NEW HORIZON
COLLEGE OF ENGINEERING

ENVIRONMENTAL IMPACT

Water Conservation Report

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GREEN AUDIT AND QUALITY AUDIT REPORT

ON

WATER AUDIT, ENERGY AUDIT,

WASTE MANAGEMENT AUDIT,

GREEN CAMPUS MANAGEMENT AUDIT

AND ENVIRONMENT AUDIT

OF

NEW HORIZON COLLEGE OF ENGINEERING

BELLANDUR MAIN ROAD, NEAR MARATHAHALLI,

BENGALURU – 560 103

2023-24

NEW HORIZON
COLLEGE OF ENGINEERING
New Horizon Knowledge Park, Ring Road, Marathalli
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade. Accredited by NBA

ECO ENERGIME ENGINEERS LLP

ENHANCING RESOURCE EFFICIENCY

GREEN AUDIT AND QUALITY AUDIT REPORT

OF

NEW HORIZON COLLEGE OF ENGINEERING

BELLANDUR MAIN ROAD, NEAR MARATHAHALLI,

BENGALURU – 560 103

2023-24

FOR MORE INFORMATION

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PROJECT ADVISOR

- Mr. Prabu Das M.Tech
- Ms. Aparna Reddy B.Arch., MBA

ACKNOWLEDGEMENTS

We are thankful to the management of **New Horizon College of Engineering, Bengaluru,** for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the concerned personnel/ staff members of the college. They took key interest and gave valuable inputs during the course of study. We would like to thank:

Chairman – New Horizon Educational Institutions, Bangalore

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Certificate

This is to certify that M/s. Eco Energime Engineers LLP, Bengaluru has conducted **Green Audit** and **Quality Audit** that comprises of **Water Audit, Energy Audit, Waste Management Audit, Green Campus Management Audit, and Environment Audit** of **"New Horizon College of Engineering, Bengaluru"** during the **November 2023 to October 2024**.

The audit involves field visit, measurements and observations, verification of bills, log books, data base, maintenance registers and interview with staffs, and this gives an overview of the existing system. In an opinion and to the best of our information and according to the information given to us, said Quality Audit gives a true and fair view in conformity with auditing principles.

For Eco Energime Engineers LLP

Authorized Signatory

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Sustainable Tomorrow **Eco Energime Engineers LLP**

EEELLP ACKNOWLEDGEMENT

EEELLP Team thanks the Management of **New Horizon College of Engineering, Bengaluru** for assigning this interesting work to us. We appreciate the cooperation extended to our team during the entire process.

Our special thanks to **The Registrar – Mr H N Suryaprakash & Team of colleagues** for giving us necessary support and inputs to carry out this very vital exercise.

We would like to thank Principal, the Head of Departments and staff members who were actively involved while collecting the data and conducting field measurements.

For Eco Energime Engineers LLP

Authorized Signatory

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DISCLAIMER

The audit team has prepared this report for **New Horizon College of Engineering, Bengaluru** based on input data submitted by the representatives of College complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

For Eco Energime Engineers LLP

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4. WATER AUDIT

4.1. Facility description

The water audit study involved carrying out various observations and analysis, to realistically assess usage of water and potential for water conservation. BWSSB and Bore-well are the sources of water, for facilitating the water supply requirement of the entire campus.

BWSSB water received at main sump of 1000 kL near ground at gate no.3. From the main sump, then the water further distributed to SVB block, CSB block, NSCB block, SMV block and RC block sumps by hydro pneumatic pumps of 3 Nos. to maintain the water level in the sumps.

The list of sumps and location details are given in table 4.1.

S. No.	Location	Sump	Source of water
1	Near Ground (Gate-3)	Main Sump	From BWSSB
2	SVB Block	Surface Sump - PVC Tanks	From Main Sump
3	CSB Block	UG Sump - RCC Tank	From Main Sump
4	NSCB Block	UG Sump - RCC Tank	From Main Sump
5	SMV Block-Main Store	UG Sump - RCC Tank	From Main Sump
6	RC Block	UG Sump - RCC Tank	From Main Sump

Table 4-1: Details of sumps and location

The details of list of tanks installed in various blocks with capacity, type of tank and installed location are given in table 4.2.

S. No.	Block Name	Location	PVC Tank	RCC Tank
1	SVB Block	Terrace	5 kL x 2 No. for Raw Water 5 kL x 2 No. for Hot water inlet 2 kL x 1 No. for Drinking Water - This drinking water tank supplies water for SVB block and Hemu Kalani block	-
2	Hemu Kalani Block	Terrace	2 kL x 3 No. for Raw Water	

S. No.	Block Name	Location	PVC Tank	RCC Tank
3	CSB Block	Terrace	2 kL x 1 No. Drinking Water - LHS 2 kL x 1 No. Drinking Water - RHS	Fire Water Tank - LHS - 2 No. Raw Water Tank - LHS - 2 No. Fire Water Tank - RHS - 2 No. Raw Water Tank - RHS - 2 No.
4	NSCB Block	Terrace	2 kL x 2 No. for Raw Water 2 kL x 1 No. for Drinking Water	
		Ground Floor	2 kL x 1 No. Drinking Water - near open gym area	
5	SBS Block	Terrace	2 kL x 1 No. Drinking Water	Fire Water Tank - 1 No. Raw Water Tank - 1 No.
		Ground Floor	2 kL x 1 No. Drinking Water - behind the building	
6	SMV Block	Terrace	5 kL x 2 No. for Raw Water 2 kL x 1 No. for Hot water inlet 2 kL x 1 No. for Drinking Water	
		Ground Floor	2 kL x 1 No. Drinking Water - in Main store area	
7	RC Block	Terrace	2 kL x 1 No. for Raw Water 2 kL x 1 No. for Hot water inlet	
8	JKR Block	Terrace	500 litre x 1 No. for Hot water inlet & Raw water 2 kL x 1 No. for Drinking Water - This drinking water tank supplies water for RC block and JKR block	

