# Annual Quality Assurance Report (AQAR) for AY 2022-23

## Criterion VII – Institutional Values and Best Practices

### 7.1 Institutional Values and Social Responsibilities

| Metric No. | Details | |
|---|---|---|
| 7.1.4 | Water conservation facilities available in the Institution | |
| | **FACILITIES AVAILABLE** | **PAGE NO.** |
| | Rainwater harvesting | 01 |
| | Bore well / Open well recharge | 09 |
| | Waste water recycling | 10 |
| | Maintenance of water bodies and distribution system in the campus | 13 |

## RAINWATER HARVESTING

- B.S Abdur Rahman Crescent Institute of science and technology is one of the pioneers in implementing solutions to save water.
- The institute has implemented rain water harvesting system in the campus with a strong desire to utilize the rain water at maximum extent.
- The Institute has taken tremendous efforts to reduce the water consumption and also to treat the wastewater generated within the campus so that it can be effectively reused for gardening and toilet flushing.
- In the forefront to save water, our institute of science and technology has initiated and executed the rainwater harvesting in the campus.
- Rainwater harvesting facility is done in all blocks to collect rainwater from the roof of all buildings.
- The harvested water is diverted to open wells in institute campus, Men's Hostel and ladies hostel.
- The placement of rainwater facility within the campus is decided upon by considering the profile of the land so as to drain the maximum amount of water collected with ease.
- In the buildings, sufficient plumbing connections are provided to trap the rain water from the roof tops.

- Underground connections are ensured to connect the collected water from the roof top to the rainwater recharge pit.
- It was also ensured that the rainwater harvesting structures are constructed as per the norms. The recharge pit provided to collect the rain water is series of filter bed.
- This initiative took shape when the institute faced shortage of water during summer. Cost of buying water was becoming a financial burden. The only alternative to the water crisis was to use the available water more effectively.
- The features of the recharge pit are described below.
- A mesh is provided at the inlets of rain water pipes so that solid waste/debris is prevented B.S.Abdur Rahman Crescent Institute of Science and Technology has taken initiatives to install rain water harvesting pits in the campus from entering the pit system.
- The recharge pits are of size 2m x 2m x 2m is excavated
- The recharge pit comprises different set of filter media. The filter media comprises of thick layers of boulders at the bottom followed by layers of gravels and coarse sand.
- This enables the filtration of water and also prevents the deposition of silt on the recharge pit.
- Access Manhole frames and covers are provided.
- The rain water is also stored in Underground sumps of Life Science block, Mechanical Science Block and New Staff Quarters.

## RAIN WATER HARVESTING STRUCTURES AND UTILIZATION IN THE CAMPUS

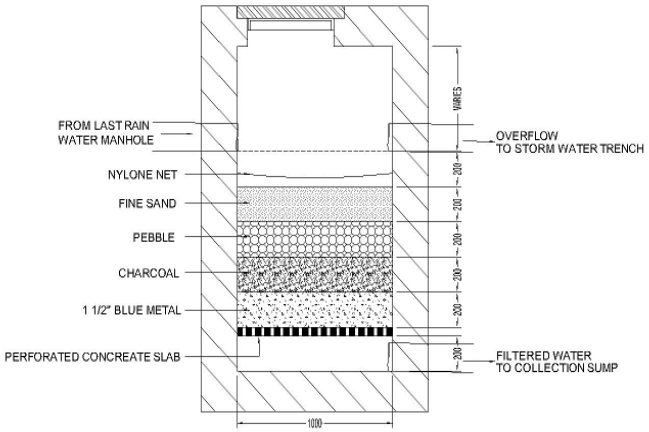
B.S.Abdur Rahman Crescent Institute of Science and Technology has taken initiatives to install rain water harvesting pits in the campus.

