SMART WATER AND WASTEWATER MANAGEMENT FOR INDIA

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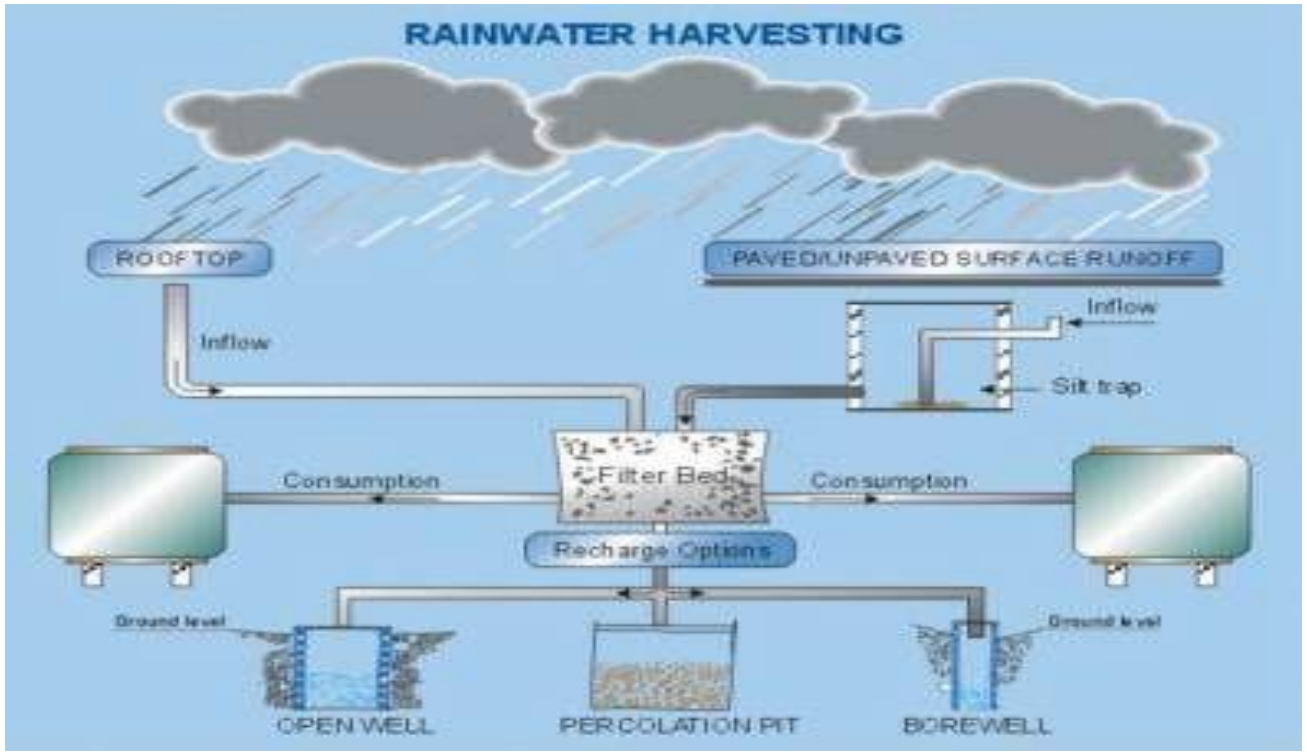
What is smart water management?

- Reduce, Reuse and Recycle; Sustainable
- Water Conservation:- Use of fixtures (public buildings), small and big discharge while flushing
- Rainwater harvesting
- Greywater treatment by constructed wetlands in cities
- Wastewater treatment by constructed wetlands in rural areas
- Technologies like MBR, MBBR, SBR in big cities
- Automation of water and wastewater conveyance and treatment in big cities
- Use of software for design of water treatment plants, sewage treatment plants, sewerage networks, water distribution networks

Rainwater Harvesting : Options



Water Treatment/Automation which is necessary

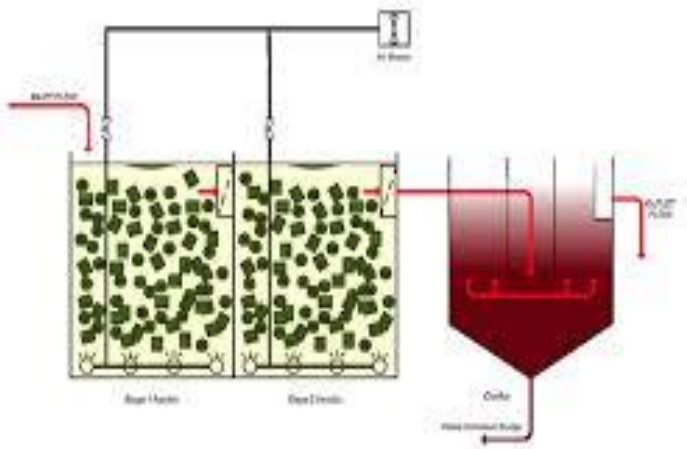
- Analyse the water sample before treatment is suggested.
- Remove the craze for RO treatment
- Monitor the treatment performance
- Disinfection is the mandatory treatment
- Use automation judiciously, sensors for level indicators and starters. Avoids overflows and manpower requirement
- SCADA for operating large water treatment plants, Bhandup Complex, Mumbai
- Use software for design of water treatment plant, water distribution networks

