17th Edition IGBC's
Green Building Congress 2019
India's annual flagship event on Green Built Environment
25 - 28 September 2019 HICC, Hyderabad, India
Theme: Green Built Environment for People & the Planet

1st Edition
GREEN CONFERENCE ON RAIL 2019
BUILDINGS TO BUILT ENVIRONMENT

BlueDrop Enviro
Giving Water a Second Life

Sustainable Wastewater Treatment Solutions – Case Study

Ganges, Sudha Kiran, Prashanth & Sravan





- **AVERAGE DATA FOR 1 MLD**
- **AIR POLLUTION****
- GHG EMISSION DURING THE SBR WASTEWATER TREATMENT PROCESS OVER AN ONE PERIOD (1 YEAR).
- CO2 – 33.50.
- CH4 – 20.27.
- NO2 – 481.16. G CO2-EQ
- TOTAL – 534.93 G CO2-EQ
- VOLATILE ORGANIC COMPOUNDS (VOCS)
- **SOUND POLLUTION**
- FOR MOTORS IN THE RANGE OF 3600 RPM, A SOUND IS AS HIGH AS **106 DB***

- DISINFECTION THE CHLORINE RESIDUAL, EVEN AT LOW CONCENTRATIONS, IS TOXIC TO AQUATIC LIFE***
- SLUDGE***
- SLUDGE CONTAINS HEAVY METALS, TOXIC CHEMICALS, AND PATHOGENS.
- SLUDGE ODORS POSE A PUBLIC HEALTH THREAT AND LOWER QUALITY OF LIFE.

*NOISE SOURCES, Professor Samir N.Y. Gerges, Federal University of Santa Catarina, Mechanical Engineering Department
** http://www.jwsponline.com/uploadpic/Magazine/pp%20131-139%20JWS-A-12-008.pdf.
2. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.
3. https://sci-hub.se/10.1016/j.ibiod.2015.11.028.
4. ***Metcalf & Eddy, wastewater engineering, fourth edition (Indian) 2003, Sewage Sludge Disposal – Land Application Environmental Problems – An

- 19,673.6 KM DRIVEN BY AN AVERAGE PASSENGER VEHICLE.
- 2,135.7 L OF GASOLINE CONSUMED.
- 2.4 T OF COAL BURNED.

WHAT ARE WETLANDS!?

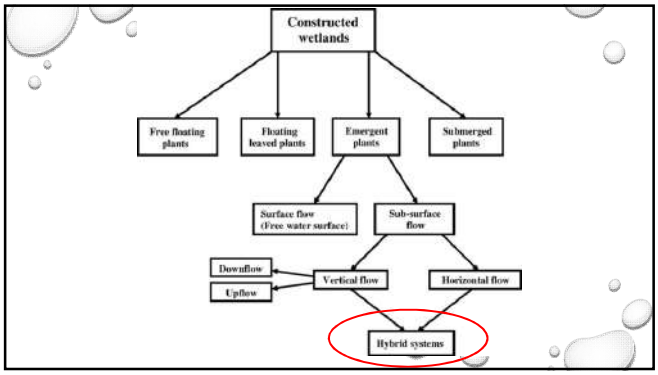
WETLANDS which are naturally formed

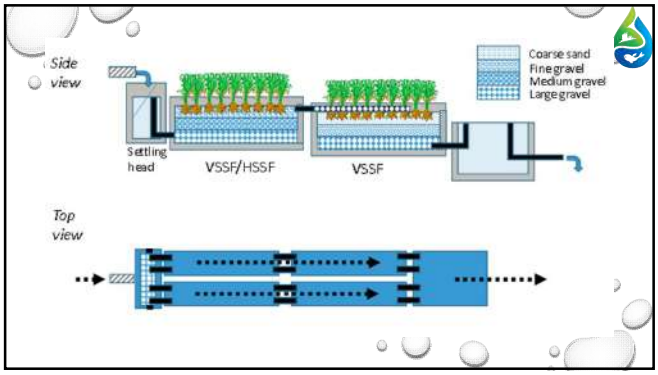
WHAT ARE WETLANDS!?