Table 4-2: Details of tanks, type and location

Based on the source, usage, type and recycling, water is classified as following types in the college campus that include:

- Raw Water
- Drinking Water
- Hot Water
- Rain Water
- Sewage Water
- Treated Water (from Sewage Treatment Plant)
- RO Reject Water

Details of the various types of water usages are discussed in detail, in the following sections.

4.1.1. Raw Water System

The raw water is consumed in the following areas:

- RO Input
- Hostel – Bathrooms
- Washrooms
- Cleaning
- Laboratories
- Garden

The schematic of overall raw water distribution system of the campus is given in figure 4-1.

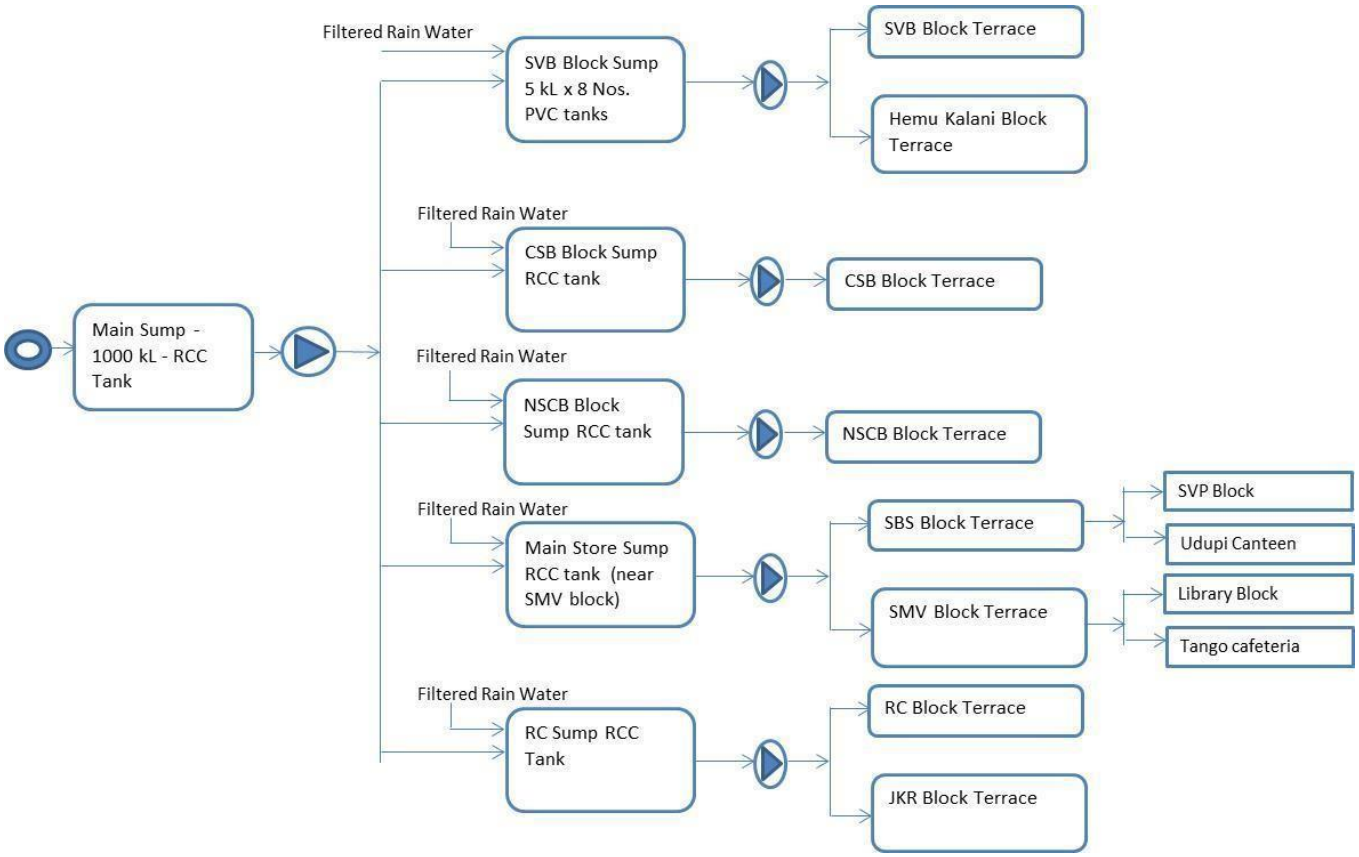

Figure 4-1: Schematic of Overall Raw Water Distribution System

- The main water sump (BWSSB) capacity is 1000 kL, and it is located at the entrance of gate No.3 (near playground area).
- BWSSB water flow meter is located at Gate 3. Figure 4.2 shows the BWSSB water flow meter and main water sump located near Gate 3.
- From the main water tank, the water is transferred to the sump (SVB, CSB, NSCB, SMV, RCB) by hydro pneumatic pumps. Three numbers of hydro-

pneumatic pumps are available in the pump room near the main water sump. From the main sump, the water is distributed to various sumps through underground water pipe lines. Control and regulation valves are provided in the water distribution system for better operation and control.