Constructed Wetlands for Greywater Treatment in Cities and Wastewater Treatment in Rural Areas

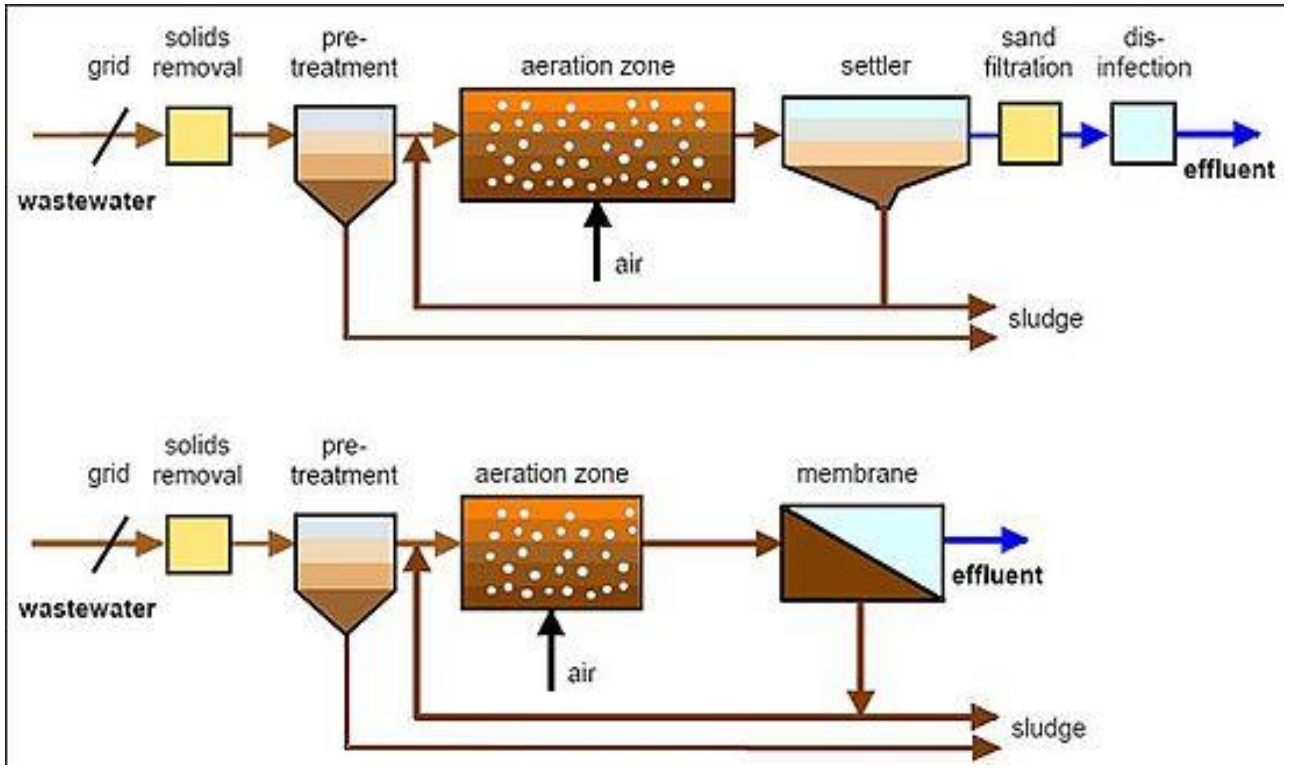
DECENTRALISED STPs IN CITIES

- Mandatory for new Big Projects
- Treated water can be used for flushing, car washing, gardening
- Constraints:- Lack of space
- Advantages:- Availability of power, skilled labour
- Popular Smart technologies:- MBBR, MBR
- Use of software for design of STP