All these are WETLANDS which are naturally formed and have been at work rejuvenating water, popularly recognized by the sustainability experts as "Earth's kidneys". They filter impurities and pollutants from

WHAT ARE CONSTRUCTED WETLANDS

- NATURE REPLICATION :
  - Constructed wetlands **replicate** the natural process of wetlands in creating biological answers to some of the waste issues.
  - Constructed wetlands are human engineered systems that utilize natural treatment processes to reduce various pollutants from water, soil or air by plants.
  - The combination of substrates, plants, hydrology and microorganisms efficiently remove organic pollutants, nutrient concentrations and toxic contaminants in water





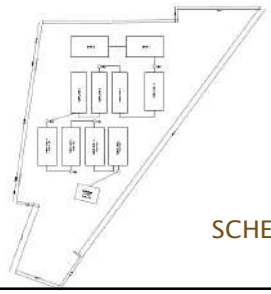
CHERLAPALLI- A CASE STUDY

- Latitude:17°27'53.12"N
- Longitude: 78°35'55.34"E
- Wastewater is received from Phase 2.
- Assorted industries which includes
  - Food processing industry
  - Plastic industries
  - Iron, steel conversion industry
  - Pharma Formulations etc.
- Wastewater was directly flowing to low laying area creating merky and unhealthy surroundings.
- Storm water drains carrying wastewater.

CHERLAPALLI- A CASE STUDY

- TSIIC & IALA came forward to have wetlands as a treatment system.
- The treated water will be used for landscaping the plants which were planted under "Telangana Ku Haritha Haram"
- The wastewater has typical properties of both industrial and domestic wastewater.
- It was planned to have combination of Surface flow & Subsurface flow Hybrid system for treatment, total of 8 wetlands and 1 free floating pond.
- A treated water tank for 70 KL capacity.

CHERLAPALLI- A CASE STUDY



SCHEMATIC LAY OUT

CHERLAPALLI- A CASE STUDY

- Materials used were
  - HDPE liner stuffed with coir liner
  - Locally available gravel (10 – 60 mm)
  - River sand
  - More than 8 verities. Of Aquatic plants
  - Landscaping with locally available plan
  - 2 submersible pumps 1 HP capacity ea







CONSTRUCTED WETLANDS

- **O& M COST :**
  - Operated by a unskilled manpower.
  - The role of the manpower is to note the water meter reading , landscaping, housekeeping & checking the pump.
  - A fully matured system can treat higher capacities of **wastewater than the design capacity**
- **AESTHETICS :**
  - Plant landscaping added to aesthetics in the residential colonies/townships, industries.
  - Became a part of landscaping activity therefore decreasing the demand for land usage.
- **REUSE :**

SEASONAL OBSERVATIONS 2 YEARS DATA*.

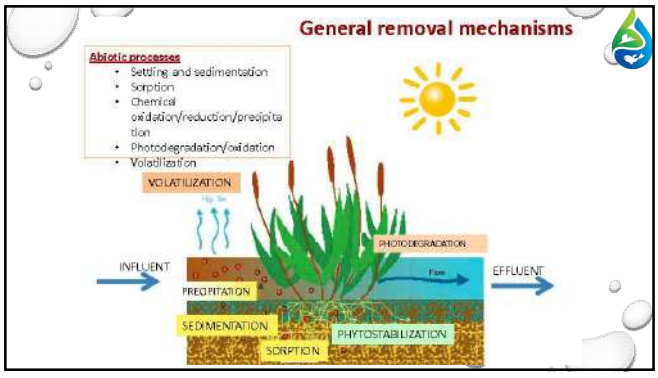
Sl. No	Parameter	Unit	In put parameters	Season 1	Season 2	Season 3	Season 4	IS2490 standards
1	pH		6.2	7.25	7.82	7.66	7.35	5.5 to 9.0
2	TSS	mg/L	165	8	2	28	25	150
3	COD	mg/L	760	24.19	16.12	45	40	150
4	BOD	mg/L	235	4.03	7.25	9.5	7.9	10
5	Ammonical Nitrogen	mg/L	58	9	2.77	1.75	2.5	10
6	Oil & Grease	mg/L	18	8.75	7.2	6	5	10
7	Fecal Coliforms	MNP/100 ml	80	25	15	45	10	100

