

Name of Department	Sustainability Department
Field of work	Waste water Management
Report Prepared	Ms. Pallavi U.P (Sustainability Engineer)
Report inclusive	(a) Sewage/ Waste Management within E-CITY (b) Sewage Treatment Plants (c) Rain water Harvesting / Recharge (d) E-Toilets (e) Fecal sludge / Septage Management (f) Zoho Software (g) Air Pollution (h) Re-creation / Rejuvenation of Lake

1. Sewage/ Waste water Management within E-city

Sewage / Waste water management – Is the process of converting waste water, which is no longer indeed for use into clear usable water that can be discharged into environment without any harm.

Objectives:

The main goal of waste water management is to clean and protect water.

- (a) To improve water conservation
- (b) To achieve Pollution free environment
- (c) To prevent eutrophication

ELCITA STRATEGY: Waste Water Managements

In order to reduce fresh water demand, 100% recycling and reuse of treated water has been proposed.

To achieve this, the untreated waste water generated and disposed in the storm drains in Electronics city should be prohibited without proper treatment. And at the same time, the excess treated water disposal from the companies should be reused by other companies if it requires. Therefore, we are trying to achieve no net disposal of waste water from Electronics city.

ELCITA INIATIVE TOWARDS UNAUTHORIZED SEWAGE DISPOSAL

Electronics city is spread over 903 acres of land on Hosur Road just outside the limit of BBMP. E-city established with various Small scale and large scale industries. Total consumption of fresh water within Electronics city is 6,700 KLD (as per Eco-first report -2014). Only 87% of the waste water generated is treated, and 52% of treated waste water is reused.

As per KSPCB Norms, all demand centres sewage generation over than 10 KLD should install their own STP's. Demand centres generating less than 10 KLD are required to have septic tanks.

ELCITA has taken initiative to built network. Industries using the network will dump untreated water into a waste water collection network that will convey this water to the STP currently, no such collection network exists. KAM-AVIDA tankers are used to transport waste water from the demand centres to treatment plant. This network has designed and constructed to make this model sustainable.

The system is running with economy. ELCITA has fixed the rate for sewage Service of Rs. 75 per KL and treated water supply for 1 KL of Rs. 65/- based on the operation and maintenance of vehicles, distance and respective Labour expenses.

2. Sewage Treatment Plant

Sewage treatment is the process of removing contaminants from municipal & domestic wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater that is safe enough for release into the environment

ELCITA has four STP's with different technologies with one pipeline sewer system, Septic tank within Electronics city.

Sl. No.	Technologies	Capacity	Location
1	Extended Aeration Activated Sludge Process (CSTP)	300 KLD	@ ELCIA CLUSTER
2	Soil Bio Technology (SBT)	8 KLD	@ Fire Station
3	Eco Sequence batch Reactor (e-SBR)	7 KLD	@ ELCIA COMPLEX
4	Anaerobic Baffle Reactor (ABR)	9 KLD	@ PUMP House
5	Sewer line of HDPC -90MM (Septic Tank)	400 KLD	@ KSSIDC Block
6	KIADB Septic Tank	550 KLD	@ KIADB

Standard operating procedure:

ELCITA runs a 300 KLD extended aeration activated sludge processing CSTP for treating Sewage from large and small scale industries existing within electronics city. The sewage to the STP is picked up by compressor vehicle from the industries as well as by a pumping system. Sewage from the KSSIDC complex is sent to the CSTP through conduit connection. The septic sump is connected with inlets of more than 100

companies around it. A mobile app captures the quantity of sewage that's comes in from various location.

(1) CSTP -300 KLD Located at ELCIA Cluster.

Extended aeration activated sludge process is works on the principle of Suspended growth aerobic process. It has high process stability with a retention period of 20-24 hours with high treatment efficiency.

An **extended-aeration** system includes capabilities for **aeration** & mixing, settling, return of activated sludge and solids removal, this last in the form of a biomass known as waste-activated sludge. It is preferred for sewage fluctual characteristics inflow to get desirable quality of treatment for clear and suitable water for "*Reuse, Recovery and Recycle*".