- From the sump tank, the water is pumped to the overhead tanks located in the terrace by submersible pumps. The pictures of UG Sumps and Overhead tanks are given in figure 4.2 and figure 4.3.

Figure 4-2: Sumps in the campus

Figure 4-3: Overhead tanks in the campus

RC Block Sump:

The raw water from main sump is received in the RC block sump. Filtered rain water is also connected to this sump. Two numbers of submersible pumps have been installed in the sump, to pump the raw water from sump to overhead tanks.

One submersible pump transfers water from RC block sump to overhead tanks in RC block terrace. From the overhead tank, water is supplied to meet the water needs of this block.

The other submersible pump transfers raw water from RC block sump to overhead tank in JKR block terrace. From the overhead tank, water is supplied to meet the water needs of this block.

SMV Block Sump:

The raw water from main sump is received in the SMV block (main store) sump. Filtered rain water is also connected to this sump. Three numbers of submersible pumps have been installed in the sump, to pump the raw water from sump to overhead tanks.

One submersible pump transfers water from SMV block sump to overhead tanks in SMV block terrace. From the overhead tank, water is supplied to meet the water requirement of SMV block, Library block and Tango cafeteria.

The second submersible pump transfers raw water from SMV block sump to overhead tank in SBS block terrace. From the overhead tank, water is supplied to meet the water needs of SBS block, SVP block and Udupi Canteen.

The third submersible pump is used to transfer water from sump to hot water inlet tank directly.

SVB Block Sump:

The raw water from main sump is received in the SVB block sump. Filtered rain water is also connected to this sump. Two numbers of submersible pumps have been installed in the sump, to pump the raw water from sump to overhead tanks.

One submersible pump transfers water from SVB block sump to overhead tanks in SVB block terrace. From the overhead tank, water is supplied to meet the water needs of this block.

The other submersible pump transfers raw water from SVB block sump to overhead tank in Hemu Kalani block terrace. From the overhead tank, water is supplied to meet the water needs of this block.

CSB Block Sump:

The raw water from main sump is received in the CSB block sump. Filtered rain water is also connected to this sump. One number of submersible pump is installed in the sump, to pump the raw water from sump to overhead tanks. From the overhead tank, water is supplied to meet the water needs of this block.

NSCB Block Sump:

The raw water from main sump is received in the NSCB block sump. Filtered rain water is also connected to this sump. One number of submersible pump is installed in the sump, to pump the raw water from sump to overhead tanks. From the overhead tank, water is supplied to meet the water requirement of this block.

4.1.2. Drinking Water System

The drinking water requirement of the entire campus is met by RO water system installed the campus. Three numbers of RO plant is available in the campus. Two numbers of RO plants are installed in NSCB block and one number of RO plant is installed in SVB block. The schematic of drinking water system is given in figure 4.4.

