Country: India
Landuse: Red
Scale: Neighbourhood
Objectives: Water, Nature, Education
Ownership: Private
Intervention: Project

Location: Nimli, Rajasthan

- Climate zone: Composite (Extreme summer and winter with warm-humid monsoons)
- Site area: 39,090 sq.mt (9.66 Acres)
- Gross area (including basement): 9,800 sq.mt
- Air conditioned area: 2,900 sq.mt Cost: ₹40 crores
- Occupancy schedule:
  24 hours: residential
  8 hours: academic and administration

Background

AAETI is a project of the Centre for Science and Environment (CSE). A learning, training and innovation centre designed to find appropriate and affordable solutions to some of the most pressing problems faced by the global...
South — from climate change, air pollution and urban mobility to water and waste management and environmental degradation. Currently, the campus can house some 100 guests and some 40-50 permanent staff. The cafeteria has a sitting capacity of 150 people. The academic block has 6 classrooms of various sizes with their capacities ranging from 35 people to 124. The campus also houses CSE’s pollution monitoring laboratory, which is designed as India’s first faecal sludge testing laboratory.

The site is part of the larger natural drainage pattern of the area, the nallah (seasonal stream) cuts through the site; and the catchment is vast. If not planned carefully the campus would be flooded during monsoons and would have water scarcity in the rest of the season.

The Anil Agarwal Environmental Training Institute (AAETI) is neither connected to municipal water supply nor to sewerage network. It treats wastewater coming from cafeteria, hostels and quarters of support staff through a soil Biotechnology (SBT) based wastewater treatment system. The treated wastewater is reused in toilets for flushing; this in turn reduces the dependence on ground water.

**Objectives**

**Timeframe**

Operational since: 2017

**Project Collaborators**

Implementing organisation: CSE, New Delhi and Vision Earthcare

Architecture, landscape and interior design: Pradeep Sachdeva Design Associates

**Strategies and Interventions**
Soil Biotechnology based wastewater treatment system

Designed Capacity: 20 KLD  
Area : 140 m²

Wastewater management for the three buildings consists of a raw water collection tank, two bioreactor beds, collection tank (CT1) and treated wastewater collection tank (CT2), pumping and conveyance system. The wastewater generated from kitchen has an additional unit i.e. oil and grease trap that arrests oil before it enters treatment so that the treatment is efficient through natural microbial degradation. Thereafter the wastewater from cafeteria, hostel block and support staff housing enters the raw water collection tank. Through a pumping and piping system, raw water is sprinkled over the bioreactor bed (BR-1). The bioreactor bed consists of crushed stones, jute bags, crushed bricks with media that supports microbial growth. This bioreactor bed can be planted for aesthetics. The water is collected in collection tank (CT-1) from where it is sent to the second bioreactor (BR-2) for further treatment (if required – varies with the quality of inlet and reuse). As the wastewater passes through various layers of the bioreactor, it undergoes a series of natural biochemical reactions which break down the contaminants present. The treated water is collected in a tank and then pumped to overhead tank for use in flush toilets.

Decentralised wastewater treatment system

Designed Capacity: 8 KLD  
Area : 80 m²
The system consists of two chambered settler, five chambered anaerobic baffled reactor (ABR), planted gravel filter (PGF) bed and polishing pond. Wastewater generated from the academic block feed into the settler where the sedimentation process removes the settleable solids. The effluent from the settler is conveyed to ABR with two filter chambers, where anaerobic degradation process by microorganism is designed to reduce upto 90% of the BOD. Further, the outlet of ABR is fed into PGF bed through an inlet chamber for tertiary treatment. The bed of PGF consists of crushed stones and on the top of it Canna indica plant is grown for removal of nitrogen and phosphates. The bottom of the PGF bed is designed with 1% slope, which ensures treated water to flow towards polishing pond without any pumping. The polishing pond removes pathogen and odor with the help of natural aeration and sunlight. The final treated water will be pumped for horticulture purpose.

Outcomes of the Project

SBT: The system is expected to provide treated water that would be used for flushing purposes in toilets. The system will generate about 20,000 litres per day of treated water that would be pumped to the overhead tank for ready availability for toilet flushing. Water quality report at the inlet and outlet of the SBT will be furnished in due course.

DWWTS: The system is expected to provide treated water that would be used for horticulture purposes to maintain green area of 0.5 Acres. This would help in saving about 8000 litres of fresh water. Water quality

Funding and costs

Soil Biotechnology based wastewater treatment system
Capital cost : Rs. 10 Lakhs
O&M : Rs. 1-1.8 Lakhs (including labor and energy cost)

Decentralised wastewater treatment system
Capital cost : Rs. 8 Lakhs
O&M: Expected to be between Rs. 40-60 thousands
report at the inlet and outlet of the DWWTs will be furnished in due course.

AAETI has left no stone unturned in creating a world class facility with notable green features like an energy-saving architectural design, rainwater harvesting systems, a decentralised wastewater treatment system and HMX cooling solutions.

Additional information:

References:


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