SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY

WATER QUALITY STANDARD AND GUIDELINES FOR DISCHARGE

Policy	Date
Policy Created On	21st June 2015
Policy Revised On	29th May 2024
Edition	4

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WATER QUALITY STANDARDS AND GUIDELINES FOR WATER DISCHARGE

VISION

In the origination of our vision, we required to make sure to include water quality as well as quantity. Our vision includes potable and ditch water and protecting both of those sources. Wastewater discharge standards protect water sources from pollution and mis-management. We do not yet have enough information to estimate how much we can save through conservation or to decide what a reasonable goal for optimal use of water on campus might be in the long-term.

MISION

To provide an environment

- That eases the universal development of the individual
- That empowers the students to play a dynamic role in the nation building process and contribute to the progress of humanity
- That disseminates knowledge even beyond the academia.
- That inspires in the students, a feel for frontier disciplines and cultivates a concern for water conservation and environment.

By setting lofty standards in the ever – evolving teacher-learner interface.

INTRODUCTION

Water is necessary for all forms of life as well as industries on which humans are reliant, like technology development and agriculture. This global need for clean water access necessitates water resource policy to determine the

means of supplying and protecting water resources. During recent years there has been increasing awareness of, and concern about, water pollution all over the world, and new approaches towards achieving sustainable exploitation of water resources have been developed internationally. It is widely agreed that a properly developed policy framework is a key element in the sound management of water resources. A number of possible elements for such policies have been identified, especially during the preparation of guidelines as well as during various follow up activities. This policy proposes some general principles for the policy making process and for policy document structure. Some examples of policy elements which support the overall sustainable management of water resources are also given.

WATER DISCHARGE POLICY GOALS

The primary goal of our Institute water conservation policy is to achieve water neutrality by 2030. The Institute is implementing water – efficient fixtures in its new constructions in campuses, ensuring 100% treatment and recycling of sewage and rainwater harvesting. Fast campus sewage will be treated using state of art technologies and will be recycled for use in flush tanks and irrigation. Students and staff engagement play a vital role in our water sustainable strategy. Reducing water consumption and protecting water quality shall be the key objectives of sustainable policy of our Institute. The Institute views water from the three inter- related dimensions of efficient conservation, responsible consumption and restoring and retaining surface and groundwater.

One of the critical issues of efficient water conservation is the salty groundwater

in many areas of the Institute and the management has implemented standard metering infrastructure and procedures across the campus. Our Institute also integrated rainwater harvesting into the consumption side of the campus water cycle. Our Centre took great initiative in order to improve water governance by giving awareness programs for staff, students and involvement of water plumbers in the campus. For instance water is used in the college in every conceivable way like for department labs, individual purpose, cleanliness, fish and aquaculture needs. Teaching, non- teaching and student community have no idea of how much water is being used or at what cost. It was the consistent effort of the management that will be taking impart in the implementation of efficient methods at various sites in the campus.

INITIATIVES BY THE INSTITUTE

Sathyabama emphasizes sustainable water management through continuous monitoring of water quality, ensuring that all sources meet health and safety standards while minimizing environmental impact. A central focus is placed on re-use, with advanced recycling practices integrated across the campus. The institution operates a dedicated Sewage Treatment Plant (STP), where treated water is systematically re-used for gardening, landscaping, and other non-potable applications, thereby reducing dependence on fresh water and ensuring maximum efficiency in resource utilization. By combining rainwater harvesting systems with STP-driven re-use initiatives, Sathyabama fosters a culture of conservation and circular water use.

The institution Initiatives are:

- Ensuring improvement of the water and water dependent natural

resources at surrounding areas in the campus.

- Installation of Aerators in all new basins across the campuses. Aerators provide a constant flow rate of above 0.5 GPM through variable pressure gauge for optimizing water use to a great extent.
- Flow regulator taps: Installation of flow regulators taps in the toilets at all blocks in University campus.
- Sewage Treatment Plant: Sewage Treatment Plant is functional with the parameters specified by the local pollution control board.
- Water Conservation Storages: With the help of CGWB, The Institute management is working hard to establish a rain water harvesting system with the capacity of 10, 00,000 liters at main campus. The system will be functional by 2022.
- Cement Tanks: Institute also have one cement tank of about 30,000 litres capacity for water harvesting.
- Surface Water Conservation through ponds and wells: Institute has two ponds and supplementary tank. We have a 20,000 litre supplementary tank for fish breeding, one water percolation pit of 10 feet depth for water recharging.