MBBR



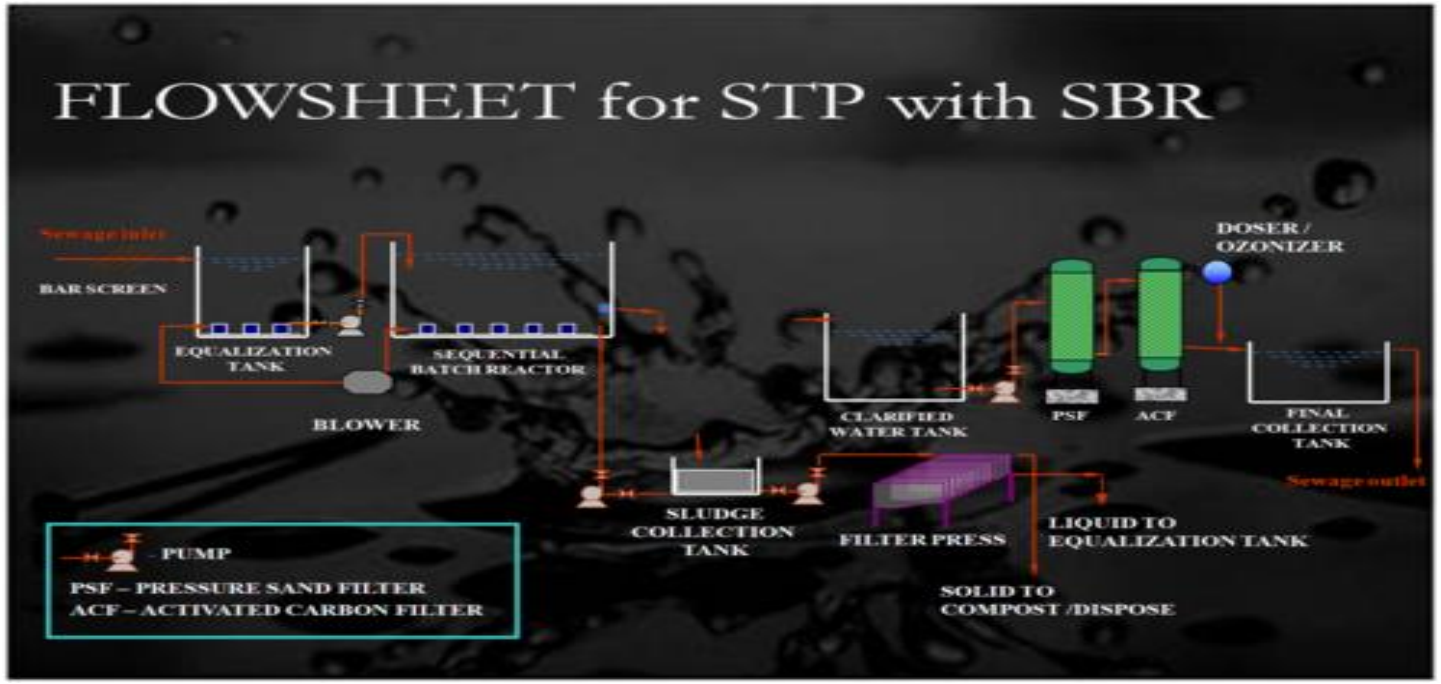
MBR


grid
solids removal
pre-treatment
aeration zone
settler
sand filtration
dis-infection
wastewater
effluent
air
sludge
grid
solids removal
pre-treatment
aeration zone
membrane
wastewater
effluent
air
sludge