### Rain Water Harvesting

Rainwater harvesting facility is done in all blocks to collect rain water from the terrace. The harvested water is diverted to open wells in institute campus, Men's Hostel and ladies hostel. The rain water is also stored in Underground sumps of Life Science block, Mechanical Science Block and New Staff Quarters.The rain water is stored after passing through the pre-filter as shown in Figure below.

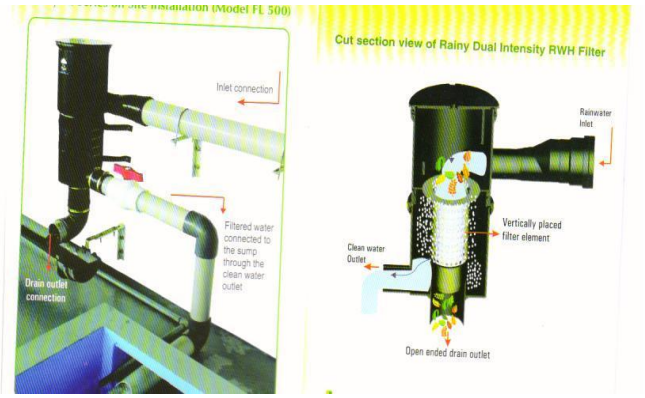
| S.No | CAMPUS/ BLOCKS | Number of Rain Water Harvesting | Quantity of Water Collected(L) |
|---|---|---|---|
| 1 | College/Life Sciences Block | 1 | 10000(Approx) |
| 2 | New Architecture Block | 1 | 10000(Approx) |

| | | | |
|---|---|---|---|
| 3 | Computer Science block | 1 | 10000(Approx) |
| 4 | Pharmacy Block | 1 | 10000(Approx) |




RAIN WATER FILTER DETAIL

The special features of the filtration unit connected with the rain water harvesting system is given as follow




## Special Features:

- ❖ Dual Intensity Filter works on the principle of cohesive & centrifugal force.
- ❖ Works on Gravitational force (No external energy required)
- ❖ Compact in size and wall mounted
- ❖ Automatic flush out of dirt particles
- ❖ Flexibility in pipe connection to any angle and degree
- ❖ Provision of bypass valve

In our Institute Rainy filter –FL 500 is used as part of the rainwater harvesting system. Thetechnical specifications of Model FL 500 is given below

## Rainy Filter –FL 500

Technical Specifications & Parameters of Model FL 500


| | |
|---|---|
| Suitable up to area: | 500 SQMTRS |
| Max: Intensity of Rainfall: | 75 mm/hr |
| Working Principle : | Cohesive Force & Centrifugal force |
| Operating Pressure: | Less than 2 feet of head (0.060kg/cm$^2$) |
| Capacity: | 480 LPM |
| Filter Element: | SS-304 Screen |
| Mesh Size: | 250 Microns |
| Inlet: | 110 MM |
| Clean Water Outlet: | 90 MM |
| Drain Outlet: | 110 MM |
| Housing: | High Density Polyethylene |
| Efficiency of Filter: | Above 90% |
| Source of Power: | Gravity |

The characteristic features of FL Series Dual Intensity RWH Filter are its capacity to take up the load up to 10 to 500 square meters of Roof area with variable intensity of rainfall of 5 to 75 mm/ hour with a discharge capacity of 10 To 480 Liters per minute.

## RAIN WATER HARVESTING STRUCTURES IN CAMPUS


**RAINWATER HARVESTING PIT**


**RAINWATER COLLECTION WELL**


**RAINWATER HARVESTING PIT AT LIFE SCIENCE BLOCK**


**FILTER UNIT IN RAINWATER HARVESTING SYSTEM (ARCHITECTURAL BLOCK)**


**RAINWATER COLLECTION SUMP (ARCHITECTURAL BLOCK)**


## FILTER UNIT IN RAINWATER HARVESTING SYSTEM (COMPUTER SCIENCE BLOCK)

Rainwater harvesting facility is done in all blocks to collect rain water from the terrace. The details are listed below.