RESEARCH AND TRAINING

For effective and economical management of our water resources, the frontiers of knowledge need to be pushed forward in several directions by intensifying research efforts in various areas, including the following:

- Hydro-Meteorology
- Assessment of Water Resources

- Groundwater hydrology and recharge
- Water quality, recycling and reuse
- Prevention of salinity ingress
- Prevention of water-logging and soil salinity
- Water harvesting
- Construction material and technology (with particular reference to roller compacted concrete, fibre reinforced concrete, new methodologies in tunneling technologies, instrumentation, advanced numerical analysis, etc.) • use of remote sensing techniques
- Better water management practices and improvements in operational technologies
- Use of sea water resources
- Risk analysis and disaster management
- Sewage treatment on smaller scales and reuse of water after treatment

Since the overall thrust of the new national water policy is towards people's participation at all stages, the highest priority is given for conducting various training awareness programs for students and staffs.

FUTURE GOALS

- Maximize water use efficiency and minimize wastage of water
- All existing buildings to be used for water conservation and rain water harvesting
- Promote appropriate innovative water and wastewater management technologies and services.
- Provide appreciate certificate to students and teachers for efficient water use and conservation.

- Provide above continuous awareness training program to all students , staff and stakeholders of the University and nearby community.
- Conducting outreach programs under the leadership of NSS and other student bodies.
- Encourage research, development and implementation of water conservation techniques in relation to the ecological needs and responses.
- Recycle non-sewage and greywater for on-site use.
- Inform, educate and increase awareness regarding the importance of water to life and the need for conservation and efficient use of water.

Efficient water storage can be a viable solution to water conservation. Understanding relationships between environmental and societal factors and academia's support for water conservation measures can help planners and policy makers to identify obstacles and opportunities to increase the role of conservation and efficiency in making urban water supply systems sustainable. Policy plays a very important role in water conservation as it lays out a government framework for guiding long-term decisions, and evolves in the light of healthy interactions between academia and administrative leadership.

WATER AUDIT REPORT

Sathyabama Institute of Science and Technology

Chennai, Tamil Nadu-600119

Prepared by,

WasmanPro Environmental Solutions LLP

June 2023-May 2024

Introduction

The Importance of Water and the Role of Water Auditing

Water is the foundation of all life. The United Nations recognizes access to clean water as a fundamental human right. Yet, in India, millions of people continue to live without direct access to safe drinking water. With rapid population growth and the reality that water reserves are finite, this vital resource is projected to become increasingly scarce and valuable in the coming years. In this context, it is imperative for decision-makers to take urgent action to ensure the effective use, equitable distribution, and sustainable supply of water.

One of the most effective mechanisms for conserving water is **water auditing**. A comprehensive water audit provides a detailed profile of the distribution system and its users, enabling institutions to manage resources more efficiently and reliably. By quantifying total water intake, analyzing patterns of use, identifying wastage or leakage, and evaluating wastewater treatment methods, a water audit offers actionable insights for conservation.

For institutions, water auditing is not merely a technical exercise—it is a strategic tool. It allows for a realistic assessment of current performance levels, highlights inefficiencies, and guides corrective measures. By adopting water audits, institutions can balance demand and supply, reduce wastage, and implement sustainable practices that safeguard this precious resource.

In essence, any environmentally responsible institution must conduct regular water audits and critically examine its water use practices. Doing so ensures accountability, promotes conservation, and contributes to the broader goal of sustainable development.

1.1 Key Methodology adopted for Water Audit

a. Base Line data were collected by walk through survey and by conducting interactions with concerned staff and authorities.
b. Walk through survey was done, at various locations of buildings to understand the nature of water uses to identify the type of water fixtures, and various systems installed in the building.
c. A walk through survey of the entire facility was conducted for measuring the water usage at various points based on flow rates. Survey was done to identify defective fixtures and to spot water leakage/ wastage points.
d. The walk through survey and interacting with the staff and other concerned authorities were conducted a different intervals spanning between October 2023 and May 2024
e. Discussion was held with the administrative officers, pump operators, ETP/STP staff, housekeeping staff, kitchen employees, students, staffs on the various water usage done by them during the day and the related treatment aspects.
f. Collection of records of water pumped to the overhead and underground tanks and average running hours of all pumps etc. was done to estimate actual supply and to quantify the total water intake by the Institute.
g. The amount of water sent to water treatment unit and the quantity of water recycled and reused was also analyzed.
h. Past records were also analyzed to get historic water usage data for baseline study purpose and to have a companion of past years and present years water footprint.

i. Based on the findings, calculation was done on overall water usage in the campus and methods for reducing the water footprint were suggested.