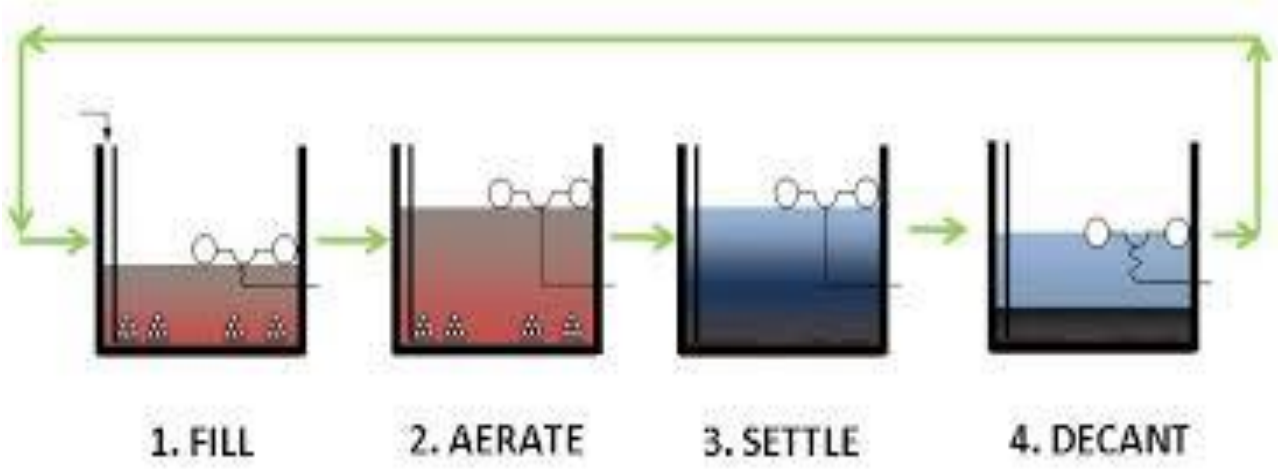
Centralised STPs for Cities

- Smart Objective: Reuse and recycle
- Smart Technology: Sequential Batch Reactor
- Constraints: Stringent Standards for BOD, COD, SS
- First STP based on SBR and Automation was installed in Goa
- Guidance: CM Mr. Manohar Parrikar
- Design of STPs using Software

