickel anode, Brighteners, Rochelle Copper Salt, Copper anode, SPC+SC & anode, Caustic Soda, Zinc anode, Conditioner, Tin Salt, Additive
8	Hitech Industry No. 165/1-1, KSSIDC Area, Bommasandra, Bengaluru-560099	Chrome Plating: 75000 sq inches/day	Chrome		Heef-25 (Chromic Acid)
9	ITI LTD, Bengaluru Plant Dooravaninagar Bengaluru-560016		i. Alkaline Zinc, Copper and Zinc-Nickel ii. Acid Tin and Nickel	Large	Sodium hydroxide flakes-300kgs/yr, Nickel Sulphate-60kgs/yr, Nickel Carbonate-10kgs/yr, Tri-Chloro ethylene-2700kgs/yr, Nitric Acid-764kgs/yr, Hydrochloric Acid-1001kgs/yr, Sulphuric acid-1100, Unimax Post dip-50kgs/yr, Trichromo HB 2203C-90kgs/yr
10	Nicam Industries No. B-84, KSSIDC Industrial estate, Bommasandra, Bengaluru-560099	4lks sq.inches /month	Zinc,Silver, Nickel & Tin	small	Caustic Soda-300kg/mth, Steelex K-20 - 100kg/mth, Zinc Bond-808 - 100kg/mth, Hcl-450kg/mth, Nitric Acid-200kg/mth, Sulphuric Acid-200kg, Zinc Brightner-100lts, Purifier- 30lts/mth, Passivation Chemical-100lts/mth, Zinc Anode-300kg/mth, Additives-25lts/mth, Brightner-15lts/mth, Silver Salt-2kg/mth, Nickel Sulphate-20kg/mth, Nickel Chloride-5kg/mth, Boric Acid-2kg/mth, Nickel Anode-10kg/mth

11	BEML Bharat Electronics, A Govt. of India Enterprises, Min of Defense, Jalahalli Post, Bengaluru-560013		Surface Treatment and plating	Large	Not Provided
12	Mitra Metal Finishers Sy:24 Behind Central Bank, 100ft Road, Dasarahalli, Bengaluru-560057		Nickel & Chrome	Small	Not Provided
13	SML Metal Finishers Sy:24, Behind Syndicate Bank, 100Ft Road, T.Dasarahalli, Bengaluru-560057		Zinc	Small	B-salt, Boric Acid, A-liquid
14	Sharada Electro Chem. A-14, F-2, 8th Cross, Attibele Industrial Area, Anekal Taluka, Bengaluru		coating & painting	Small	Zinc Salt-100kg/mth, Brightener-100lts/mth, Sulphuric Acid-50lts/mth, Hydrochloric Acid-500lts/mth, Additives-100lts/mth, Passivator-30lts/mth
15	Srinivas Industries Works:42, 3rd cross, 100ft Road, Nathaji nagar, Jalahalli Cross, Bangalor-560057		zinc	Small	Zinc anode, Boric Acid, B-salt
16	Vijai Rotogravures #90/A, 3rd Main Road, Keonix layout, Thigalarapalya main road, Peenya 2nd stage, Bengaluru-560058		Chromium And Copper	Small	Copper sulphate, Chromic acid
17	Manjunatha Metal Finishers # 784, 11th cross road, 4th phase peenya industrial area, Ganapathi Nagar, Bengaluru-560058		Zinc	Small	Caustic Soda-900kgs/yr, HCl-1200kgs/yr, Zinc Anode-1700kgs/yr, Brightner 400- 500lts/yr, Passivation 1100-100lts/yr, Conditioner-6lts/yr, Nitric Acid-20lts/yr, Degreasing salt-100kgs/mth
18	Raj Metal Finishers # 24, 100Ft Road, Jalahalli Cross, Behind syndicate Bank, Bengaluru- 560057		Tin , Copper	Small	Not Provided
19	Suraj Metal Finishers #13, 1st Cross, Kempamma Extn, Kaverinagar, Laggare, Peenya 3rd phase, Bengaluru-560058		Tin & Nickel	Small	Not Provided

Table 3.2: Details on Water consumption, wastewater generation and treatment details