1.2 Water Audit Survey/Questionnaire

1. List various sources of water in your Institute.
2. How many wells are there in your Institute?
3. What is the depth of each well?
4. What is the present depth of water in each well?
5. No. of motors used for pumping water from each well?
6. What is the total horsepower of each motor?
7. Does the Institute buy water from outside sources?
8. Is the institute located in water stressed area or water scarce area?
9. Quantity of water stored in overhead water tank?(in liters)
10. Quantity of water pumped every day?(in liters)
11. List out various uses of water
12. List productive and unproductive usage of water seen in the Institute
13. No. of water coolers. Amount of water used per day?(in liters)
14. No. of water taps. Amount of water used per day?
15. No. of bath rooms in staff rooms, common area, hostels. Amount of water used per day?
16. No. of toilet, urinals. Amount of water used per day?
17. No. of water taps in the canteen. Amount of water used per day?
18. Amount of water used per day for gardening.
19. No. of water taps in laboratories. Amount of water used per day in each lab?

20. Total use of water in each hostel?
21. Is there any water used for agricultural purposes?
22. How many water fountains are there?
23. How often is the garden watered?
24. Quantity of water used to watering the ground?
25. Quantity of water used for bus cleaning?(liters per day)
26. Amount of water for other uses?(items not mentioned above)
27. At the end of the period, compile a table to show how many liters of water have been used in the Institute for each purpose
28. If there is water wastage, specify why.
29. How many of the taps are leaky? Amount of water lost per day?
30. Are there signs reminding people to turn off the water?
31. How many water fountains are leaky?
32. How can the wastage be prevented/stopped?
33. Locate the point of entry of water and point of exit of waste water in the Institute.
34. Where does waste water come from?
35. Where does the waste water go?
36. What are the uses of waste water in your Institute?
37. Is there any treatment for waste water?
38. What happens to the water used in labs? Whether it gets mixed with ground water?
39. Is there any treatment for the lab water?
40. Whether green chemistry methods are practiced in labs?
41. Write down four ways that could reduce the amount of water used in the

Institute.

42. Record water use from the Institute water meter for six months.
43. Bimonthly water charges paid to water connections if any,
44. Is there any water conservation plan in the Institute?
45. Does your Institute harvest rainwater?
46. If yes, how many rain water harvesting units are there?(Approx .amount)
47. Is there any water less toilets?
48. Is drip irrigation used to water plants outside?
49. Area under green coverage.
50. Is there any water management plan in the Institute?
51. Are there any water saving techniques followed in your Institute? What are they?
52. List out key opportunities for water consumption reduction, reuse & recycle.

1.3Water Audit-Key Findings

Water audit was performed by WasmanPro Environmental Solutions and the main water usage points in the campus were noted to be for cooking, drinking, gardening, cleaning, toilet and bathroom usages, hostel uses, washing, laboratory uses, canteen uses, office uses, floor cleaning, etc.

Table 1: Source of Water for the Institution

Source	Details
Number of Tankers	25 tanker lorries per day (10,000 L each = 250,000 L/day)
Number of Bore Wells	Nil
Number of Ponds	Nil

Number of Open Wells	6 (located at Kaaranai, ~2 km away)

Table 2: Water Storage Structure in the Campus

Storage Type	Number
Raw Water Tanks	7
Water Tanks for Storage	9
Distribution Tanks (Fresh Water)	26
Fire Water Storage Tanks	5
Treated Water Tanks	3 (50,000 L each)
Treated Water Distribution Tanks	4

Table 3: Distribution Tanks in the Campus

Capacity of Distribution Tanks	Number of Tanks
25,000 L	19
20,000 L	14
10,000 L	7
5,000 L	10
1,000 L	5
Total	**55**

Table 4: Location of Raw Water Distribution Tanks in Campus

- Location of Distribution Tank
- Old CoE office
- Mess
- Ladies Hostel
- Dental Block
- Admn block
- Advanced New Research block
- ETC lab
- Gents Hostel
- Library
- IRC
- B.Arch Block
- Dental Block
- JPR Research Park
- Advanced New Research Block

Table 5: Various points of Usage of Water

Usage Point	**Details**
RO Plant (40,000 L Capacity)	2 tanks (20,000 L each)
Number of Urinals	688
Number of Toilets	1,525
Number of Waterless Urinals	Nil
Number of Bathrooms	1,000
Number of Water Taps	1,735
Water Taps in Laboratories	164