| Rain Water Harvesting Details | | | | |
|---|---|---|---|---|
| **S.No** | **Inlet Pit Detail** | **Area (sq. m)** | **Rain water filter capacity ( Litres)** | **Location** |
| 1 | Inlet pit-1 | 156 | 200 | Mechanical Science Block |
| | Inlet pit-2 | 122 | 200 | |
| | Inlet pit-3 | 296 | 300 | |
| | Inlet pit-4 | 175 | 200 | |
| | Inlet pit-5 | 243 | 300 | |
| 2 | Inlet pit-1 | 191 | 200 | Ladies Hostel-New Block |
| | Inlet pit-2 | 188 | 200 | |
| | Inlet pit-3 | 132 | 200 | |
| 3 | Inlet pit-1 | 68 | 100 | New Staff quarters |
| | Inlet pit-2 | 65 | 100 | |
| | Inlet pit-3 | 81 | 100 | |
| | Inlet pit-4 | 66 | 100 | |
| | Inlet pit-5 | 81 | 100 | |
| | Inlet pit-6 | 66 | 100 | |

| | | | | |
|---|---|---|---|---|
| 4 | Inlet pit-1 | 61 | 100 | Men's Hostel-A&B BLOCK |
| | Inlet pit-2 | 71 | 100 | |
| | Inlet pit-3 | 43 | 100 | |
| | Inlet pit-4 | 132 | 200 | |
| | Inlet pit-5 | 132 | 200 | |
| | Inlet pit-6 | 43 | 100 | |
| | Inlet pit-7 | 71 | 100 | |
| | Inlet pit-8 | 61 | 100 | |
| 5 | Inlet pit-1 | 297 | 300 | Men's Hostel -C& D BLOCK |
| | Inlet pit-2 | 297 | 300 | |
| 6 | Inlet pit-1 | 71 | 100 | Men's Hostel -PG BLOCK |
| | Inlet pit-2 | 71 | 100 | |
| | Inlet pit-3 | 71 | 100 | |
| | Inlet pit-4 | 71 | 100 | |
| | Inlet pit-5 | 71 | 100 | |
| | Inlet pit-6 | 71 | 100 | |
| | Inlet pit-7 | 71 | 100 | |
| | Inlet pit-8 | 71 | 100 | |
| 7 | Inlet pit-1 | 275 | 300 | Pharmacy Block |
| 8 | Inlet pit-1 | 340 | 300 | Library Block |

## BORE WELL / OPEN WELL RECHARGE

### (I) UNIVERSITY – OPEN WELL & BORE WELLS:

The water required is also met by extracting the water from the bore wells (3 Nos) and open wells (3 Nos) facility available in the Institute. The Annual Extraction of Water is **5000 m³** per year. The Institute also ensures that the quality of water obtained from the private supply and also from the well meets the drinking water standards by frequently conducting the water quality test.