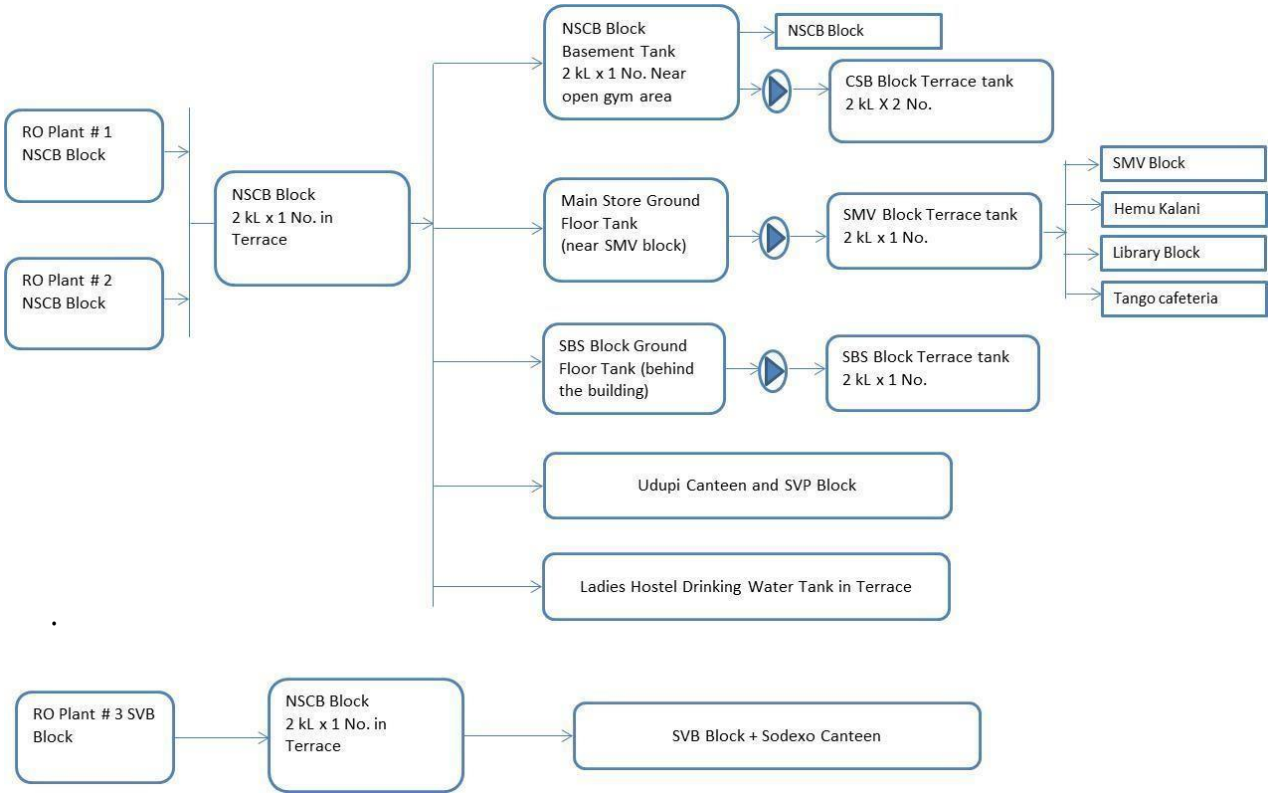

Figure 4-4: Schematic of drinking water system in the campus

4.1.2.1. NSCB Block RO Plant

- The input for the RO plant comes from the overhead tanks
- The output water from two numbers of RO plant in NSCB block is stored in the overhead drinking water tank (2000 Litres x 1 No) available in NSCB block.
- The RO reject water is sent to sump
- The RO back wash water is collected and sent to STP for recycling
- From the overhead drinking water tank, plumbing lines are distributed to all the blocks across the campus. For better control and maintenance purposes, water tanks are kept at some of the blocks, the details are explained below
    - NSCB block ground floor (near open gym area), one number of 2000 litres drinking water tank is available. The input supply to this tank is from the main drinking water distribution header. From the ground floor drinking water tank, water distribution line is given to CSB block terrace drinking water tank of two numbers each 2000 litres capacity
    - One number of 2000 litres capacity drinking water tank is available in ground floor of main store (near SMV block). The input supply to this tank is from the main drinking water distribution header. From the ground floor drinking water tank, water is pumped to SMV block terrace drinking water tank – 2000 litres capacity, one number. From this drinking water tank, the drinking water is supplied to SMV block, Hemu Kalani block, Library block and Tango cafeteria
    - One number of 2000 litres capacity drinking water tank is available in ground floor of SBS block (behind the building). The input supply to this tank is from the main drinking water distribution header. From the ground floor drinking water tank, water is pumped to SBS block terrace drinking water tank – 2000 litres capacity, one number. From this tank, the water is supplied to the SBS block. The picture of RO plant installed in the campus is given in figure 4.5.

Figure 4-5: RO water treatment plant in the campus

4.1.2.2. SVB Block RO Plant

- The input for the RO plant comes from the overhead tank
- The output water from RO plant in SVB block is stored in the overhead drinking water tank (2000 Litres x 1 No) available in SVB block.
- The RO reject water is sent to sump
- The RO back wash water is collected and sent to STP for recycling
- From the overhead drinking water tank – one number of 2000 litres capacity, the drinking water is supplied to SVB block and Sodexo canteen.

The drinking water coolers and water dispensers are available in each floor of all the blocks. Sample photos of the water coolers and water dispensers are given in figure 4.6.

RO water is used for cooking in the hostel and canteens.

Figure 4-6: RO water treatment plant in the campus

4.1.3. Hot Water System

The hot water is mainly consumed in hostels for bathing purposes. The hot water requirement for bathing is met by solar water heater systems and electrical heaters (geysers) installed in the hostel bathrooms.

Apart from this, hot water for drinking purposes in canteen is supplied by water drums (water is heated in cooking gas stoves and stored in a water drum). In few places water dispenser with electrical heating option is also available for supplying drinking hot water. Electrical kettles are also provided in some of the departments for drinking water purposes.

The details of solar water heater systems, capacity and installed location are given in table 4.3. The pictures of solar water heater installed in the hostels are given in figure 4.7.

S. No.	Block	Location	SWH	Capacity, Litres	Total Capacity, Litres
1	SVB	Terrace	2	500	1000
2	SMV	Terrace	2	500	1000
3	SBS	Terrace	2	500	1000
4	RC	Terrace	2	500	1000
5	JKR	Terrace	2	500	1000
				Total	5000

Table 4-3: Details of Solar heater systems

Figure 4-7: Solar water heater installed in the campus

The details of electrical water heaters and installed location are given in table 4.4. The pictures of electrical water heater installed in the hostels are given in figure 4.8.

S. No.	Block	Location	Electrical Heaters
1	SVB	Bathrooms	4
2	SMV	Bathrooms	7
3	SBS	Bathrooms	10
4	RC	Bathrooms	3
5	JKR	Bathrooms	8
		Total	**32**

Table 4-4: Details of Electrical water heaters

Figure 4-8: Electrical water heaters installed in hostels

The hot water supplied in canteen for drinking purposes is shown in figure 4.9.

Figure 4-9: Hot water supplied in canteen

The hot water dispenser available in college for drinking purposes is shown in figure 4.10.

Figure 4-10: Hot water dispenser available in college

4.1.4. Rain Water System

- The college campus has a well designed and engineered rain water harvesting system in place for rain water harvesting.
- Ground water recharging is done with rainwater collected from the roof and open space.
- Bore well recharge well is available for ground water recharge
- The rain water from terrace of each of blocks is brought to ground level through pipes and rain water filters are connected. The filtered rain water is then connected to the sumps available in each building respectively.
- There is provision of storing rain water in STP final treated water tank. Pipeline interconnections are available to regulate the water towards STP final treated water tank.
- During rainy seasons, the intake of water from BWSSB is reduced and maximum utilization of rain water collected in the sumps are utilized to the maximum possible extent.
- Figure 4-11 depicts the sample rain water filters installed in each blocks.

