

7.1.4 : Water conservation facilities available in the Institution:

Waste Water Recycling:

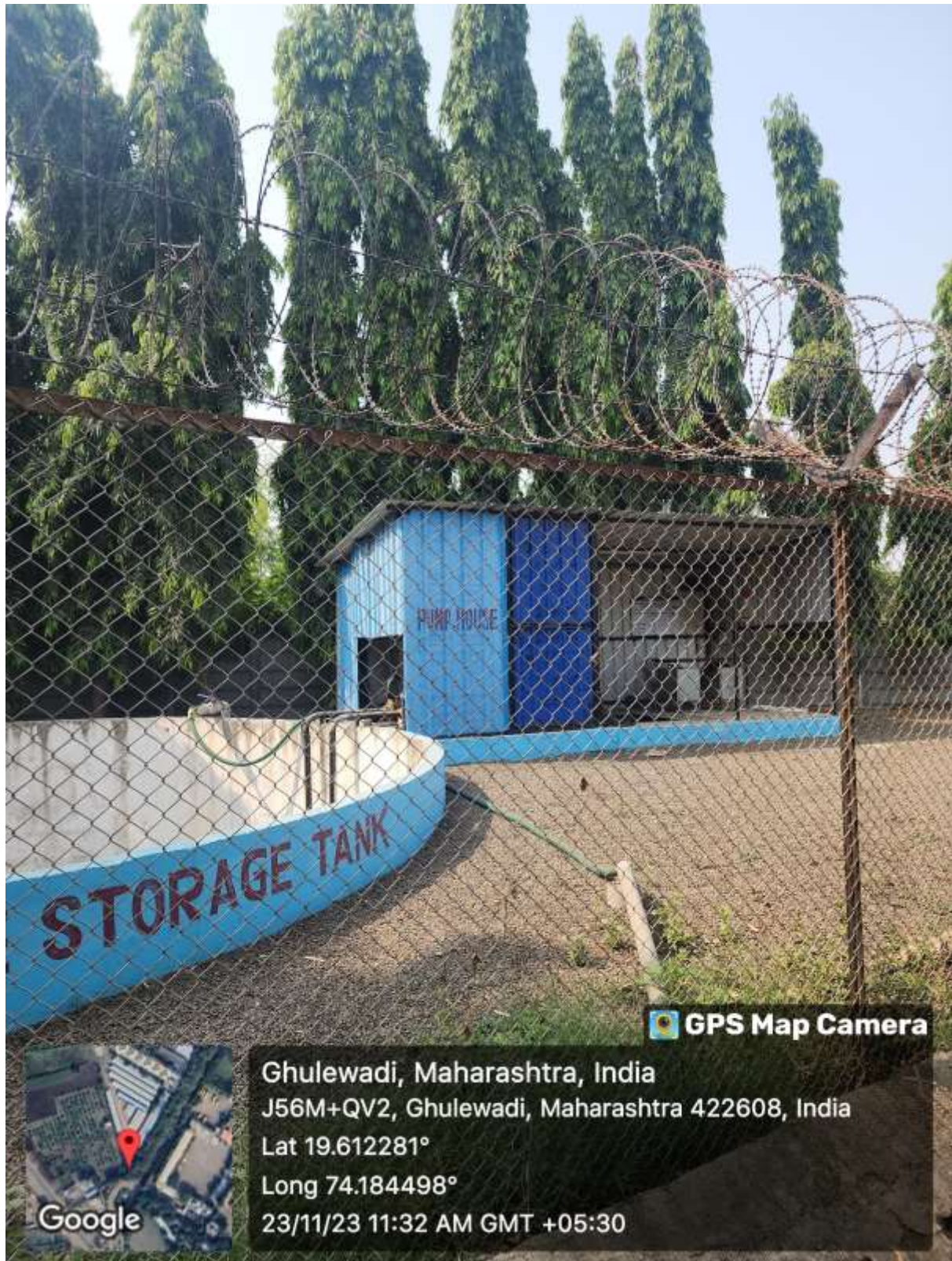
Liquid Waste Management:

Waste water generated from Amrutvahini Campus includes sewage from the educational buildings, boy's hostels, girl's hostel and staff quarters etc. It needs treatment before discharging it as effluent into natural stream/river etc. and same treated waste water can be utilized for various purposes like gardening and irrigation. To treat waste water, innovative 3E (Eco-friendly, Economical, and Efficient) microbial technology has adopted by the institute. In 2019, Sewage Treatment Plant (STP) having capacity of 0.4MLD is started.