Number of Washbasins	400
Water Pumps	6 (10 HP each)

Table 6: RO Plant Water Output Details

Parameter	Result
pH	7.4
Turbidity	1 NTU
TDS	83 mg/L

Table 7: Water Cooler Details

SL.NO	Location	Nos.
1	Block (Research)	6
2	Block (admin)	6
3	Block (hospital)	12
4	Block (academics)	9
5	Block (dental)	8
6	Hostel	5
7	Hostel	4
8	Work shop 3& 4	2
9	Library	8
10	Ladies Hostel	7
11	Mess	11
12	Canteen	Nil
Grand Total		78

Table 8: Various Points of Water Wastage

Wastage Point	Details
Leaky Taps	Nil
Leaky Pipes	Nil
Leaky Urinals	Nil
Leaky Tanks	Nil
Overflow Water Wastage	Max 7–8 minutes overflow – immediate switch-off followed
Evaporation Loss	None (tanks are fully covered)

Table 9: Details of Water Treatment System

Parameter	Details
Number of Systems	1 (STP, 1.5 MLD capacity)
Total Quantity Treated	952 KLD
Total Quantity Reused	750 KLD

Overall Utilization of water in the Institute

The water consumption by the Institution for the year 2023-24 was audited by WasmanPro Environmental Solutions. The audit was conducted in various time periods spanning from October 2023 to May 2024 to get a clear picture of water consumption of the institute and the measures taken by it to reduce the wastage and decrease the water footprint

The STP unit was also audited at several occasions to check its functionality the quality of treated water. It was found that the Institution has been using treated water from the STP for gardening and flushing which are one of the major water usage points in the educational Institution. Nearly 40 LPCD is used for flushing in an educational Institution, this requirement is met by the treated water.

The fresh water take is used for purposes like drinking, cooking, cleaning, bathing, laboratory use etc. So the water footprint of the Sathyabama Institute of Technology is considerable less due to presence of an efficient water treatment unit and Rain water harvesting facility.

So the intake water of 1191KLD per day seems adequate. Total fresh water consumption in the Institution = 1191KLD