Figure 4-11: Rain water harvesting system in the campus

4.1.5. Sewage Water System

- The sources of waste water in the college campus of all blocks are as follows

    - Washrooms
    - Toilets
    - Kitchen
    - Hostel
    - Labs
    - Canteen

- Waste water from the above mentioned sources are collected and treated at sewage treatment plant (STP). The capacity of STP is 200 kLPD (kilo Litres Per Day)
- The plumbing system (waste water collection, waste water transfer to STP, STP treated water storage and STP treated water to land scaping) is very well designed, the pipes are laid underground, and access / chambers are provided to regulate and control the flow of water.
- The treated water from the STP is distributed via underground pipes to the entire campus for flushing, Cleaning and gardening purposes.
- All the blocks have dual water piping system to use STP treated final water for flushing purposes
- The picture of STP facility is show in figure 4.12.

Figure 4-12: Sewage Treatment Plant

Figure 4.13 depicts the STP Schematic. Figure 4.14 depicts STP block diagram

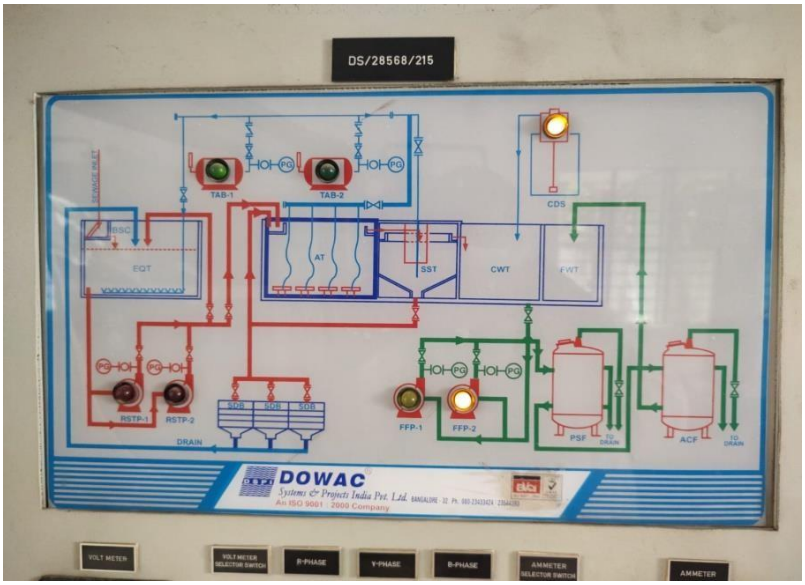

Figure 4-13: STP Schematic

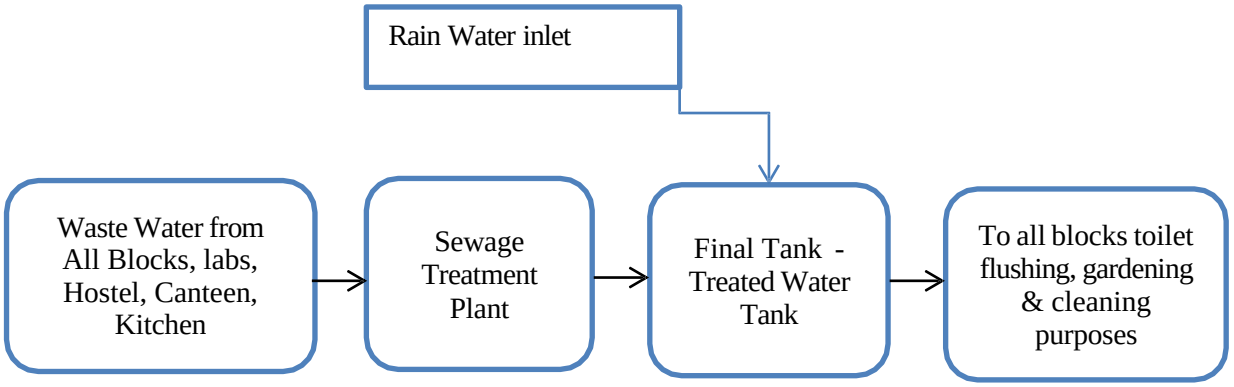

Figure 4-14: STP Block Diagram

4.2. Best Practices Implemented for Water Conservation

4.2.1. Water Flow Meter

One number of water flow meter is installed near gate# 3 to quantify the water used. Regular monitoring of water consumption data and recording of data is being carried out. The water flow meter is shown in figure 4-15.

Figure 4-15: Water flow meter installed in the campus

4.2.2. Dual water piping system for wash rooms

The toilets and rest rooms in all the blocks of the college campus have been provided with dual water piping system. The dual water piping system consists of raw water piping network and STP treated final water piping network.

The STP treated final water is used for flushing in the toilets.

This method of processing the sewage water to convert as treated water, and utilizing in all possible areas would have resulted in substantial amount of water savings.

Figure 4-16: Dual water piping system installed in the campus

4.2.3. Low flow taps

Low flow taps perform better with less water usage when compared to regular taps. These taps compensate the water pressure and give defined water flow rate, therefore less water wastage & more savings on water bills. The advantages of low flow taps are as follows:

- Saves water
- Reduced water bill
- Optimized flow rate
- Different flow patterns (shower/Foam)
- Annual Savings upto 10,000 litres/Year/tap

The picture of low flow taps used in the college is shown in figure 4.17.