Sewage Treatment Plant Installation cost (INR In lakhs) = 35.5

Sewage Treatment Plant:Photos







Sewage Treatment Plant: Information

Amrutvahini Sheti and Shikshan Vikas Sanstha's
Amrutvahini College of Engineering, Sangamner

Sewage Treatment Plant at AVCOE Campus

➤ **Objective:**

To treat **0.4 MLD** of wastewater generated from campus and its reuse for Gardening and Irrigation Purpose.

➤ **Context:**

Wastewater generated from **Amrutvahini Campus** is about **0.4 MLD**, which includes sewage from the educational buildings (Day scholar students, Teaching, Non-Teaching staff, office staff etc.), Boys Hostel, Girl hostel and staff Quarters etc.

It needs treatment before discharging it as effluent into natural stream/river, etc., and same treated wastewater can be utilized for various purposes like gardening and Irrigation. To treat wastewater, **3E Technology** is adopted by the institution (Eco-Friendly, Economical, Efficient).

➤ **Practice:**

Treatment plant contains 3 Major Tanks.

- a) Collection Tank
- b) Bio Tower
- c) Bio Filter

Functioning of these three tanks is as follows:

a) **Collection Tank:**

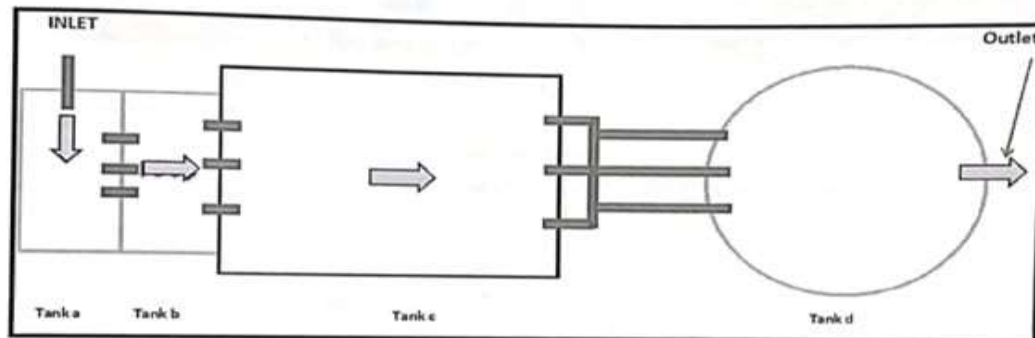
Control the velocity of wastewater, and it gets collected into a collection tank. Heavier material/particles settle down by its weight, and floating material can be taken out with the help of net.

b) **Bio Tower:**

Bio tower contains 20mm aggregates and coating of bio-film around it, which reduces colour, odour and approximately 40% of BOD.

c) Bio Filter :

This Unit maintains the pH of water, and it reduces the BOD to 30 mg/l, reduction in colour and E-Coli count. Growth of Bacteria in this filter is in multiples of 10^{46} . Bio filter contains black cotton soil and the addition of bacteria which decompose and degrade the wastewater and make it useable for agriculture and irrigation purpose.



Tank a: Collection Tank

Tank b : Bio Tower

Tank c: Bio Filter

Tank d: Temporary storage tank

Figure: 1 Showing the layout of the plant

➤ Practice adopted for Testing of sewage samples

The Sewage Treatment Plant at A.V.C.O.E. campus is capable of treating around 0.4 MLD, i.e. four lacs litres of wastewater per day generated from student's hostels, staff-quarters, and academic buildings etc. To meet the quality, i.e. effluents discharge standards as per CPCB (Central Pollution Control Board) and MPCB (Maharashtra Pollution Control Board) norms and evaluation of overall working efficiency of the plant, several physical and chemical characteristics needs to be tested on a regular basis.