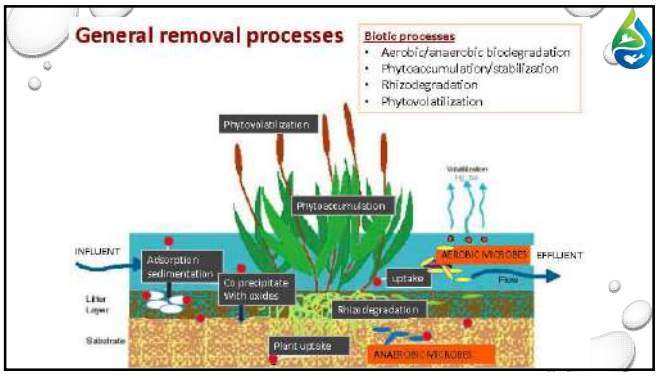
*TSIIC-Cherlapalli, average of each month.
All Parameters expressed in mg/lit

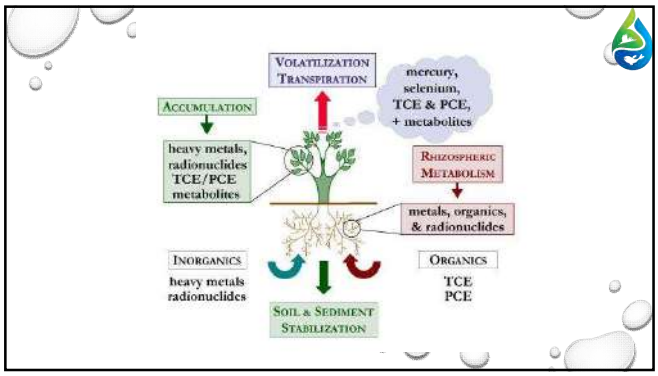


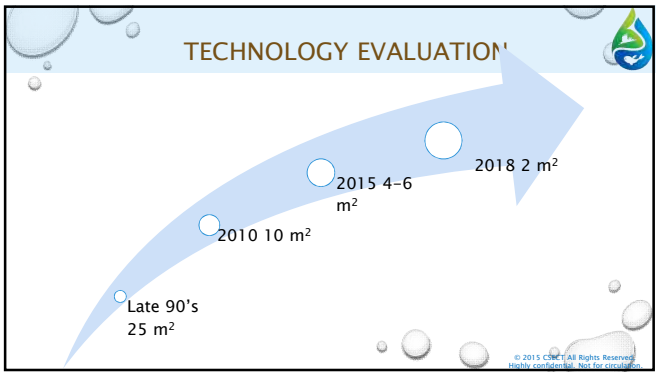


BEFORE & AFTER






VOLATILIZATION
TRANSPIRATION
mercury, selenium, TCE & PCE, + metabolites
ACCUMULATION
heavy metals, radionuclides TCE/PCE metabolites
RHIZOSPHERIC METABOLISM
metals, organics, & radionuclides
INORGANICS
heavy metals radionuclides
ORGANICS
TCE
PCE
SOIL & SEDIMENT STABILIZATION


TECHNOLOGY EVALUATION
2018 2 m²
2015 4-6 m²
2010 10 m²
Late 90's
25 m²
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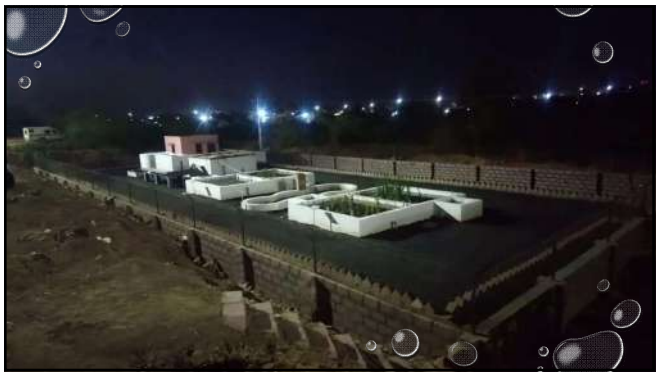
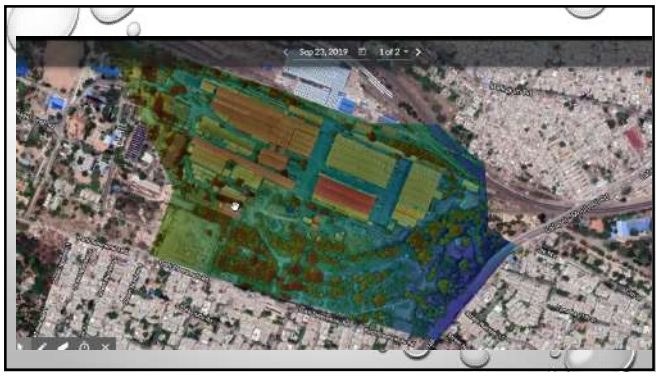
BHUJ PIT LINE WATER
• 24 KLD/ DAY
• COMMISSIONED IN 3 MONTHS
• ALL LOCAL MATERIALS
• 2 YEARS O&M