Figure 4-17: Low flow taps installed in the college

4.2.4. Water less urinals

Traditional water based urinals are one of the major water consumer in any facility. Apart from the water usage, the cost for handling raw water to the urinals is an added expenditure. Also, maintaining the water taps and flushes for urinals will add to maintenance cost aswell.

To overcome these challenges and as part of water conservation measure, the management has initiated the water less urinals implementation in campus.

The advantages of water less urinals are as follows:

- Saves water
- Reduces water bill
- Reduces maintenance cost
- Reduces water handling cost (electricity cost for pumping raw water)
- Reduces usage of chemicals
- Improves overall bathroom hygiene

The poster of water less urinals is shown in figure 4.18.

Figure 4-18: Water less urinals installed in the college

4.2.5. Rain water harvesting

Rainwater harvesting is the simple process or technology used to conserve rainwater by collecting, conveying, purifying and storing of rainwater for later use.

The benefits of rainwater harvesting system are listed below.

- Helps in reducing the water bill.
- Decreases the demand for water.
- Reduces the need of bore well water
- Promotes both water and energy conservation
- Improves the quality and quantity of groundwater
- It is an excellent source of water for landscape irrigation

The college campus has a fully integrated rain water harvesting system for each blocks and inter-connections are available between blocks, STP and storm water chambers.

The purchase bills of the rain water harvesting system related procurement has been verified during the study. Sample purchase invoice is given in figure 4.19.

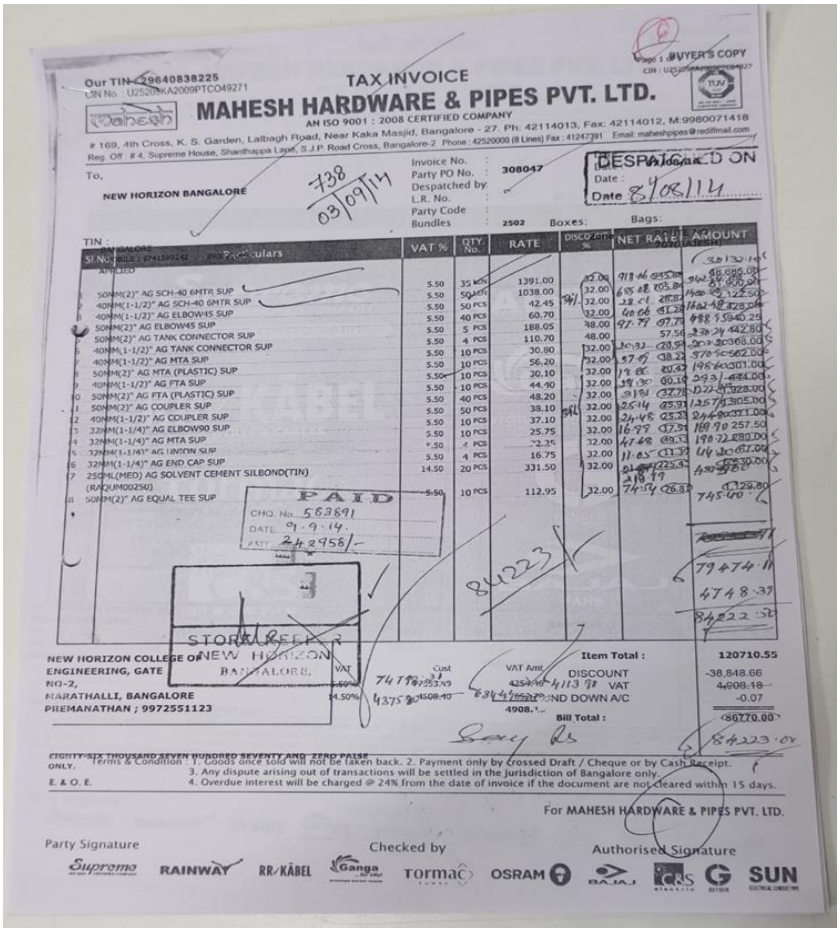

Figure 4-19: Sample procurement bills for rain water harvesting system

4.2.6. Regular testing of water quality

Testing water quality on a regular basis is an important part of maintaining a safe and reliable source. The test result allows to properly addressing the specific problems of a water supply. This will help ensure that the water source is being properly protected from potential contamination, and that appropriate treatment is selected and operating properly.

It is important to test the suitability of water quality for its intended use, whether it be livestock watering, chemical spraying, or drinking water. This will assist in making informed decisions about your water and how you use it. The sample water test report is given in figure 4.20. Water testing is done by college, on regular basis to ensure quality of water used for drinking and other purposes.

Regular testing is important to :

- identify existing problems
- ensure water is suitable for the intended use, especially if used for drinking by humans and animals
- track changes over time
- determine the effectiveness of a treatment system

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C-56, KSSIDC Industrial Estate, Veerasandra, Hosur Road, Bangalore-560 100.

Ph.: 080-2960 0330 Mob.: 98456 65241 E-mail : enquiry2022.eth@gmail.com

TEST REPORT

Name & Address of the Customer : **M/s. NEW HORIZON ENGINEERING COLLEGE.**
Kadubisanahalli, Outer Ring Road, Marathahalli,
Bangalore-560103.

Sample Code	ETH/AUG-24/97-1		
Date of Sample Collection	24/08/2024	**Date of Sample Receipt**	24/08/2024
Analysis Commenced Date	26/08/2024	**Analysis Completed Date**	29/08/2024
Sample Description	RO Drinking Water (Netaji Subhas Chandra Bose Block)	**Report Issue Date**	29/08/2024
Qty. Received	2 Ltrs	**Sample Received Condition**	Good
Sample Appearance	Clear Liquid		
Sampling Details	Sample Collected by A to Z Enviro Test House LLP Representative.		