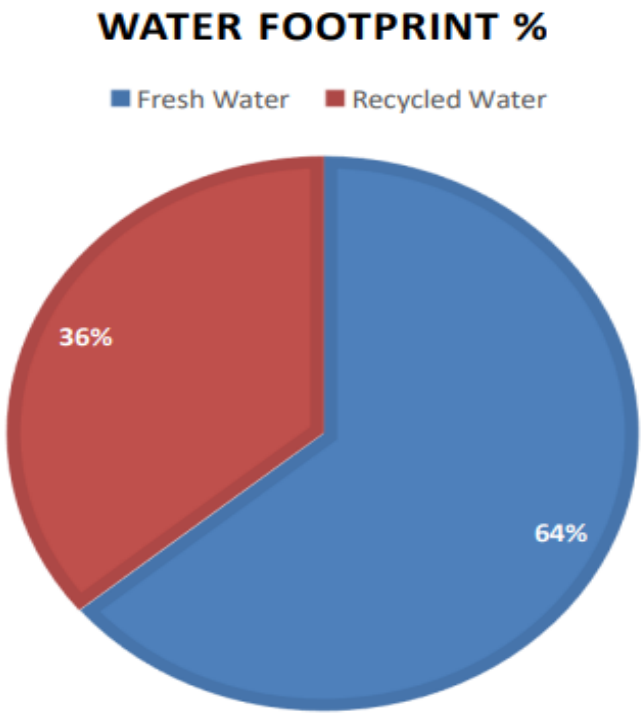

Figure 1: Water FootPrint of the Institute in the Year 2023-2024

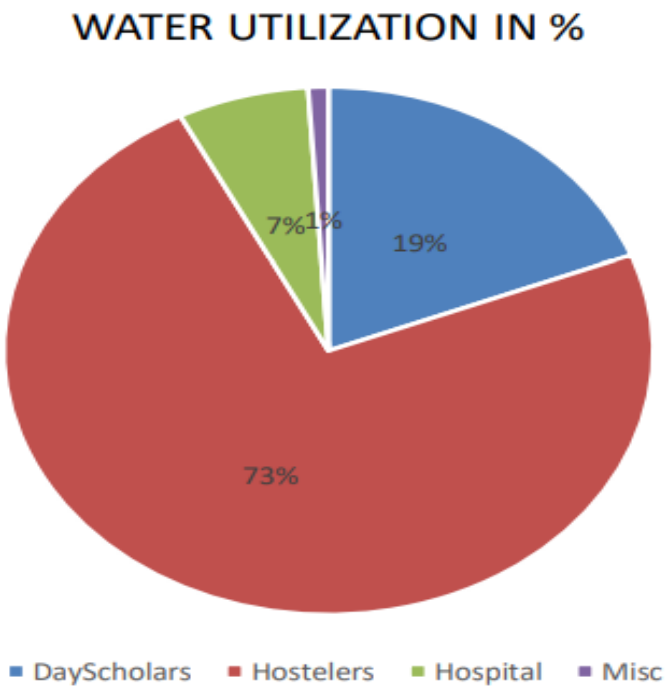

Figure 2: Major Water Utilization Points at the Institute in the Year 2023-2024

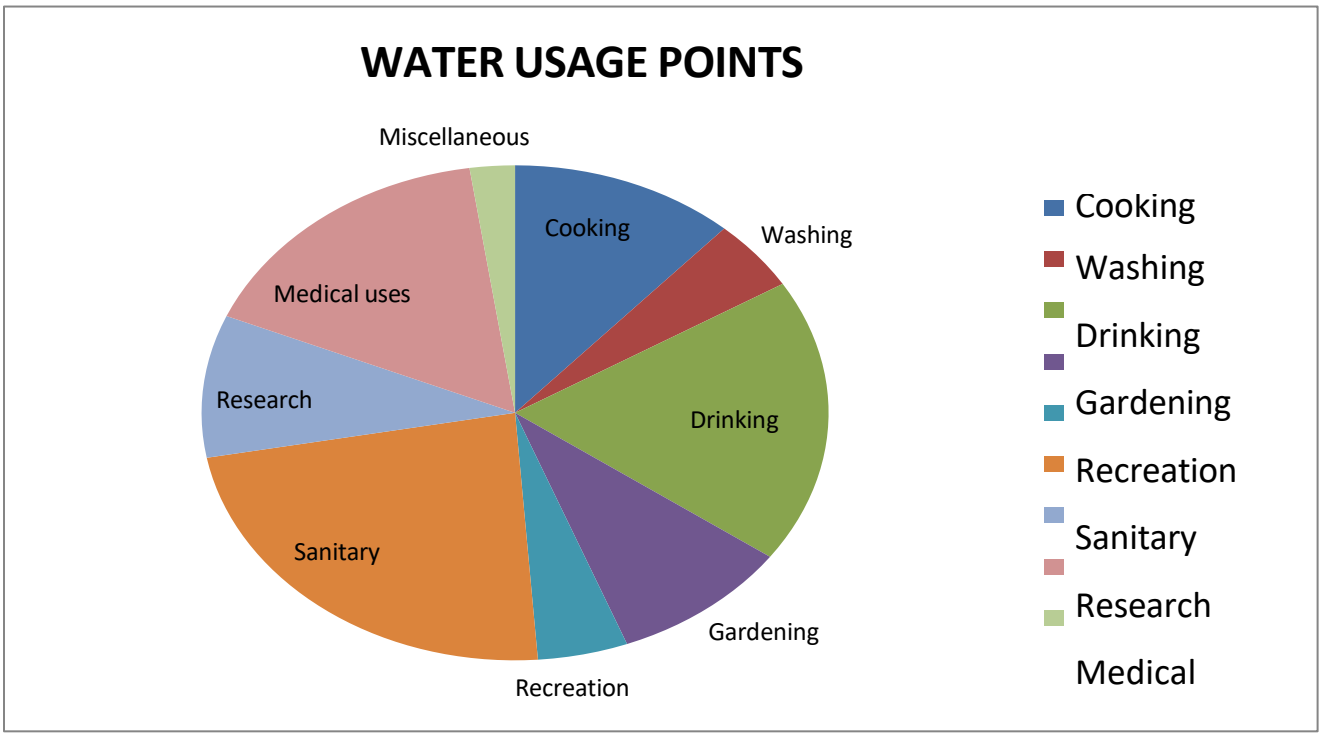

Figure 3 : Water usage Points at the Institute in the Year 2023-2024

Wastewater Treatment Unit Details

Sewage Treatment Plant at Sathyabama Institute Campus

(Capacity of 1.50 Million Liters per Day)	
Input flow to STP	952 KLD
STP designed for	1.5 MLD

Table 10: Characteristics of Raw Sewage

Sl. No.	Parameters	Inlet character	Units
1.	Flow	41	m^3/day
2.	pH	8.0	-
3.	BOD_3	430	mg/l
4.	COD	670	mg/l
5.	TSS	360	Ppm