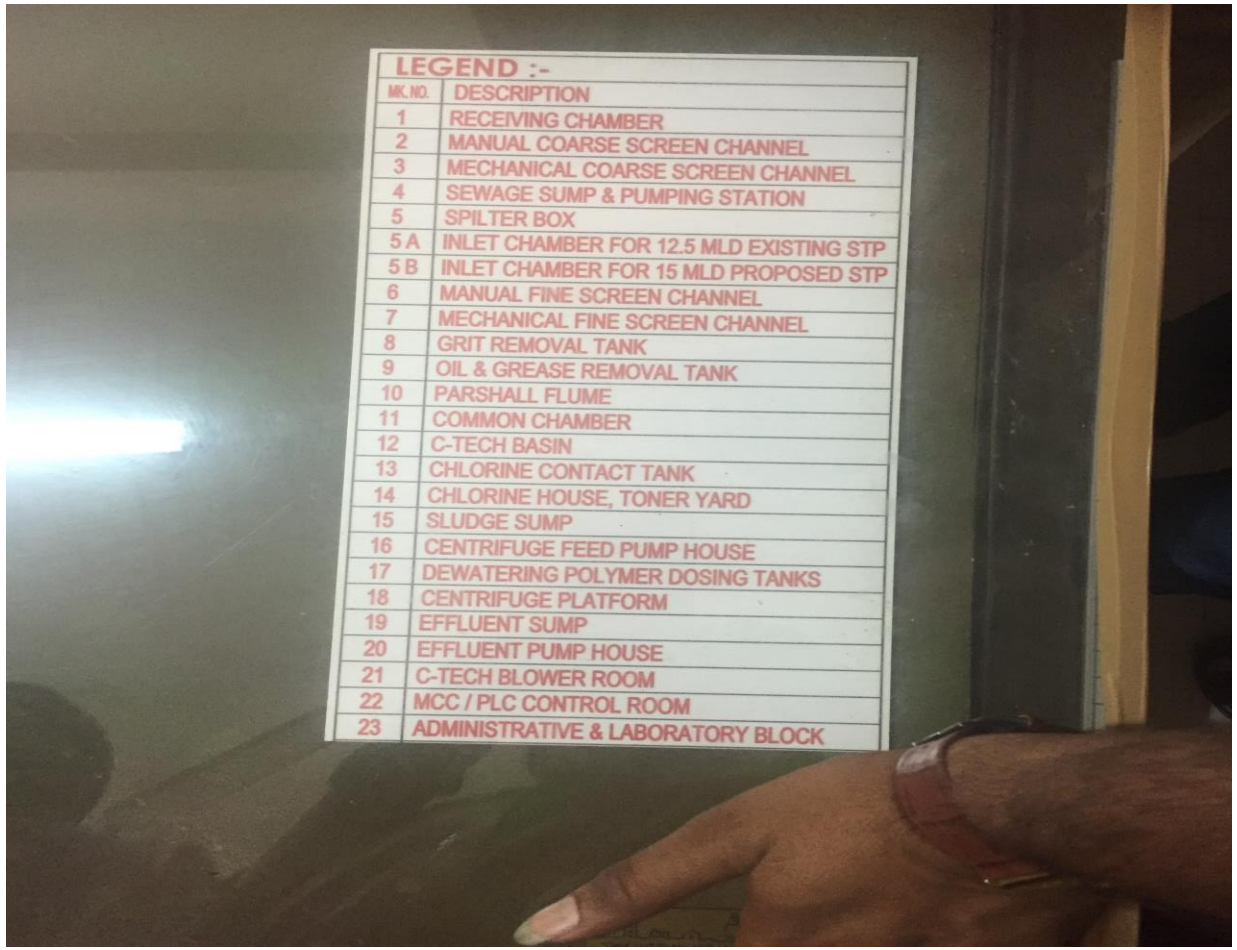
STP WITH SBR - 1



STP WITH SBR - 2



STP WITH SBR FOR GOA

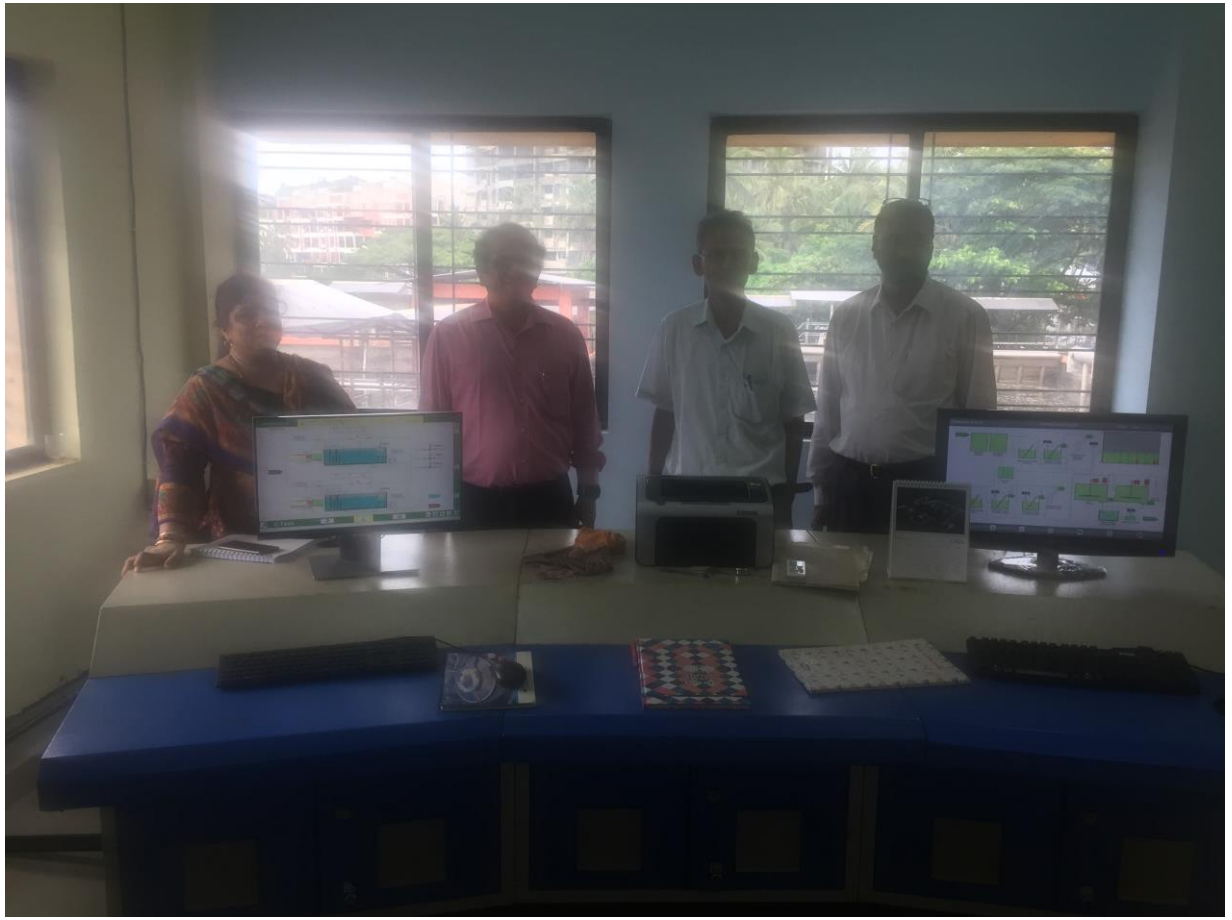