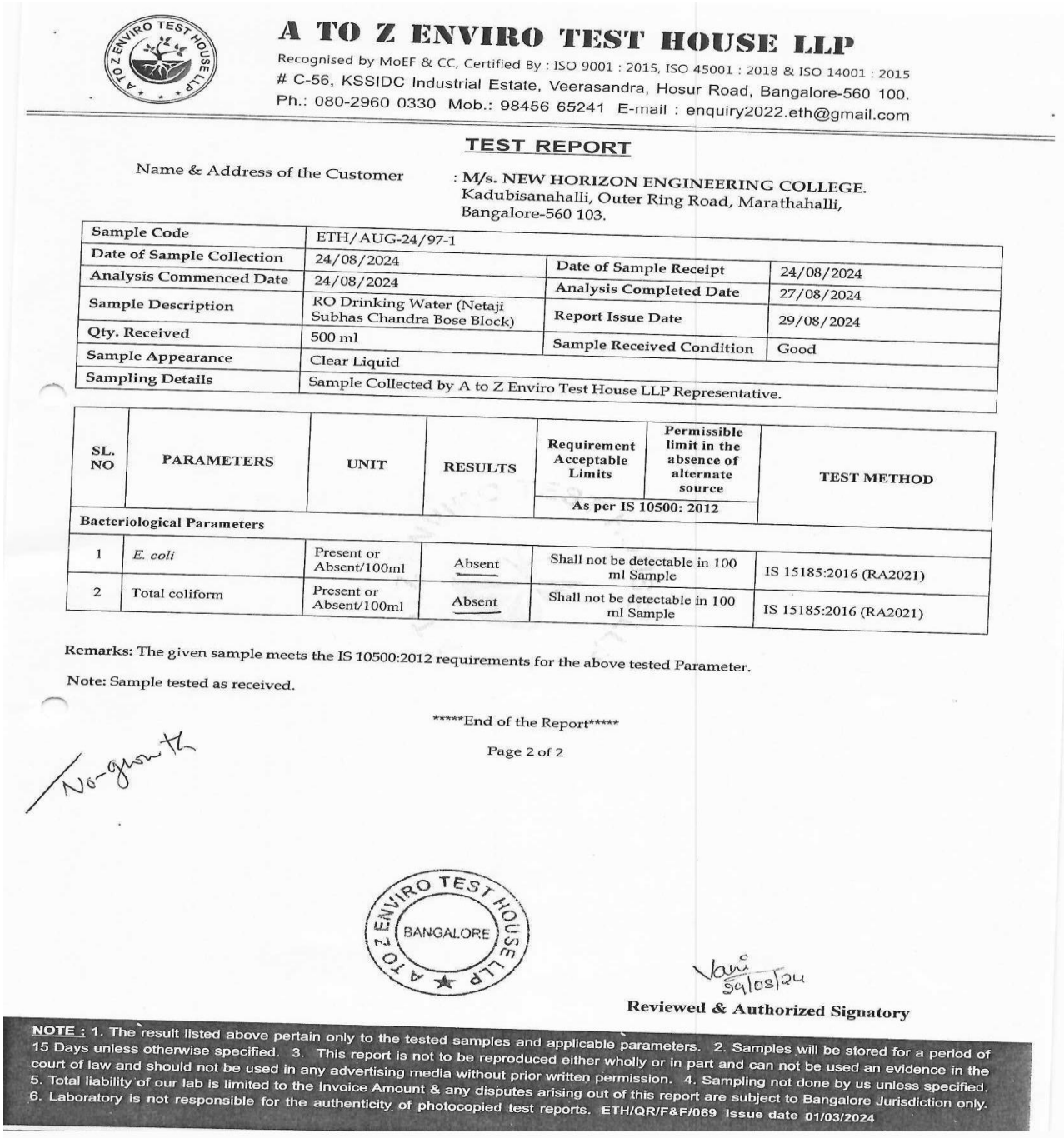
SL. NO	PARAMETERS	UNIT	RESULTS	Requirement Acceptable Limits	Permissible limit in the absence of alternate source	TEST METHOD
				As per IS 10500: 2012		
Physico Chemical Parameters						
1	Colour	Hazen units	<1.0	5	15	IS 3025(Part -04) 2021
2	Odor	--	Agreeable	Agreeable	Agreeable	IS 3025(Part -05) 2018
3	pH Value @25°C	--	6.85	6.5-8.5	No relaxation	IS 3025(Part -11) 2022
4	Taste	--	Agreeable	Agreeable	Agreeable	IS 3025(Part -08) 2023
5	Turbidity	NTU	<1.0	1	5	IS 3025(Part -10) 2023
6	Total Dissolved Solids	mg/L	29.7	500	2000	IS 3025(Part -16) 2023
General Parameters						
7	Calcium as Ca	mg/L	4.1	75	200	IS 3025(Part -40)1991(RA2019)
8	Chloride as Cl	mg/L	11.4	250	1000	IS 3025(Part -32)1988(RA2019)
9	Magnesium as Mg	mg/L	0.5	30	100	IS 3025(Part -46) 2023
10	Total Hardness as $CaCO_3$	mg/L	12.2	200	600	IS 3025(Part -21)2009(RA2019)
11	Total Alkalinity as $CaCO_3$	mg/L	9.7	200	600	IS 3025(Part -23) 2023
12	Total Ammonia as NH_3.N	mg/L	<0.1	0.5	No relaxation	IS 3025(Part -34)1988(RA2019)
13	Fluoride as F	mg/L	<0.1	1.0	1.5	IS 3025(Part -60)2008(RA2019)
14	Nitrate as NO_3	mg/L	0.9	45	No relaxation	IS 3025(Part -34)1988 (RA2019)
15	Sulphate as SO_4	mg/L	2.0	200	400	IS 3025(Part:24/Sec I)2022
16	Residual Free Chlorine	mg/L	<0.1	0.2	1.0	IS 3025 (Part -26)2021
17	Sulfide as S^{2-}	mg/L	Nil	0.05	No relaxation	IS 3025(Part -29) 2022