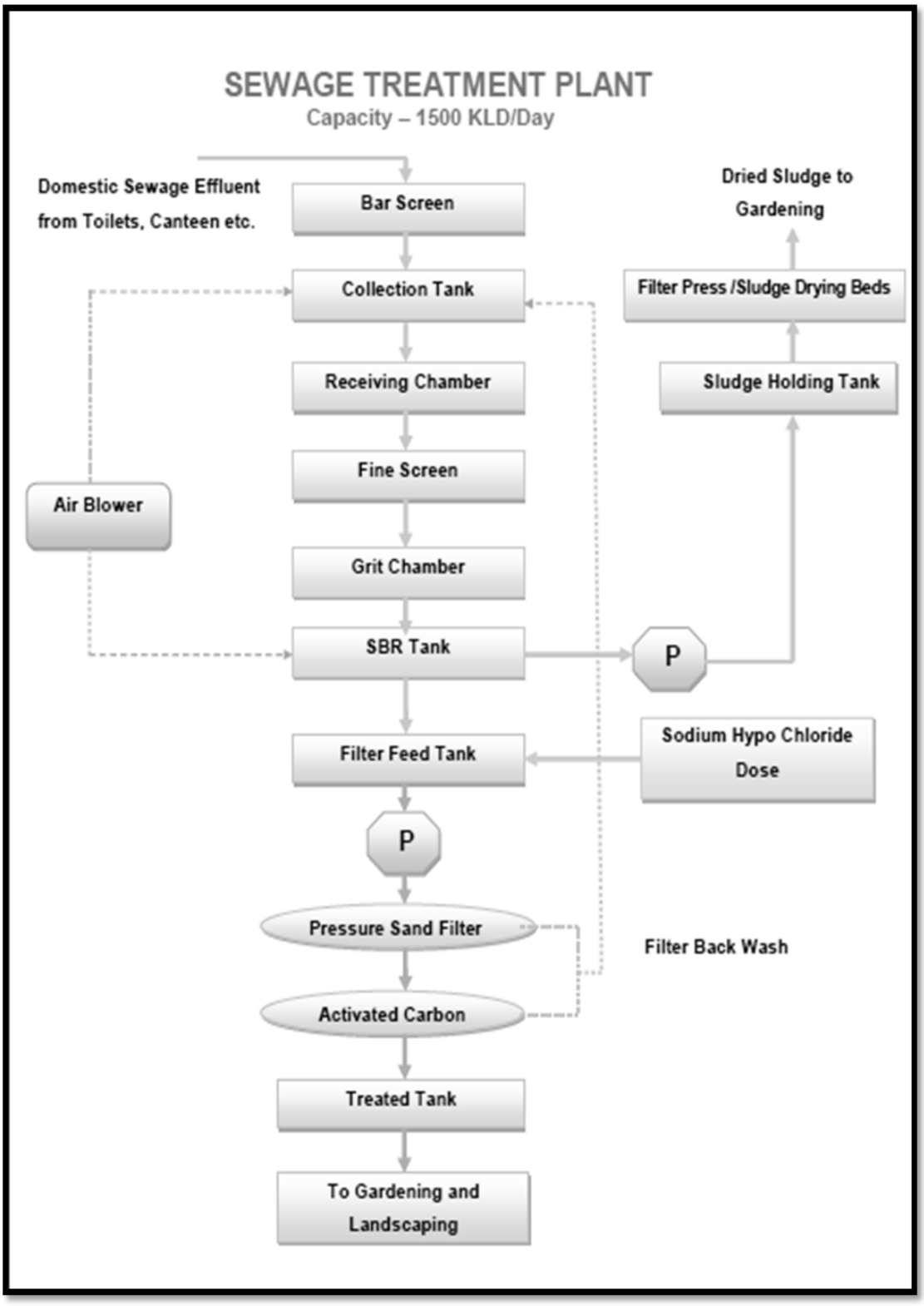

Figure 4 : Flow diagram of the treatment process in the STP

Table 11: Size of Unit Operations of Sewage Treatment Plant

SI.No.	Description of unit operation of STP	Size/Capacity (M)	Liquid Volume (KL)	Free Board Volume (KL)
1	Bar Screen	2.5 × 1.5 × 1.0M (TD)	-	3.75
2	Raw Sewage Sump	15.0 × 12.0 × 4.0M (LD) + 1.0M (FB)	720	180
3	Receiving Chamber	2.5 × 1.5 × 0.7M (TD)	-	2.6
4	Fine Screen Channel	4.0 × 0.525 × 0.8M (TD)	-	1.7
5	Grid Chamber Manual	4.5 × 2.5 × 1.5M (LD) + 0.5M (FB)	16.875	5.625
6	SBR Basins – I	15.0 × 6.0 × 4.5M (LD) + 1.0M (FB)	405	90
7	SBR Basins – II	15.0 × 6.0 × 4.5M (LD) + 1.0M (FB)	405	90
8	Clarified Water Tank	15.0 × 12.0 × 2.8M (LD) + 2.2M (FB)	504	396
9	Treated Tank	15.0 × 12.0 × 4.5M (LD) + 0.5M (FB)	810	90
10	Sludge Sump	4.0 × 4.0 × 3.5M (LD) + 0.5M (FB)	56	8
11	Sludge Drying Beds (4 Nos)	3.0 × 3.0 × 1.5M (TD)	28.8	25.2

2.1 Water Audit – Evaluations and Recommendations

A water audit was conducted by WasmanPro at Sathyabama Institute of Science and Technology. The entire water usage of the Institution was analysed during the audit process. The audited included all aspects of water consumption right from the start, the point where water enters the premises and conducted up to the point where the waste water was sent to the treatment unit and its recycling and reuse at various points in the Institution. All aspects of use was critically examined. The audit analysed the quantity/volume of water being used, wastage if any, leakages existing, excess use etc.

The audit was even conducted to analyse the existing best practices implemented at the Institution and to suggest ways to improve water use efficiency and reduce usage and wastage.

Water audit was extensively done for the Sathyabama Institute of Science and Technology and the Audit findings are as follows.

Best Practices Observed in the Institution -Water Management

- Treatment of waste water using STP of capacity 1500 KLD per day and reusing the treated water for gardening and flushing
- Rainwater harvesting in tanks 5000 L capacity using Rooftop Rain water harvesting structures and rain water harvesting pits.
- Institution has own RO unit catering to drinking water requirement of the entire campus
- Ledgers were maintained in various departments and hostels where students could make entry about leaky taps/ water wastage when-ever it

comes to their notice

- ❖ Institution is conducting periodic awareness camp for own students as well as for the members of the adopted village about water conservation, Sanitation and Hygiene
- ❖ Institution also conducted Water Audit training for its students in July 2023 to create more awareness among them
- ❖ Posters were displayed at various locations urging students to conserve water