Average Capacity per day of STP;

Total Quantity of Inflow in Cum = 230 -240 KLD

Sources with Avg. quantity –

- (a) From Small companies of around 32 Nos. by KAM-AVIDA -90 KLD
- (b) From KIADB Septic Tank by KAM-AVIDA – 56 KLD
- (c) From KSSIDC Septic Tank by Pipe line – 100 KLD

Generated Sewage is collected, Transported, Treated through various treatment units, in order to get an quality of treated water which meets the KSPCB Permissible limits as per "water and air act".

List of Treatment facility existed at 300 KLD CSTP

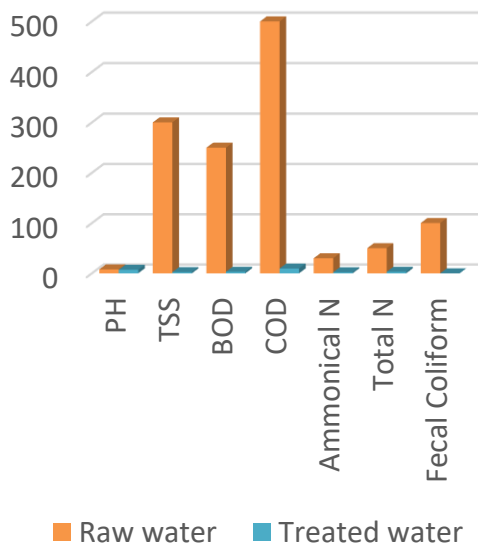
1. Equalization Tank
2. Aeration Tank
3. Extended Aeration Tank
4. Preliminary Clarifier
5. Secondary Clarifier
6. Filtration
7. Chlorination
8. Final Treated Tank



(2) 7 KLD e-SBR Technologies STP.

A 7 KLD eco sequence batch reactor system treats about 5 to 6 KLD/Day of sewage generated by the ELCITA office.

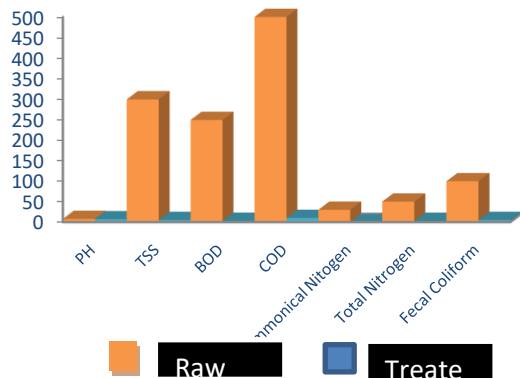
Performance of e-SBR STP



Parameters	Raw water	Treated water
PH	7.7	7
TSS	300	2.2
BOD	250	3
COD	500	9.5
Ammonical N	30	2
Total N	50	3
Fecal Coliform	100	0

(3) 8 KLD SBT Technology STP:

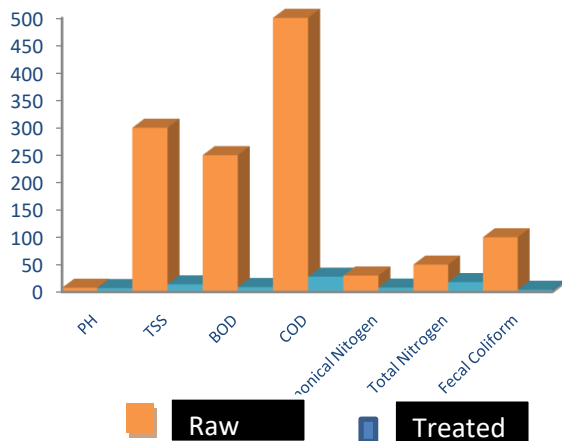
An 8 KLD Soil Bio Technology STP was set up at the Electronics city Fire station, This technology is works on the principle of a wetland Purifying system and treats around 6-7 KLD/Day .



