SDG - 6 Clean Water and Sanitation

6.5.4 Sustainable Water Extraction on Campus

KITS has implemented sustainable water extraction practices on the campus essential for conserving water and reducing the environmental impact of campus operations. The strategies that KITS has considered to achieve sustainable water extraction are:

- IoT based Smart Irrigation
- Recycling and Reuse of Greywater generated in the campus.
- Sustainable building design with rainwater harvesting
- Water metering and monitoring
- Water efficient appliances such as self-closing taps, semi-automatic flushing tap, *Push*
- tap in wash basin, Hand shower, Push tap in water purifier,
- Research and innovation
- Water audits to identify the supply and demand.
- Policy

a. Water Structures in the campus (Ponds, tanks, small reservoirs and open wells)

S.No.	Lattitude	Longitude	Elevation (mts.)	Name	Location
1	10.943585	76.745736		Open well	Near West gate, Periya Thoppu
2	10.958098	76.753671	482	Open well	Near Farm Office, Seeba Well
3	10.942536	76.75331	460	Open well	Opposite to Farm Office
4	10.950613	76.747587	470	Open well	Near Orchard
5	10.940869	76.746818	478	Open well	Near Store Room
6	10.942536	76.75331	474	Open well	Opposite to Farm Pond
7	10.942536	76.75331	483	Open well	Near Dgs Ground
8	10.943751	76.74859	482	Open well	Near East Gate

9	10.942536	76.75331	482	Open well	**Block B1, Near Old banana area**
10	10.943585	76.745736	473	Open well	West side of North Land, Gokulam Theatre
11	10.958098	76.753671	483	Borewell	Four Corner
12	10.958098	76.753671	479	Borewell	Near shade net
13	10.943316	78.745222	475	Borewell	Borewell Thoppu
S.No.	Lattitude	Longitude	Elevation (mts.)	Name	Location
1	10.938314	76.750319	482	Borewell	EMS Opp.land (6.5 ac)
2	10.93893	76.750098	484	Borewell	EMS Opp.land (6.5 ac)
3	10.939587	76.752978	480	Borewell	EMS back side-1
4	10.935921	76.743564	473	Borewell	EMS back side-2
5	10.931493	76.748582	472	Borewell	Road side, EMS Back side-3
6	10.931548	76.74851	480	Borewell	EMS Back side-4
7	10.929945	76.757638	472	Borewell	EMS Back side-5
8	10.929945	76.757638	479	Borewell	EMS Back side-6
9	10.934145	76.751591	460	Open well	EMS Back side

Water Conservation Structures (Farm Ponds and Tanks) – Karunya Institute of Technology and Sciences

b. Rainwater Harvesting: During monsoon season, the volume of water collected from terrace of each building is calculated using the terrace area and the depth of rainfall over the area. The water collected over the terrace is directed to augment the groundwater through soak pits located in each of the building.

Ferrocement Storage Tank (Partially underground)

In the campus, a roof top rainwater structure (with capacity of 25,000 m3) made of ferrocement has been installed to collect the storm water from the roof of administrative block with an area of 1900 sq. m. The rain water that is being collected in the tank is supplied for washing purposes in the same block

Soak Pit (Groundwater Recharge)

Around 33 soak pits (3 m depth with 1.8 m diameter) are used to harvest roof top water, which are located in front / behind the academic departments and student hostels. These structures improve the groundwater recharge in the campus and augment the groundwater potential.

c. **Efficient Irrigation System:** Karunya model is a unique drip irrigation system where every line of plantation can be irrigated separately. The gate valves have been divided into blocks and independent rows as well leading to have multiple crop in one area. Based on the water requirement of each crop, the watering done in a controlled manner not only in block level but every row. In addition to the drip irrigation on land, overhead drip is practised in head which is a permanent fixture. Also drought resistant plants in landscaping reduce the water requirement.

d. Greywater Recycling and Reuse: For effective recycling and reuse of greywater from sinks, showers, washing of utensils in the kitchen and washing machines, five Sewage Treatment Plants (STP) have been constructed in the Student Hostels. In addition to that, to treat the black water from all the student hostels, four Biogas Plants have been installed to treat black water and for production of biogas to replace two to three commercial cylinders for cooking every day. The treated or recycled wastewater is reused for gardening (from 113 STP treated water outlets). The details on the capacity of each STP and the inflow rate with the quantity of treated effluent are given in the table below.