2.2 Consolidation of Water Audit Findings-Evaluation

- The Water audit was conducted in Sathyabama Institute of Science and Technology in three stages: pre-audit, an on-site audit and post-audit follow-up.
- In the Preliminary audit, a walk through the entire institution was carried out to understand the nature of water uses, to identify the major water usage points, to note the best practices implemented at the institution for reducing the water footprint.
- Discussion with the administrative officers, staff in-charge of water division, housekeeping and kitchen employees were held to note down water usage throughout the day.
- Discussions with the administrative department including the electrician, staff in-charge of water division was done to gather information about the raw water intake, pumping frequency and to identify the capacity of storage and distribution tank.
- During preaudit stage efforts were made to gather information on source of raw water intake, presence of alternative source of water during summer season, any water meters and sub- meters installed in the campus, any existing

water conservation techniques followed in the Institution.

- During the on-site audit, the raw water pumping stations, storage and distribution tanks were visited. The onsite water treatment units were visited to observe its efficiency of operation. The water samples were collected and tested to find the quality of effluent water input to treatment system and to find the quality of treated output water of STP.
- Discussion with the staff in-charge of water division was held during on-site audit to gather site specific information including: water supply records to determine current water use and water costs; size of the facility; and the population occupying the facility during various shifts of operation, details about pumping station, total water storage capacity in entire educational campus etc.
- During On-Site audit, walk through survey was done to examine building layout, to identifying any water leakage from water pumping station to conveyance points to water usage points, disposal point, recycling and reuse locations.
- During the Post Audit Stage the data collected and identified were analysed to find the how the water is managed throughout the institution from raw-water intake to reuse and recycling. Various observation noted down were taken into consideration during the analysis stage.
- While analyzing the source of input water, it was observed that the main source of raw water for the campus is supplied by tanker lorries nearly 25 tanker lorries of 10,000 L capacity. Rest of the water is taken from 6 Open wells located at Kaaranai nearly 2 km away from the Institution. The raw water from these open wells is conveyed to the institution by Pipeline and motor.