Sl. No.	Name of the Industry	Details of Water		Effluent details			
		Water Consumption (Cubic metre/ Day)	Waste water generation (Cubic metre/Day)	Trade Effluent (LPD)	Treatment System	Domestic effluent (LPD)	Treatment System
1	Electro Circuit Treatments No. 193/A, 4th Main, 6th Cross, 4th Stage, Industrial Town, Rajajinagar, Bengaluru-560044	0.5	0.1	67	CETP- Eco Green Solution Systems (Pvt) Ltd.	240	Into BWSSB Sewer with permission
2	J.M.J Enterprises No. 21, 5th Main, 5th Cross, Industrial Town, Rajajinagar, Bengaluru-560044	0.2	0.05	90	CETP- Eco Green Solution Systems (Pvt) Ltd.	400	Into BWSSB Sewer with permission
3	VMX Connectors Private Limited #15/C, 2nd Stage Veerasandra, KSSIDC Industrial Estate, Huskur Road, Bengaluru-560099	Not Provided	Not Provided	500	CETP- M/s. Pai & Pai Chemicals for treatment & disposal	500	Into Septic tank & Soak Pit
4	Nagalakshmi Electroplaters No. 5 & 6, 5th Cross Kanteerava Studio Road, Behind F.T.I. Nandini layout, Bengaluru-560096	0.7	0.2	217	CETP- Eco Green Solution Systems (Pvt) Ltd.	400	CETP- Eco Green Solution Systems (Pvt) Ltd.
5	Dural Technologies Pvt. Ltd. B-91, Veerasandra Industrial Estate, Electronic City, Bengaluru-560100	0.085	0.075		CETP- M/s. Viwa Eco club for treatment & disposal		
6	Sunrise Electroplaters 122-B, Boomasandra Industrial Area, Hosur Road, Bengaluru-560099	4.3	2.8	2800	Effluent treatment plant	1260	Septic tank followed by soak pit
7	Murali Prakash Industry No. 58/10, 4th Cross, 5th Block, SSI Area, Rajajinagar, Bengaluru-560010	0.725	0.25	400	CETP	300	Into BWSSB Sewer with permission

8	Hitech Industry No. 165/1-1, KSSIDC Area, Bommasandra, Bengaluru-560099	0.35	0.15	100	CETP- M/s. Viwa Eco club for treatment & disposal	200	Septic tank followed by soak pit
9	ITI LTD, Bengaluru Plant Dooravaninagar Bengaluru-560016	2322	1058	88	Effluent treatment plant	1117	sewage treatment plant
10	Nicam Industries No. B-84, KSSIDC Industrial estate, Bommasandra, Bengaluru-560099	0.75	0.4	400	CETP- M/s. Viwa Eco club for treatment & disposal	280	Septic tank followed by soak pit
11	BEML Bharat Electronics, A Govt. of India Enterprises, Min of Defense, Jalahalli Post, Bengaluru-560013	3340	2330	1330	Effluent treatment plant	1800	for gardening
12	Mitra Metal Finishers Sy:24 Behind Central Bank, 100ft Road, Dasarahalli, Bengaluru-560057	0.24	0.08	Not Provided	CETP- Eco Green Solution Systems (Pvt) Ltd.	Not Provided	
13	SML Metal Finishers Sy:24, Behind Syndicate Bank, 100Ft Road, T.Dasarahalli, Bengaluru-560057	0.026	0.01	Not Provided	CETP- Eco Green Solution Systems (Pvt) Ltd.	Not Provided	
14	Sharada Electro Chem. A-14, F-2, 8th Cross, Attibele Industrial Area, Anekal Taluka, Bengaluru	Not Provided	0.9	Not Provided	CETP- Eco Green Solution Systems (Pvt) Ltd.	Not Provided	
15	Srinivas Industries Works:42, 3rd cross, 100ft Road, Nathaji nagar, Jalahalli Cross, Bangalor-560057	1.5	Not Provided	Not Provided	CETP- Eco Green Solution Systems (Pvt) Ltd.	Not Provided	
16	Vijai Rotogravures #90/A, 3rd Main Road, Keonix layout, Thigalarapalya main road, Peenya 2nd stage, Bengaluru-560058	0.29	Not Provided				

17	Manjunatha Metal Finishers # 784, 11th cross road, 4th phase peenya industrial area, Ganapathi Nagar, Bengaluru-560058	0.68	0.2	Not Provided		
18	Raj Metal Finishers # 24, 100Ft Road, Jalahalli Cross, Behind syndicate Bank, Bengaluru- 560057	1.93	0.13	Not Provided	CETP- Eco Green Solution Systems (Pvt) Ltd.	Not Provided
19	Suraj Metal Finishers #13, 1st Cross, Kempamma Extn, Kaverinagar, Laggare, Peenya 3rd phase, Bengaluru-560058	0.1	Not Provided		CETP- Eco Green Solution Systems (Pvt) Ltd.	Not Provided