MODEL OF GOA STP

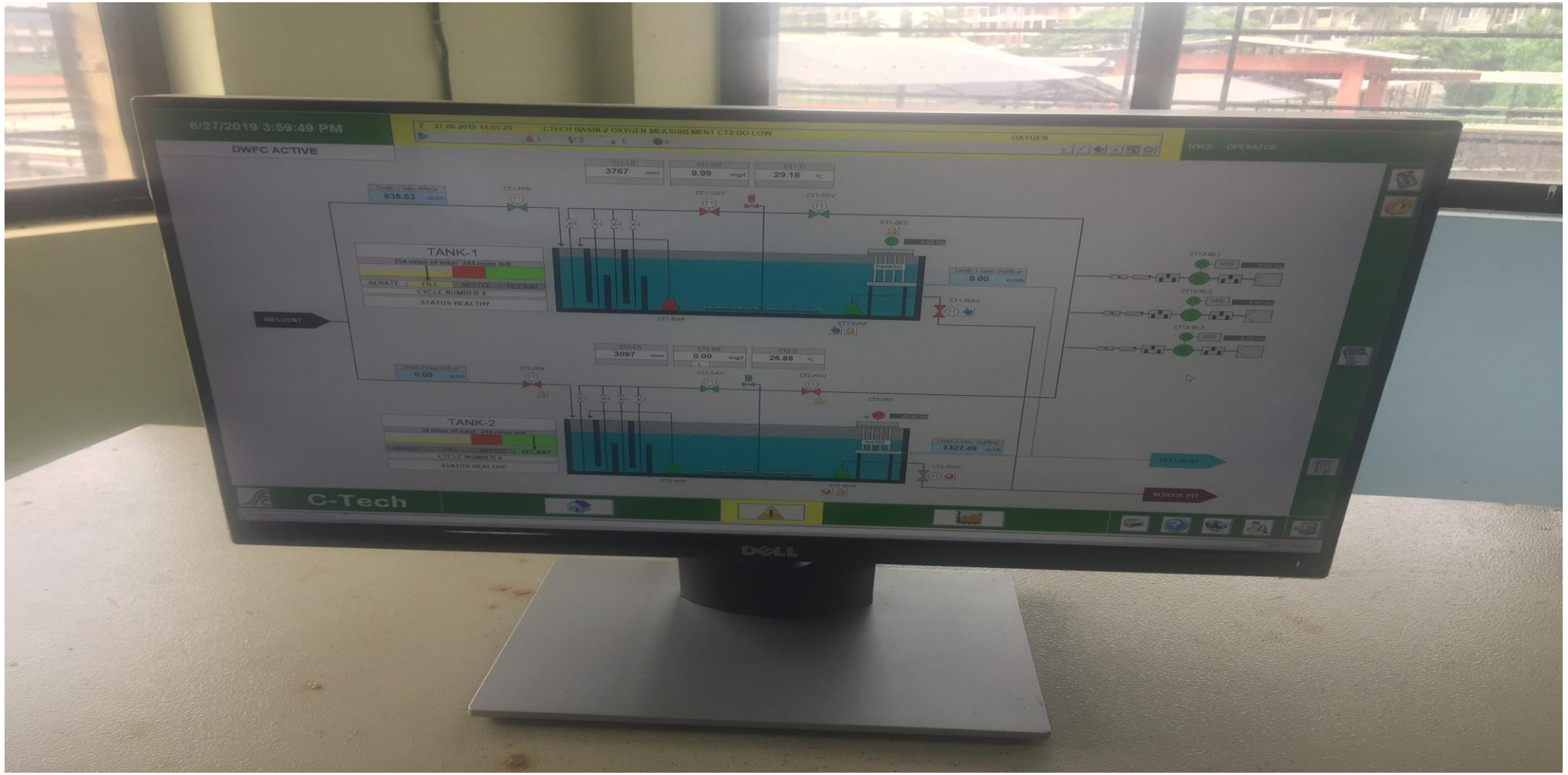
OIL AND GREASE REMOVAL TANK

SBR TANK (C-TECH BASIN)