- Analysis shows that 36 % of water demand which is majorly used for flushing & gardening is met by recycled water and only 64 % of water is brought by the Institution. This 36 % less dependence of raw water is an appreciable step, as it leads to reduced pressure on fresh water source taken by the Institution
- The water usage at different location of the institution were analyzed based on the audit data collected. The water usage in the campus were divided into 3 categories for ease of calculation- Water used by day-scholars including students and staffs (including non-teaching) at the college, water used at the hostel, water used at the hospital facility present inside the campus.
- It was found that 73% of water used in the hostel,19 % is used in the campus by the daily goers and 7% is used in the hospital and 1% for other Miscellaneous activities.
- The main water consumption for the day-scholars including students and staffs teaching & non- teaching is for toilet use(flushing). The water for the purpose is met by the recycled water coming the Institutions own STP facility. Only the rest of water needed for hand washing and drinking is to be met by the fresh water intake.
- The per capita water consumption for the Hostlers is around 135 Lpcd, of this a major portion of water consumption is for toilet usage which is met by the recycled water coming from the Institutions own STP facility. The fresh water needed for cooking, bathing, washing, laundry, cleaning etc are provided by the fresh water taken by the Institutions from various sources like Open wells, water tankers etc.
- The water needed for the Hospital facility for drinking, cleaning, laundry, canteen etc is met by the fresh water bought by the institution. Water for toilet use in the hospital is once again the treated water coming from the institutions

own STP facility.

- Based on the pie charts shown in the analysis section it can be seen that the maximum water load exerted in the Institution is by the Sanitary purpose. Next major water demand is exerted by the Medical facility present within the Institution. Water demand is high in the medical facility as extra care should be taken to maintain the sanitation hygiene in the Hospital. Rest of the load is by the cooking and drinking and followed laundry. Institution has huge green facility which needs frequent watering and maintenance, so gardening also exerts water demand. Rest of water demand is exerted by various laboratories present across various department in the Campus.
- The other miscellaneous water usage points observed in the Institution was for Campus canteen- cooking and cleaning, laboratory usage, bus cleaning etc, for this fresh water was provided.
- It was also observed that the campus has storm water drainage channels that collects the storm water and diverts it to rain water harvesting pits. The Institution has also made facilities for roof top rain water harvesting structures and rain water harvesting pits which is highly appreciable. The campus has six rain water harvesting tanks of 5000 L capacity. The rain water collected is diverted to gardening purpose and even used to substitute the raw water intake once sufficient quantity has been collected.
- It was noted that the Institution has own RO unit catering to drinking water requirement of the entire campus. During the year 23-24, all the RO units were fully utilized and fully operational.
- Careful observation was done by the audit team to find any water wastage points. But the team couldn't find any water leakage as the leaky taps are repaired whenever such leaks came to the notice of the authority. This is made

possible by the Institutes water maintenance division who are working round the clock to ensure there is no leakage. The students also played a major role as they were vigilant to report any leaky taps whenever it came to their notice. The frequent water awareness drive conducted by the authorities too played a major role as students were aware of the importance of water conservation and refrained from water wastage. There was no leakage from the overhead tank as the pumps were switched off the moment it got filled as the alarm attached to the overhead tank makes a prompt noise

- The campus has an STP of 1.5 MLD capacity to treat the waste water which is then diverted to gardening and flushing. This STP in the campus helped the institution in reducing their water footprint by 36 %, leading the huge cost saving. The treated water was recycled and reused for flushing the toilets and gardening. The left-over water was used for ground water recharge by the artificial recharge water facility built in the campus. This ensured that the level of water table in and around the Institution periphery was maintained and prevented from drastic fall.
- It can be concluded that the Institution has been taking a great effort to decrease the water footprint by relying on the recycled waste water and water harvested during the rainy season. Hence it can be said that the Institution is taking the right steps towards water management and is on the path towards achieving Zero Liquid Discharge which is highly commendable.
- The Institution is also involved in conducting periodic awareness camp for own students as well as for the members of the adopted village about water conservation, Sanitation and Hygiene and is planning to conduct water audit training for its students.

Based on the above findings, few recommendations that the Institution can follow are suggested in the following section.

2.3 Recommendations

2.3.1.1 Replace conventional flush system with latest dual model flush system to conserve water- as at present the toilet commodes have 10 liter flush which can be replaced with 3/6 liters or 2/4 liters dual flush cisterns. This can reduce water use by around 30-40%.

2.3.1.2 Installation of water meter to analyze water consumption.