**Figure VI (2.1) – 2: Water extraction from Open wells**

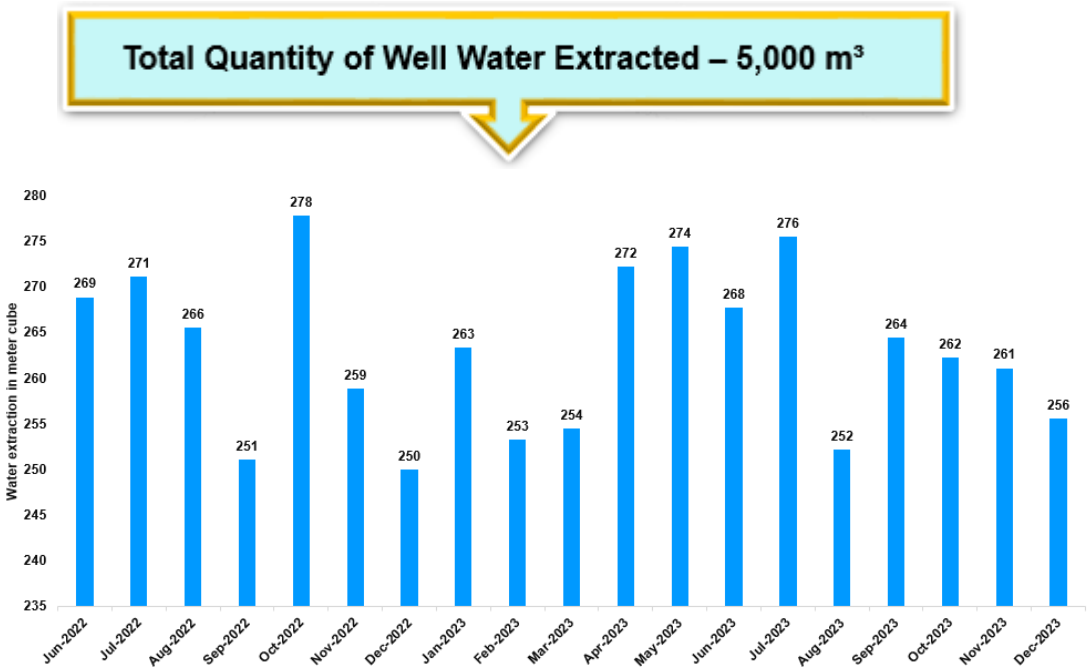



**Figure VI (2.1) – 3: Water extraction from Open wells for the period 2022-23**

**WASTE WATER RECYCLING:**

# WASTEWATER TREATMENT

B.S. Abdur Rahman Crescent Institute of Science and Technology exemplifies this commitment through its comprehensive wastewater treatment and liquid waste management strategies, ensuring the sustainable use of water within its campus.

The university has established effective measures for treating wastewater generated on its premises, ensuring that the treated water is reused efficiently. The estate office has implemented sustainable sewage treatment plants designed to handle the university's wastewater effectively. In 2022, an additional sewage treatment plant (STP) with a capacity of 100 KLD was commissioned at the KBA Men's Hostel, enhancing the existing sewage treatment plants.

## INFRASTRUCTURE OVERVIEW

Currently, the university operates two sewage treatment plants, each with a capacity of 250 KLD—one dedicated to the Men's Hostel and the other serving the institute campus. This infrastructure is critical for managing sewage, which typically contains a mix of organic, inorganic, and suspended solids. The treatment process is structured to remove these pollutants, allowing for effective reuse of the treated water.


**Figure VI (3.1) – 1: 250 KLD and 100 KLD – STP – Geo-tagged photographs**

## TREATMENT PROCESS

The treatment system comprises several stages, beginning with preliminary treatment to eliminate floating debris and grit. Bar screens filter out plastics and other floating materials, while grit chambers remove sand and silt. The primary sedimentation tank further aids in the removal of suspended solids. Following this, the secondary treatment process employs a biological treatment system to remove organic content from the wastewater.

Eco-bio blocks are incorporated to enhance the efficiency of biological treatment. These blocks facilitate the attachment of beneficial bacteria, improving the removal of organic matter and enabling the system to handle fluctuations in organic loading. The treatment process operates on the principle of an attached growth aerobic system, followed by sand and carbon filters that ensure any residual organics are adequately adsorbed before the treated water is stored in a collection tank.