Parameters	Raw water	Treated water
PH	7.67	7
TSS	300	5
BOD	250	3
COD	500	10
Ammonical Nitrogen	30	0
Total Nitrogen	50	2.8
Fecal Coliform	100	5

(4) 9 KLD ABR SYSTEM STP.

A 9KLD Anaerobic Baffle Reactor Sewage treatment technology is working to treat about 6-8 KLD of sewage generated by various commercial buildings near the ELCITA pump house

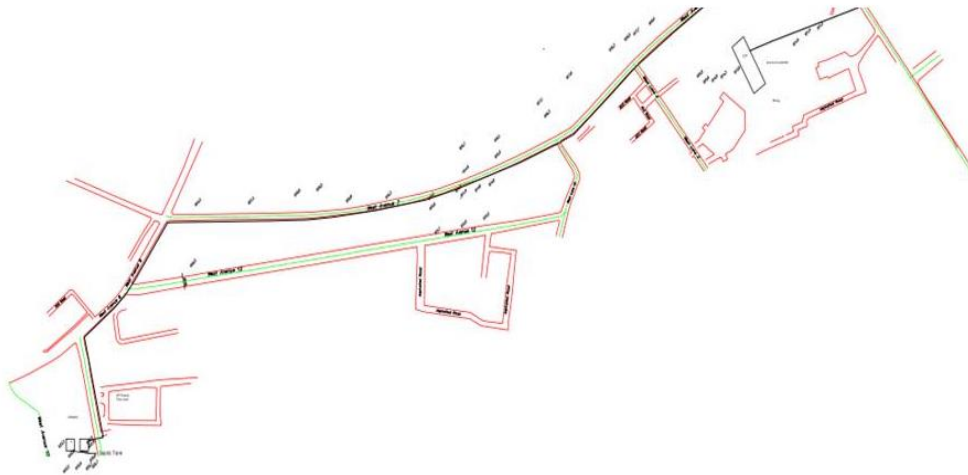


Parameters	Raw water	Treated water
PH	7.67	7
TSS	300	14
BOD	250	9
COD	500	28
Ammonical Nitrogen	30	8
Total Nitrogen	50	18
Fecal Coliform	100	4

(5) 400KLD SEPTIC TANK @ KSSIDC.

A 400 cum septic tank is constructed at KSSIDC Block. It is connected with various point source discharges of around 220 small scale industries, which is situated at KSSIDC.

ELCITA has done underground pipeline sewer lifting system of HDPC -90 MM Sewer line with 2 Nos. of 7.5 HP Ground foes Sewage cutter submersible pump (1w+1s) from KSSIDC Septic tank to 300 KLD CSTP of around 2 KM distance.



ROUTE FROM KSSIDC SEPTIC TANK TO ELCIA CLUSTER 300 KLD STP - 1500 M

(6) KIADB SEPTIC TANK.

ELCITA has constructed a sewage sump or tank of 550 cum. The sump is filled with the sewage from the surrounding villages such as Doddnagamangala, KIADB layout, silicon Town and industries. The collected sewage is treated at the CSTP through “KAM-AVIDA” Vehicle

Conclusion: Treated water from all our STP’s are used for gardening, cleaning and construction purposes.

3. E-toilets – 20 Nos.

An **electronic toilet** or **e-Toilet** is a type of public toilet that is used in India. ELCITA initiated e-toilets across Electronics city of 20 Nos. The increase in use of e-Toilets is in support of Swachh Bharat Abhiyan based On “Clean India Mission Act” which intends to reduce the practice of open defecation.

E-Toilets are self-contained, self-cleaning, unisex, user-friendly, unmanned, automated and remotely monitored toilet pods installed in public places. They were developed by a private company, Eram Scientific Solutions.