The parameters like pH, colour, odour, total dissolved solids (TDS), total suspended solids (TSS), are analyzed daily while on priority biochemical oxygen demand (BOD), and chemical oxygen demand (COD) are analyzed every week. The samples are being collected from the inlet and outlet chamber of STP.

All these tests are carried out in Environmental Engineering Laboratory of Department of Civil Engineering of the institute with the required precision and utmost care. However, it is the policy of institute to send the samples to NABL (National Accreditation Board for Testing's and Calibration Laboratories), and MoEFCC (Ministry of Environment, Forest and Climate Change) certified laboratory once in a month. The report of the same is regularly



submitted to CEO of the AS&SV Sanstha through Chief coordinator of the sewage treatment plant.

In case of any inconsistency related with working of the STP, field expert's opinion is advisable.

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Engineers & Consultants
Laboratory Services Division

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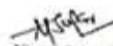
TEST REPORT

Sample ID: E/05/23/032	Report No. E/05/23/032	Report Date	06/05/2023
Name and address of Customer	Chief Executive Officer Amrutvahini College of Engineering Ghulewadi, Post Sangamner S.K., Tal. Sangamner, Dist. Ahmednagar - 422608, Maharashtra		
Sampling done by	Laboratory	Sample Description / Type	Treated Sewage Effluent
Sampling Location	STP Outlet	Date - Sampling	03/05/2023
Sample Quantity / Packing	2 L x 1 no. plastic can 1 L x 1 no. glass bottle 250 ml x 1 no. sterile bottle	Date - Receipt of sample	03/05/2023
Sampling Procedure	IS 3025 (Part 1):1987 Ands.1& APHA, 23rd Ed. 2017, 1060 B, 1-40 9060 A, 9-36 & 9060 B, 9-39 & ISO 19458:2006	Date - Start of Analysis	03/05/2023
Order Reference	P.O. No. 6709 dated 27.04.2023	Date - Completion of Analysis	06/05/2023

Sr.No.	Parameter	Result	Unit	Method
Chemical Testing: Group: Pollution & Environment				
1	Colour (Co- Pt)	2	Hazen Units	IS 3025(Part 4): 1993
2	pH	7.49	-	IS 3025 (Part 5) 1983
3	Total Suspended Solids	12	mg/L	IS 3025 (Part 7) 1994
4	Biochemical Oxygen Demand (3 days, 27°C)	41	mg/L	IS 3025 (Part 14) 1993
5	Chemical Oxygen Demand	120	mg/L	APHA, 23rd Ed. 5270-B-5-08
6	Total Dissolved Solids	1820	mg/L	IS 3025 (Part 16) 1984
7	Nitrate (as NO ₃)	3.2	mg/L	US EPA Method no. 3521
8	Phosphate (as P)	1.25	mg/L	APHA, 23rd Ed. 4500 P-1 & 104
Biological Testing: Group: Pollution & Environment				
9	E.coli	110	MPN Index /100 ml	APHA, 23rd Ed. 8220-E-9-80, 7017


Sushil Kapse
Section In-charge (Biological)
Reviewed & Authorised by


End of Report


Ninad Soundankar
Technical Manager (Chemical)
Reviewed & Authorised by


AEC/P/REP/1-A
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Figure: 2 Test Report of Sewage Sample



➤ **Advantages of 3E Technology are listed below:**

- Less Mechanical Machinery,
- Savings in Electricity Bills,
- Very Less Sludge Generation,
- No Odour Problem,
- Ares requirement is also less,
- Skilled supervision is not required,
- Eco-Friendly

➤ **Benefits of the Project:**

- Earlier well water/river water was utilized for gardening purpose, but after installation of plant treated wastewater is being used for gardening and irrigation purpose which saves natural water.
- As mechanical parts are negligible, so there is saving of electricity which strengthen green campus motto.
- Students gets aware of Environment and understand the concept of Save Water and Save Energy, which leads to the sustainable development of the campus.
- **Durability** : More Durable as compare to MBBR and Other Technologies as less machinery and its components parts and very less electric equipment's involved in the treatment process.
- **Maintenance**: After 2 to 2.5 years, additional bacteria are required to add in the Bio Filter, and the top layer of sand in the bio filter have to replace.
- **Annual Maintenance Cost**: It is 10% of the actual cost of plant for one year approximately. After 2 to 2.5 years, around 30% of the total cost of the plant will be the actual cost of bacteria for the symbiotic process.