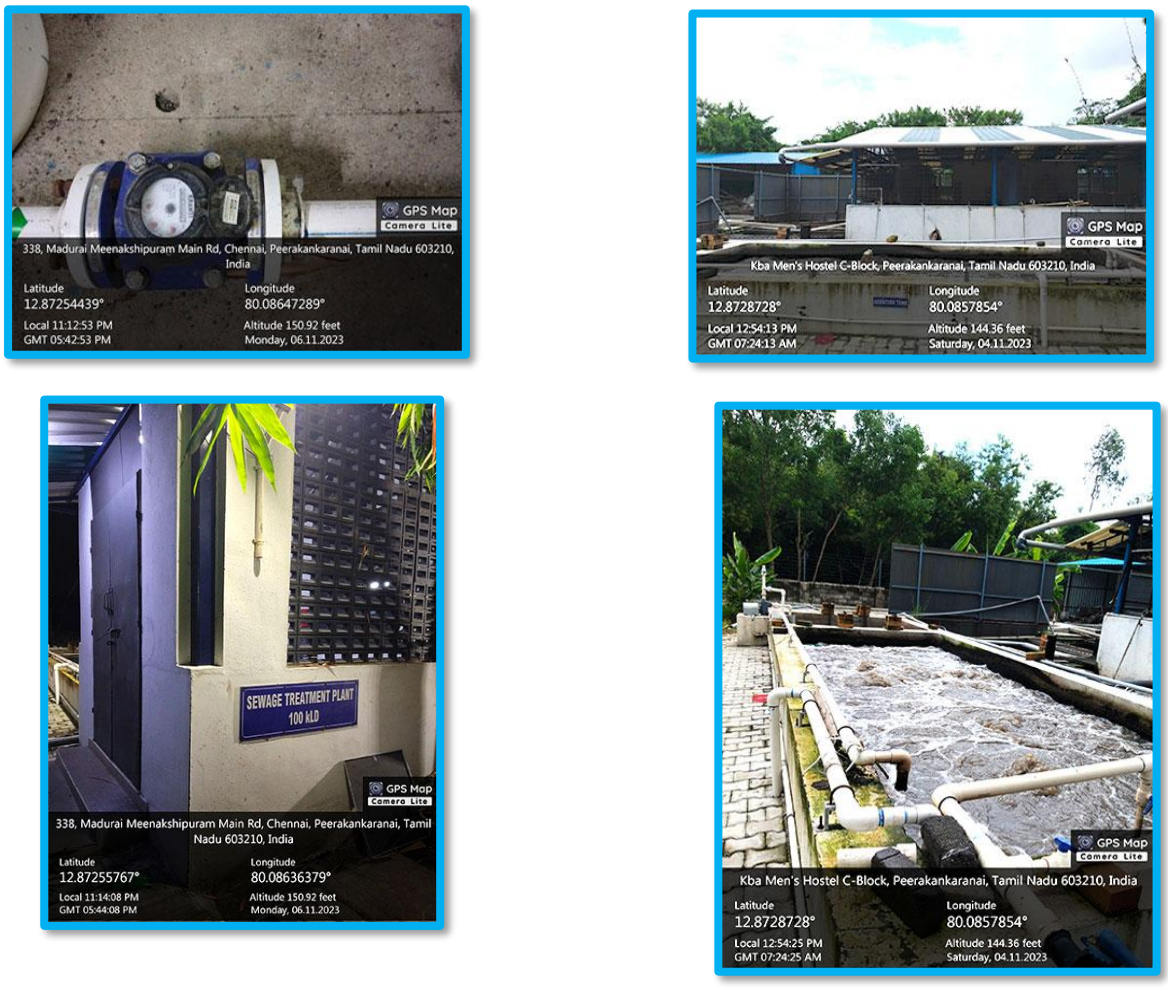



***Figure VI* (3.1) – *2: Geo-tagged photographs showing two STPs of capacity 250 KLD and 100 KLD***

## MAINTENANCE AND MONITORING

Regular maintenance of the sewage treatment plants is a priority, with periodic checks on all pumps and valves to ensure optimal functioning. The treated water is primarily utilized for landscaping and toilet flushing, significantly reducing the university's dependence on fresh water from wells for gardening purposes.