SMART TECHNOLOGY - AUTOMATION



AUTOMATION 2

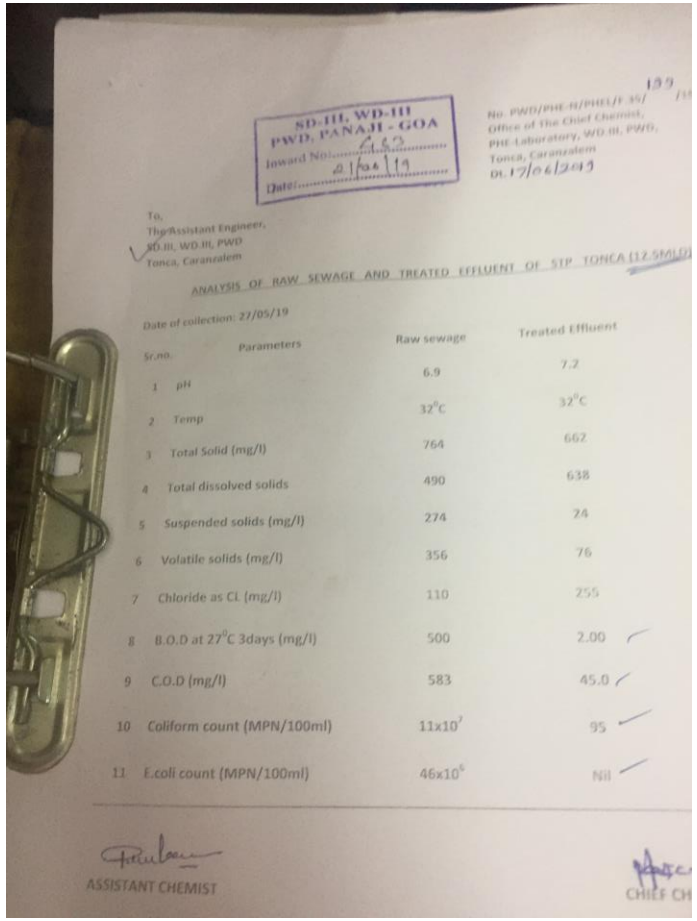


AUTOMATION 3

BLOWER ROOM FOR AERATION

CENTRIFUGE FOR SLUDGE DRYING

QUALITY OF TREATED EFFLUENT - 1



SD-III, WD-III
PWD, PANAJI - GOA
Inward No: 465
Date: 21/06/19

139

No. PWD/PHE-II/PHEL/F.35/
Office of The Chief Chemist,
PHE-Laboratory, WD III, PWD,
Tonca, Caranzalem
Dt. 17/06/2019

To,
The Assistant Engineer,
SD.III, WD.III, PWD
Tonca, Caranzalem

ANALYSIS OF RAW SEWAGE AND TREATED EFFLUENT OF STP TONCA (12.5MLD)

Date of collection: 27/05/19

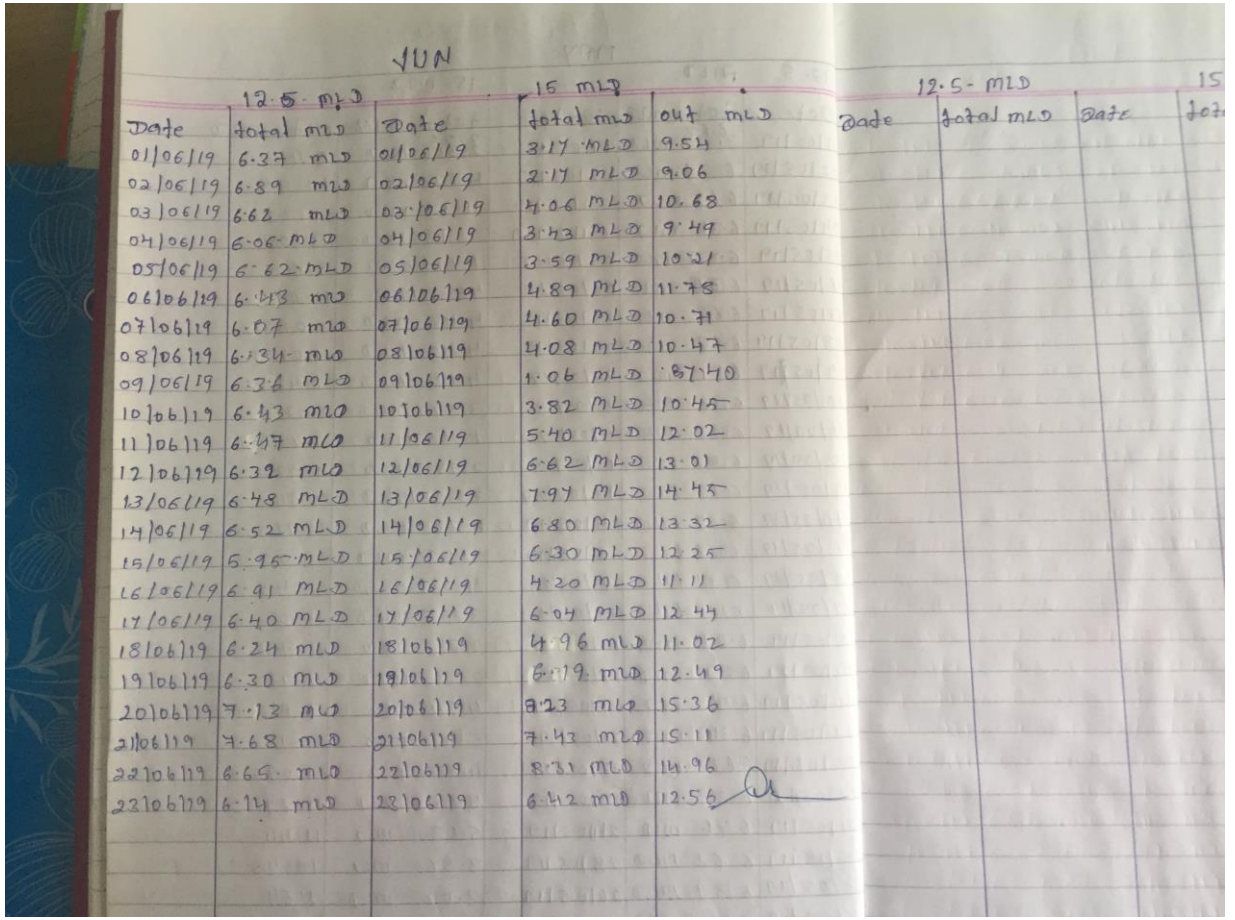
Sr.no.	Parameters	Raw sewage	Treated Effluent
1	pH	6.9	7.2
2	Temp	32°C	32°C
3	Total Solid (mg/l)	764	662
4	Total dissolved solids	490	638
5	Suspended solids (mg/l)	274	24
6	Volatile solids (mg/l)	356	76
7	Chloride as Cl (mg/l)	110	255
8	B.O.D at 27°C 3days (mg/l)	500	2.00
9	C.O.D (mg/l)	583	45.0
10	Coliform count (MPN/100ml)	$11x10^7$	95
11	E.coli count (MPN/100ml)	$46x10^6$	Nil