Sep 23, 2019
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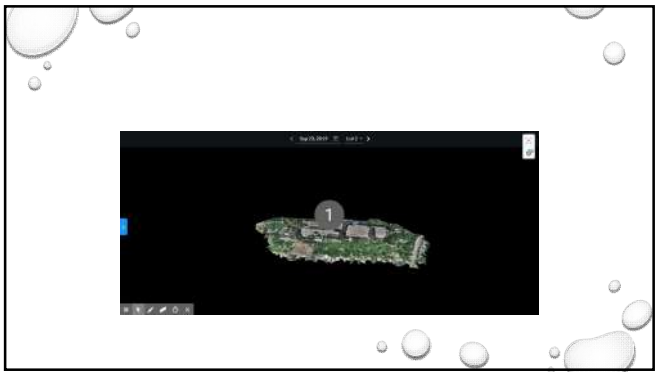
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TECHNOLOGY ADAPTATION

- NO LIMITATIONS :
  - The ICW can be used to treat any type of contaminant, and in any environmental and climatic conditions.
- CUSTOMIZATION:
  - Each system is "Customized" to every case and to its ecological conditions using local materials.
- DESIGN :
  - The systems are designed to withstand extreme fluctuations in quality and quantity, and to last forever.

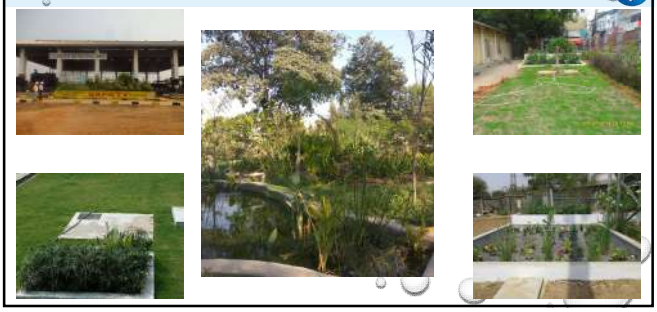
CONSTRUCTED WETLANDS

- **ENERGY & COST :**
  - Minimal usage of mechanical or electrical devices and therefore very low failures leading to maintenance free self sustainable operation
- **AESTHETICS :**
  - Plant landscaping adds to aesthetics in the residential colonies/townships, industries.
  - Becomes a part of landscaping activity therefore decreasing the demand for land usage.
- **REUSE :**
  - Treated water can be reused as it meets all the norms specified by State/Central PCB.

ADVANTAGES

- Long lasting, self sustaining systems
- Very low maintenance costs with minimal energy involvement.
- High endurance under extreme water flows and contamina loads.
- No by-products such as sludge or reject water
- Part of the local landscape and environment.
- Credits poin

MANY APPLICATIONS OF CWS



NATURES BEAUTY – WETLANDS

SOME OF INSTITUTIONS WHO LOVED WETLANDS

DIFFERENT APPLICATIONS

THE WETLANDS TREATMENT SOLUTIONS HAVE MULTIPLE APPLICATIONS AND CAN BE INTEGRATED WITH:

- LAKES AND PONDS
- GREEN SPACES
- COMMUNITY AMENITIES
- STORM DETENTION AND RETENTION
- TRAFFIC MEDIANS
- CUSTOM LANDSCAPES

WHICH ONE DO YOU PREFER IN YOUR NEIGHBOURHOOD





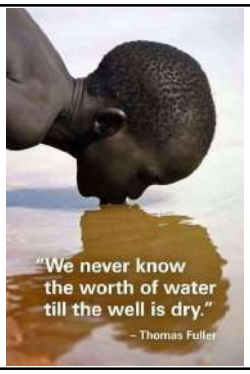
WHICH ONE DO YOU PREFER IN YOUR NEIGHBOURHOOD






Constructed Wetlands A HOT SPOT for BIODIVERSITY.





"The earth, the air, the land and the water are not an inheritance from our fore fathers but on loan from our children. So we have to handover to them at least as it was handed over to us."

Mohandas Karamchand Gandhi

MAKE A BETTER CHOICE AND MAKE IT FOR THE FUTURE

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BlueDrop Enviro