To ensure the effectiveness of the treatment systems, the physical, chemical, and biological characteristics of the treated water are routinely tested. Key parameters such as pH, solids, Chemical Oxygen Demand (COD), biochemical oxygen demand (BOD), nitrates, and chlorides are monitored to maintain water quality suitable for reuse.

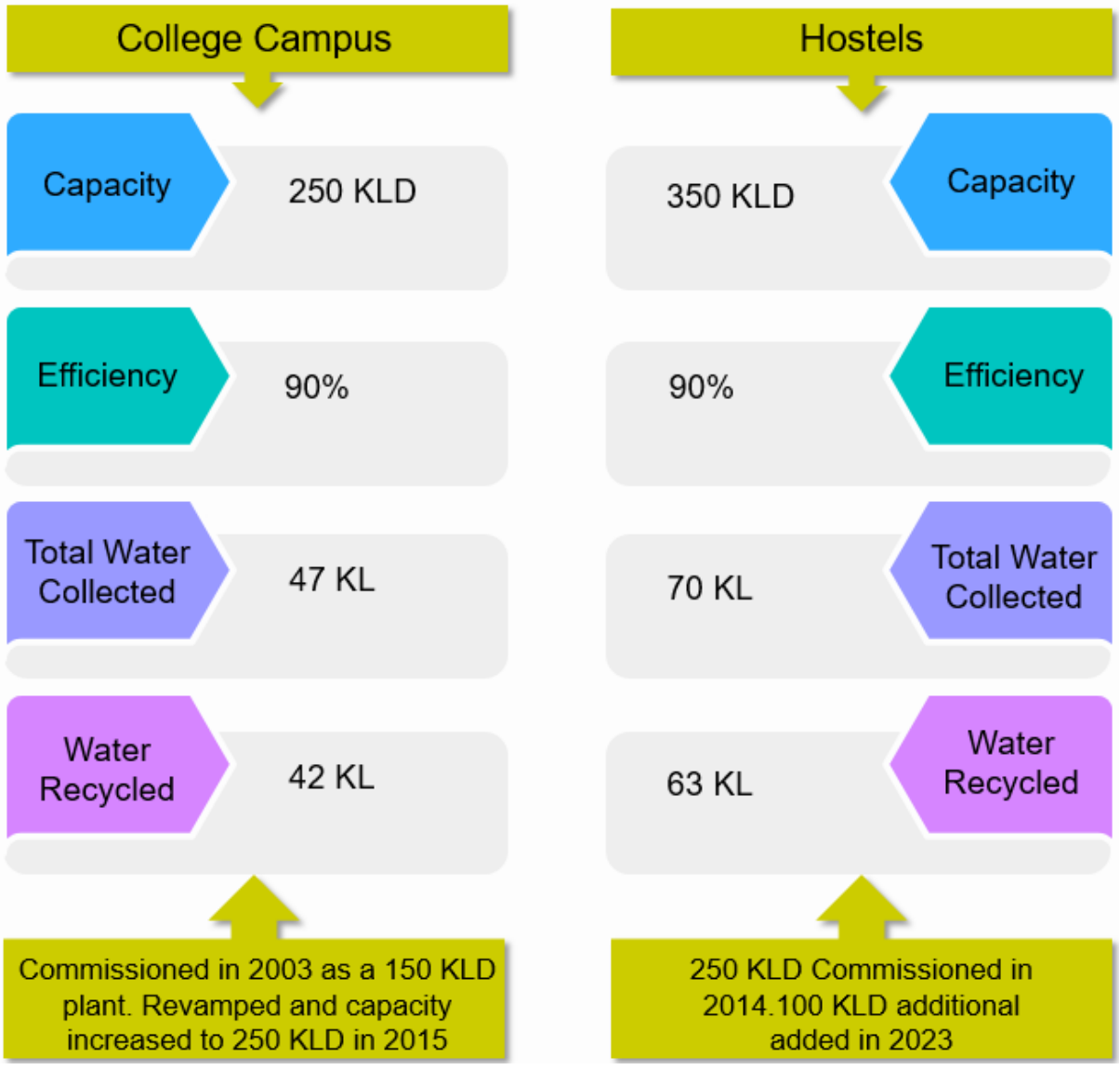



**Figure VI (3.1) – 3: Details of Wastewater Recycled**

# PREVENTING WATER SYSTEM POLLUTION

B.S. Abdur Rahman Crescent Institute of Science and Technology has implemented measures to prevent polluted water from entering the water system, specifically targeting pollution resulting from accidents and incidents.