4. Rain water recharge or Harvesting – 50 Nos.

Rainwater harvesting is the collection and storage of rainwater for reuse on-site, rather than allowing it to run off. Rainwater can be collected from rivers or roofs, and in many places, the water collected is redirected to a deep pit (well, shaft, or

borehole), a reservoir with percolation, or collected from dew or fog with nets or other tools.

Its uses include water for gardening, irrigation and domestic use with proper treatment, indoor heating for houses etc. The harvested water can also be used as drinking water, longer-term storage, and for other purposes such as groundwater recharge.

Rainwater harvesting is one of the simplest and oldest methods of self-supply of water for households usually financed by the user.

ELCITA has constructed around 50 RWH within e-city to increase the ground water table level to achieve high water conservation.



5. Fecal Sludge / Septage Management

Fecal sludge management (FSM) is the collection, transport, and treatment of fecal sludge from pit latrines, septic tanks or other onsite sanitation systems. Fecal sludge is a mixture of human excreta, water and solid wastes that are disposed in pits, tanks or vaults of onsite sanitation systems. Fecal sludge that is removed from septic tanks is called **Septage**.

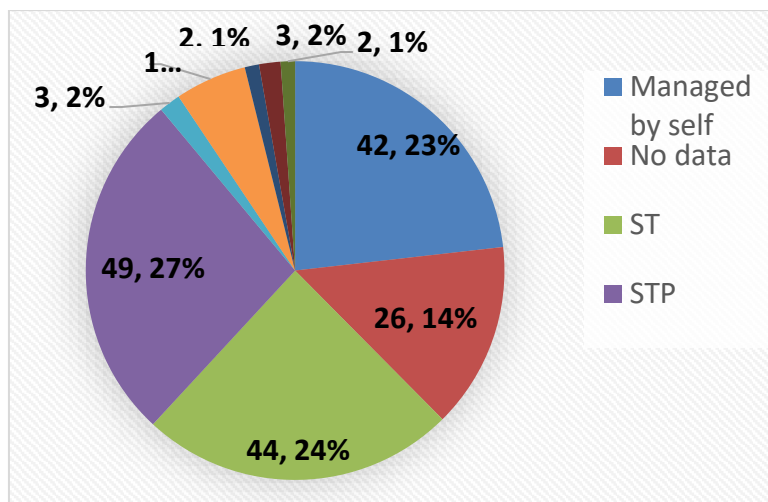
FSM is necessary in densely populated areas where a proportion of population is not connected to a sewerage network, and the covering and rebuilding pit latrines is not possible. This is the case in most urban areas of developing countries, but such services are also used in developed countries where sewerage systems are

unavailable. FSM services are usually provided by formal and informal private sector services providers, local governments, water authorities and utilities.

ELCITA currently focusing towards Fecal sludge Management. Based on available records quantity of faecal sludge generation is very less of around 25 KL per week. Hence, as per the research we are concluded that, we looking of co-treatment with existing CSTP Plant.

Source	Number
Total no. of companies (based on the list provided by Elcita)	322
Small scale wastewater management systems (sorted and compiled)	181
Systems not studied (instruction by ELCITA)	42
Data missing/Access denied	26
Data compiled	113

the breakup of wastewater management systems.



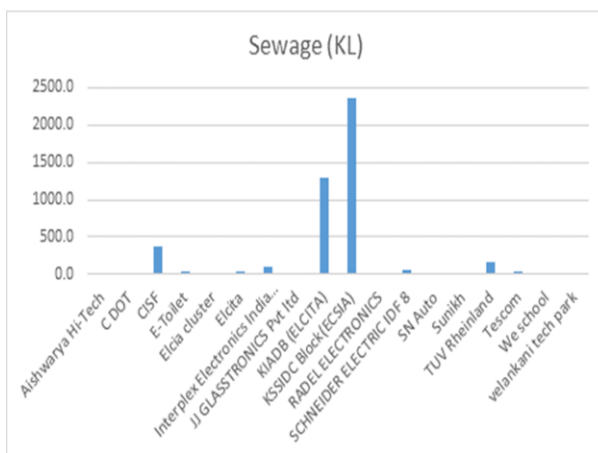
Out of the 181 institutions with data, the following is the breakup of wastewater management systems.