Table 3.3: Air emission details

Sl. No.	Name of the Industry	Air Emissions Details				
		Diesel Generator Set		Process		
		Capacity	Chimney Ht & Control Equipment	Type	Constituent to be controlled	Chimney Ht & Control Equipment
1	Electro Circuit Treatments No. 193/A, 4th Main, 6th Cross, 4th Stage, Industrial Town, Rajajinagar, Bengaluru-560044	20KVA	3mtr ARL with acoustic enclosures	Acid Pickling Section	Acid Mist	3mtr ARL with Scrubber
2	J.M.J Enterprises No. 21, 5th Main, 5th Cross, Industrial Town, Rajajinagar, Bengaluru-560044	Electricity From BESCOM		Plating Section	Acid Mist	3mtr ARL with Scrubber
3	VMX Connectors Private Limited #15/C, 2nd Stage Veerasandra, KSSIDC Industrial Estate, Hosur Road, Bengaluru-560099	30KVA	3mtr ARL with acoustic enclosures	Acid Pickling Section & Plating Section	Acid Fumes	9mtr ARL with fume extracting system & alkaline scrubber
4	Nagalakshmi Electroplaters No. 5 & 6, 5th Cross Kanteerava Studio Road, Behind F.T.I. Nandini layout, Bengaluru-560096	62.5KVA	3mtr ARL with acoustic enclosures	Plating Section, Powder coating booth-I & II and Electric Oven	Acid Mist & SPM	3mtr ARL with Scrubber & Cyclone dust collector

5	Sunrise Electroplaters 122-B, Boomasandra Industrial Area, Hosur Road, Bengaluru-560099	125KVA	5mtr ARL with acoustic enclosure	All Plating Section		Individual Chimney of 3mtr ARL with Scrubber
6	Murali Prakash Industry No. 58/10, 4th Cross, 5th Block, SSI Area, Rajajinagar, Bengaluru-560010	Not Provided		Plating Section	yh	Scrubber
7	Hitech Industry No. 165/1-1, KSSIDC Area, Bommasandra, Bengaluru-560099	Not Provided		Chrome plating bath	Acid mist	3mtr ARL with scrubber
8	ITI LTD, Bengaluru Plant Dooravaninagar Bengaluru-560016	Electricity From BESCOM		All Plating Section	Acid mist	3mtr ARL with scrubber
9	Nicam Industries No. B-84, KSSIDC Industrial estate, Bommasandra, Bengaluru-560099	62.5KVA	3mtr ARL with acoustic enclosure	Pickling & Plating Bath	Acid mist	3mtr ARL with scrubber
10	BEML Bharat Electronics, A Govt. of India Enterprises, Min of Defense, Jalahalli Post, Bengaluru-560013	Electricity From BESCOM & 38% from their own wind power plant	All Plating Section	Acid mist	3mtr ARL with scrubber	Not Provided
11	Vijai Rotogravures #90/A, 3rd Main Road, Keonix layout, Thigalarapalya main road, Peenya 2nd stage, Bengaluru-560058	37.5KVA	3mtr ARL with acoustic enclosure	Not Provided		
12	Manjunatha Metal Finishers # 784, 11th cross road, 4th phase peenya industrial area, Ganapathi Nagar, Bengaluru-560058	82.5KVA	3mtr ARL with acoustic enclosure	Not Provided		
13	Suraj Metal Finishers #13, 1st Cross, Kempamma Extn, Kaverinagar, Laggare, Peenya 3rd phase, Bengaluru-560058	Electricity From BESCOM	Not Provided			

Table 3.4: Details on Solid waste /Hazardous waste generation

Sl. No.	Name of the Industry	Solid Waste Generation		Hazardous Waste Generation
		Type	Quantity	
1	Electro Circuit Treatments No. 193/A, 4th Main, 6th Cross, 4th Stage, Industrial Town, Rajajinagar, Bengaluru-560044	Disposed through CETP		nil
2	J.M.J Enterprises No. 21, 5th Main, 5th Cross, Industrial Town, Rajajinagar, Bengaluru-560044	Binding Wire	10kgs/mth	nil
3	VMX Connectors Private Limited #15/C, 2nd Stage Veerasandra, KSSIDC Industrial Estate, Hosur Road, Bengaluru-560099	Metal Scrap	200kgs/mth	nil
		Domestic Garbage	10kgs/mth	
4	Nagalakshmi Electroplaters No. 5 & 6, 5th Cross Kanteerava Studio Road, Behind F.T.I. Nandini layout, Bengaluru-560096	Cotton & Paper Waste, Copper binding wire	4.5kgs/mth,	nil
5	Sunrise Electroplaters 122-B, Boomasandra Industrial Area, Hosur Road, Bengaluru-560099	Papers, cardboards, plastics, others	2kg/day	Used oil, oil soaked cotton waste, oil filters, ETP sludge
6	Murali Prakash Industry No. 58/10, 4th Cross, 5th Block, SSI Area, Rajajinagar, Bengaluru-560010	Paper & Cotton Waste, Copper binding wire	4kg/mth	Nil
8	Hitech Industry No. 165/1-1, KSSIDC Area, Bommasandra, Bengaluru-560099	Not Provided		nil
9	ITI LTD, Bengaluru Plant Dooravaninagar Bengaluru-560016	Not Provided		Used oil, oil soaked cotton waste, oil filters, ETP sludge, lead bearing residue, glass epoxy powder
10	Nicam Industries No. B-84, KSSIDC Industrial estate, Bommasandra, Bengaluru-560099	Not Provided		Used oil, oil soaked cotton waste, oil filters, ETP sludge, lead bearing residue, glass epoxy powder