Average Treated water Output from STP's in KITS Campuses

Sl.No	Location	Capacity of STP	Average Wastewater Inflow Flow Rate in STP
1	JMR STP	1000 m^3 /day	650 -700 m^3 /day
2	FDR STP	400 m^3 /day	250 -300 m^3 /day
3	Ladies Hostel STP	450 m^3 /day	300 – 350 m^3 /day
4	PR GARG STP	600 m^3 /day	350 -400 m^3 /day
5	Bethesda STP	8 m^3 /day	4 m^3 /day

Reuse of Greywater for irrigation and gardening (Outlet Points)

Location	No. of Outlet Points
Student Hostel	88
Campus	25

e. Sustainable Building Design with Water-Efficient Appliances: KITS initiated a program to promote water efficiency by installing self-closing taps in various areas, including the hostel and college campuses. These taps are designed to minimize water wastage by automatically shutting off after use. The total number of self- closing taps installed at KITS is 3,376. To assess the effectiveness of this initiative, we calculate the percentage of water-efficient appliances installed compared to the total potential. KITS has achieved full installation of these water-efficient appliances. This depicts a thorough commitment to water conservation and sustainability

f. Water Metering and Monitoring: Flow Meters (FM) have been installed to track water usage in various campus facilities and monitor consumption patterns.

- FMs have been installed at the inlet of the sewage treatment plant to measure inflow into the collection tank and at the outlet to measure the reuse water for gardening and irrigation.

- FMs have been installed in both intake and delivery points of RO plants to measure the volume of treated water being used drinking and cooking.

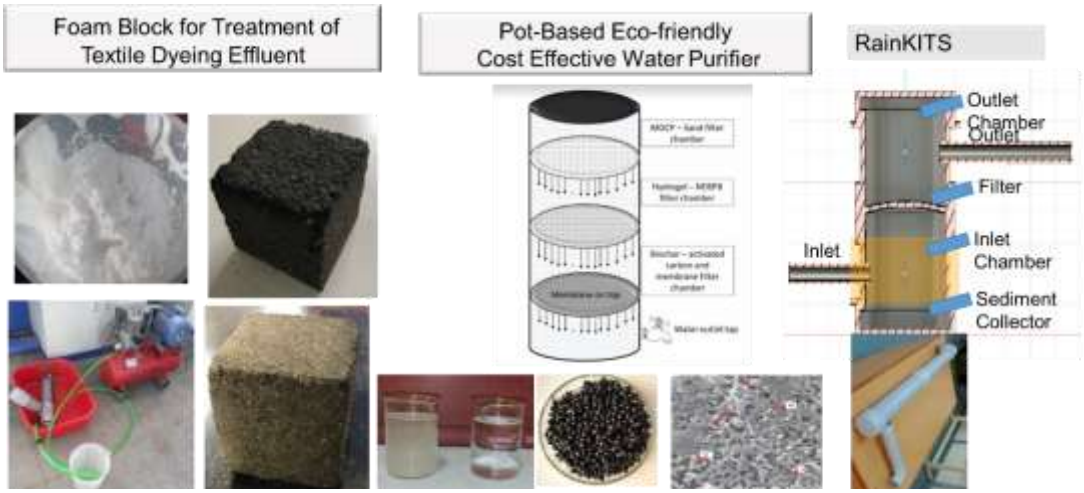
Flow Meters at the Filter Unit of Treatment Plant to measure the Treated Water

g. Education and Outreach: KITS regularly organises awareness creating webinars, club and outreach activities on importance of water conservation among students, faculty, and staff. Use posters, flyers, and digital communication channels to share information about the university's water usage and the need for conservation.

h. Conservation of Water Bodies: Water bodies play a crucial role in sustaining life and ecosystems. To raise awareness about the importance of conserving these invaluable natural resources, 135 NCC Cadets of Karunya Institute of Technology and Sciences organized an online event on January 02, 2022. This event aimed to educate, engage, and inspire individuals to take active steps towards the

preservation of water bodies. One of the standout features of this event was the creation and presentation of vlogs and poem recitation by NCC cadets, providing unique insights into water conservation.

i. Research and Innovation:

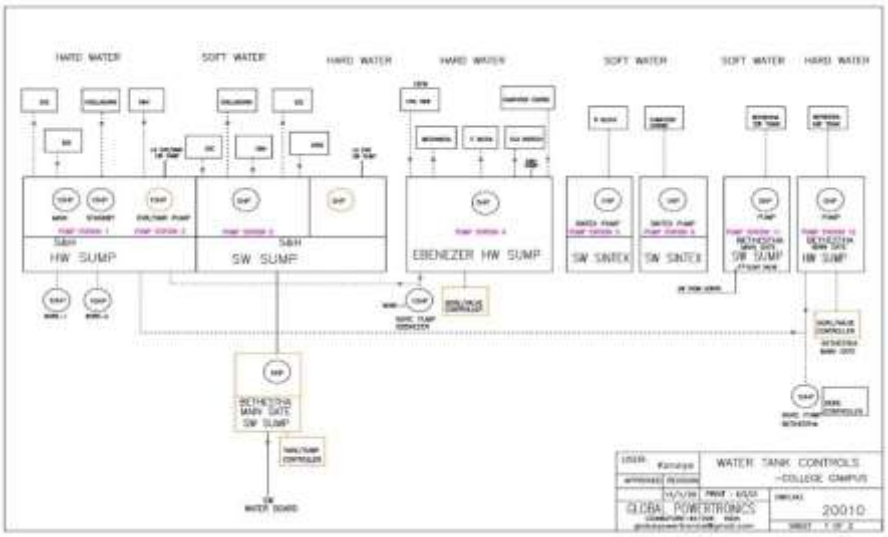


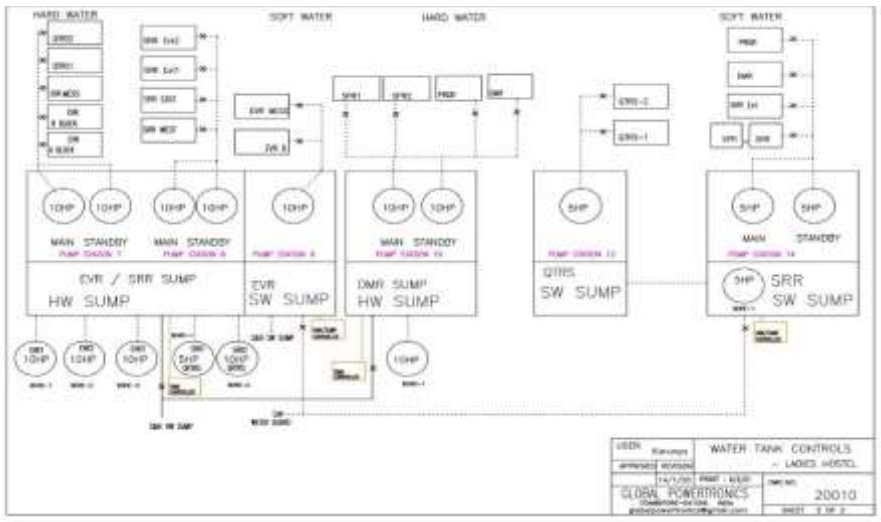
j. Water Efficiency Audits: KITS conduct r water efficiency audits to identify opportunities for improvement and assess the effectiveness of conservation measures.

k. Water Quality Monitoring: As per policy, KITS regularly monitors the water quality on the campus, including regular testing of raw water sources for pollutants. TDS value and filters of RO units are checked on a routine basis to monitor the quality of water as per the IS_10500 and revised module IS 10500:2012 - Drinking Water Quality Monitoring Protocol and for regular maintenance of the plant.

l. Quantity of Water saved by Implementing Water Conservation and Management Activities (Other Than Roof-Top RTWH): Since 2019, in University campus, the wireless water level controller operating through modbus communication system has been installed for automatic valve control at the inlet of the sump and over head storage tanks. This helps in avoiding overflow of water and power consumption of the motor there by wastage of water and energy is prevented

The wastage of water due to overflow in storage tanks and sumps is prevented by using sensor-based pump operating system. The sumps in the campus and student hostels are connected to ensure water supply at all times in case of any reduction in groundwater level or mechanical failure of pumps. Three IoT based automated water controllers have been installed in the overhead tanks and sumps by which 10% of water and energy is conserved.





Layout of IoT based Centralized Water Level Control System