6. ZOHU SOFTWARE

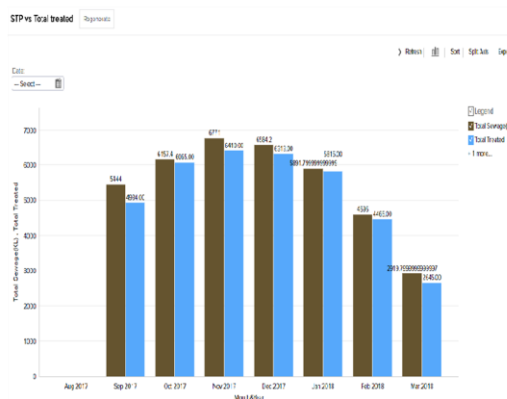
The Zoho software, which we are using for the CSTP Daily Data entry such as details of Trips, Maintenance, Vendor details and Reports, Analytics and charts and Investment and Expenses spent for CSTP -300 KLD.

It is helps to generate auto invoices for quick reach to costumers. This Zoho software is developed to reach smart management of sewage system

Online monitoring of STP by ZOHO S/W



Graphical representation of sewage picked up from companies



Graphical representation of sewage VS treated Water

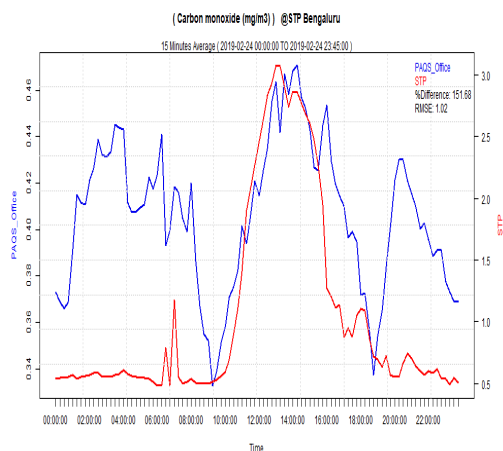
7. Air Pollution

ELCITA is currently working on “ENVIRONMENTAL Fume Sensor Solution @ CSTP”. The main objective of this project is to know about the status of air pollution in and around 300 KLD Existing CSTP.

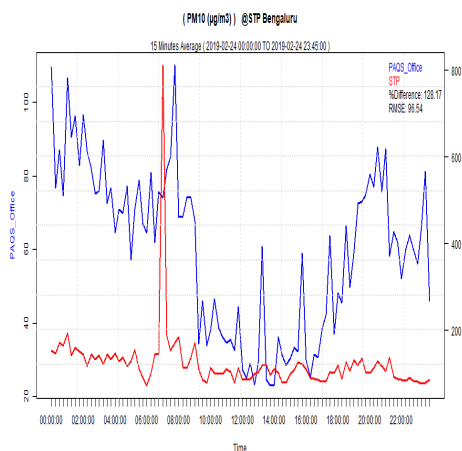
Analysis and evaluation is carried out to check the air quality parameter values and their merits and demerits towards environment.

Comparison between device at STP and PAQS Office (Distance between 2 devices=1.12km)

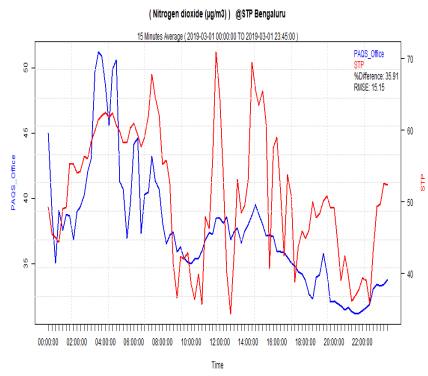
(a) Carbon Monoxide



(b) PM10



(b) Nitrogen dioxide



(b) Ozone