## A. DESCRIPTION OF THE DIAGRAM (FIGURE VI – 1):

The provided diagram outlines the water management infrastructure of the B.S. Abdur Rahman Crescent Institute of Science and Technology, showcasing various types of water lines across the campus.


**EFFICIENT INFRASTRUCTURE FOR WATER AND WASTEWATER MANAGEMENT**

***Figure VI* (3.2) – *1: Existing water supply and drainage pipeline layout with width of drains, invert levels & disposal to prevent polluted water from entering the water system***

## 1. **OVERALL LAYOUT**

- The map depicts the campus layout, highlighting key buildings and areas. Various color-coded lines represent different water types and their management systems.

## 2. COLOR-CODED SYSTEMS

- **Raw Water Lines (Green)**: These lines indicate the pathways through which untreated or source water is supplied to the campus. This water is typically drawn from local sources before any treatment process.
- **STP Treated Water Lines (Yellow)**: The yellow lines represent water undergoing treatment through the Sewage Treatment Plant (STP). This recycled water is suitable for non-potable uses, such as irrigation and cooling processes, reflecting the institution's sustainability efforts.
- **Sewage Water Lines (Blue)**: The blue lines illustrate the sewage discharge routes, showing how wastewater is collected and directed to the treatment plant for processing. This ensures effective sanitation and environmental management.

## 3. INFRASTRUCTURE ELEMENTS

- The diagram highlights important infrastructure components, such as the Sewage Treatment Plant (STP), water tanks, and other critical facilities. These components are strategically located to optimize water flow and management across the campus.

## 4. OVERALL FUNCTIONALITY

- The design emphasizes an integrated approach to water management, showcasing how raw water is sourced, treated, and utilized effectively while also addressing sewage disposal. This organized system reflects the institute's commitment to sustainability and efficient resource use.

The map serves as a valuable tool for understanding the water management framework at B.S. Abdur Rahman Crescent Institute of Science and Technology. By clearly outlining the raw water, treated water, and sewage systems, it provides insight into the institution’s initiatives for maintaining water quality and promoting environmental sustainability on campus.

## B. LAYOUT OF PIPELINES FOR WATER AND WASTEWATER (FIGURE VI – 2)

### 1. PLUMBING AND WATER COLLECTION SYSTEMS

- The institute has established a meticulously planned plumbing facility for the collection and treatment of water. This includes the transportation of water from wells to treatment units, ensuring that pipes are laid at suitable gradients to facilitate safe water transport.
- Regular inspections are conducted to check for leaks in the water pipelines, and immediate replacements are made in case of breakages due to accidents. This proactive maintenance helps prevent polluted water from entering the water system.

### 2. SEPARATE SEWER SYSTEMS

- Wastewater is collected through separate sewer pipelines, which are equipped with sufficient manholes for easy inspection. This segregation ensures that wastewater does not mix with potable water sources, thereby reducing the risk of contamination.

### 3. IDENTIFICATION AND MARKING OF PIPELINES

- The institute employs a colour-coded system for easy identification of water and sewer lines:
  - **Green**: Raw water from wells
  - **Blue**: Treated water from the Sewage Treatment Plant (STP) used for toilet flushing
- This clear marking helps prevent accidental cross-connections that could lead to pollution.


***Figure VI (3.2) – 2: Layout of pipelines for water and wastewater – Geo-tagged photographs***