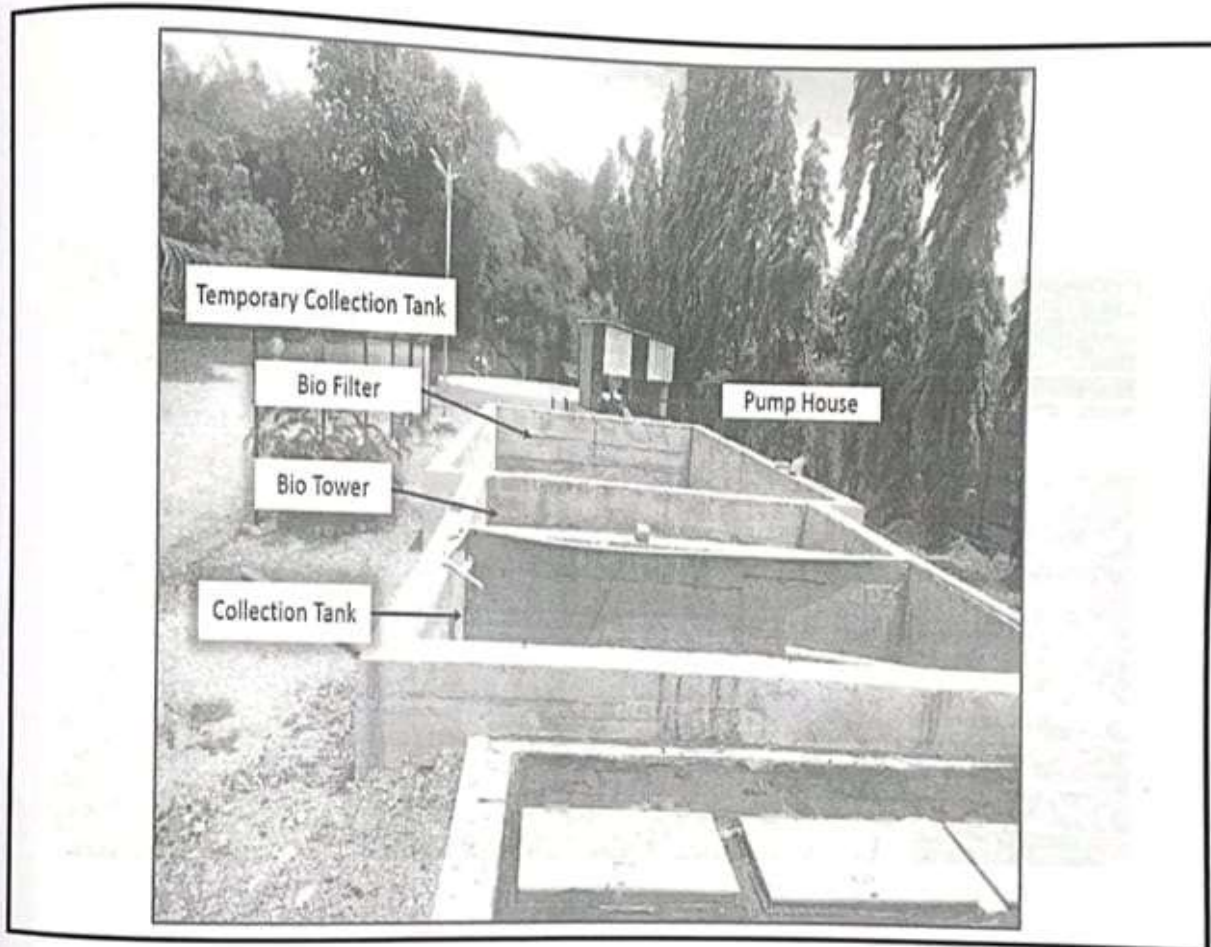


Figure: 3 Photograph showing Sewage Treatment Plant

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