ASSISTANT CHEMIST

CHIEF CH

QUALITY OF TREATED EFFLUENT - 2

RECORD KEEPING



JUN

12.5 MLD		15 MLD			12.5 MLD		15
Date	total MLD	Date	total MLD	out MLD	Date	total MLD	Date	tot
01/06/19	6.37 MLD	01/06/19	3.17 MLD	9.54				
02/06/19	6.89 MLD	02/06/19	2.17 MLD	9.06				
03/06/19	6.62 MLD	03/06/19	4.06 MLD	10.68				
04/06/19	6.06 MLD	04/06/19	3.43 MLD	9.49				
05/06/19	6.62 MLD	05/06/19	3.59 MLD	10.21				
06/06/19	6.43 MLD	06/06/19	4.89 MLD	11.78				
07/06/19	6.07 MLD	07/06/19	4.60 MLD	10.71				
08/06/19	6.34 MLD	08/06/19	4.08 MLD	10.47				
09/06/19	6.36 MLD	09/06/19	1.06 MLD	87.40				
10/06/19	6.43 MLD	10/06/19	3.82 MLD	10.45				
11/06/19	6.47 MLD	11/06/19	5.40 MLD	12.02				
12/06/19	6.32 MLD	12/06/19	6.62 MLD	13.01				
13/06/19	6.48 MLD	13/06/19	7.97 MLD	14.45				
14/06/19	6.52 MLD	14/06/19	6.80 MLD	13.32				
15/06/19	6.95 MLD	15/06/19	6.30 MLD	12.25				
16/06/19	6.91 MLD	16/06/19	4.20 MLD	11.11				
17/06/19	6.40 MLD	17/06/19	6.04 MLD	12.44				
18/06/19	6.24 MLD	18/06/19	4.96 MLD	11.02				
19/06/19	6.30 MLD	19/06/19	6.19 MLD	12.49				
20/06/19	7.13 MLD	20/06/19	8.23 MLD	15.36				
21/06/19	7.68 MLD	21/06/19	7.43 MLD	15.11				
22/06/19	6.65 MLD	22/06/19	8.31 MLD	14.96				
23/06/19	6.14 MLD	23/06/19	6.42 MLD	12.56				

COMPONENTS OF AUTOMATION

- The use of advanced instrumentation, control and automation (ICA) in STPs is increasing for cost efficient operations and to meet the tight quality norms.
- A well-established level of automation based on the physical variables and basic control of dissolved oxygen (DO) has been reached, while control based on more advanced sensors is still in its initial stages.
- Typical components of single input single output (SISO) feedback control loop are Controller, Actuator, Process and Sensor.
- In modern STPs processes such as aeration, chemical feeds and sludge pumping are usually controlled by on-line sensor measurements.
- In the control loop *actuators* such as valves, pumps and compressors are operated according to controller outputs in order to keep the controlled variable at its set-point.
- Valves may be controlled manually, electrically, pneumatically, mechanically, hydraulically, or by combinations of two or more of these methods.

Process control needs *sensors* for continuous on-line implementation: Common sensors

Flow	Sludge concentration
Level and pressure	Sludge blanket level
Temperature	Nutrients (NH_4-N, NO_3-N, PO_4-P)
pH	Total N and P
Redox potential	Organic matter with UV absorbance
Conductivity	Fluorescence
Dissolved Oxygen	Biogas (CH_4, CO_2, volume)
Turbidity	


Thank You