A TO Z ENVIRO TEST HOUSE LLP BANGALORE

29/8/24

Reviewed & Authorized Signatory

NOTE : 1. The result listed above pertain only to the tested samples and applicable parameters. 2. Samples will be stored for a period of 15 Days unless otherwise specified. 3. This report is not to be reproduced either wholly or in part and can not be used an evidence in the court of law and should not be used in any advertising media without prior written permission. 4. Sampling not done by us unless specified. 5. Total liability of our lab is limited to the Invoice Amount & any disputes arising out of this report are subject to Bangalore Jurisdiction only. 6. Laboratory is not responsible for the authenticity of photocopied test reports. ETH/QR/F&F/069 Issue date 01/03/2024



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C-56, KSSIDC Industrial Estate, Veerasandra, Hosur Road, Bangalore-560 100.
Ph.: 080-2960 0330 Mob.: 98456 65241 E-mail : enquiry2022.eth@gmail.com

TEST REPORT

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Sample Description	RO Drinking Water (Netaji Subhas Chandra Bose Block)	Report Issue Date	29/08/2024
Qty. Received	500 ml	Sample Received Condition	Good
Sample Appearance	Clear Liquid		
Sampling Details	Sample Collected by A to Z Enviro Test House LLP Representative.		

SL. NO	PARAMETERS	UNIT	RESULTS	Requirement Acceptable Limits	Permissible limit in the absence of alternate source	TEST METHOD
				As per IS 10500: 2012		
Bacteriological Parameters						
1	*E. coli*	Present or Absent/100ml	Absent	Shall not be detectable in 100 ml Sample		IS 15185:2016 (RA2021)
2	Total coliform	Present or Absent/100ml	Absent	Shall not be detectable in 100 ml Sample		IS 15185:2016 (RA2021)

Remarks: The given sample meets the IS 10500:2012 requirements for the above tested Parameter.

Note: Sample tested as received.

*****End of the Report*****

Page 2 of 2

A TO Z ENVIRO TEST HOUSE LLP BANGALORE

29/08/24

Reviewed & Authorized Signatory

NOTE : 1. The result listed above pertain only to the tested samples and applicable parameters. 2. Samples will be stored for a period of 15 Days unless otherwise specified. 3. This report is not to be reproduced either wholly or in part and can not be used an evidence in the court of law and should not be used in any advertising media without prior written permission. 4. Sampling not done by us unless specified. 5. Total liability of our lab is limited to the Invoice Amount & any disputes arising out of this report are subject to Bangalore Jurisdiction only. 6. Laboratory is not responsible for the authenticity of photocopied test reports. ETH/QR/F&F/069 Issue date 01/03/2024

Figure 4-20: Sample water testing report

Useful tests are available to help determine the health and safety of a water supply, and the performance of a water treatment system. Details of various tests are as follows:

- **Basic water potability**

  Include tests for coliform bacteria, nitrates, pH, sodium, chloride, fluoride, sulphate, iron, manganese, total dissolved solids, and hardness.

- **Coliform bacteria**

  Indicate the presence of microorganisms in the water that are potentially harmful to human health.

- **Nitrate**

  A common contaminant found mainly in groundwater. High nitrate concentrations can be particularly dangerous for babies under six months, since nitrate interferes with the ability of blood to carry oxygen.

- **Ions**

  Ions such as sodium, chloride, sulphate, iron, and manganese can impart objectionable taste or odor to water.

- **Sulfate**

  Excessive amounts of sulfate can have a laxative effect or cause gastrointestinal irritation.

- **Fluoride**

  Fluoride is an essential micro-nutrient, but excessive amounts can cause dental problems.

- **Total dissolved solids**

  Represent the amount of inorganic substances (i.e. sodium, chloride, sulphate) that are dissolved in the water. High total dissolved solids (TDS) can reduce the palatability of water.

- **Additional testing**

  Other tests may be appropriate if a particular contaminant is suspected in the water. For instance, groundwater sources are sometimes tested for arsenic, selenium, and uranium. Both surface and groundwater sources may also be tested for pesticide contamination.

4.2.7. Sewage Treatment Plant

The procedure for removing contaminants from the wastewater basically from the household sewage is called sewage treatment. It has to undergo the chemical, physical and biological procedure to remove these contaminants and give out an environmentally safe treated effluent. A semi-solid slurry called the sewage sludge is the by-product of the sewage treatment. This sludge is further processed before it is suitable for land application.

The institution has installed STP with capacity of 200 kLPD and the quantity of final treated water is 75% of the total capacity, which is 150 kLPD.

The details of water savings and cost savings due to installation of STP is given in table 4.5.

S. No.	Description	Unit	Values
1	STP capacity	kLPD	200
2	Quantity of final treated water from STP	kLPD	150
3	Quantity of water reused @ 50% utilization factor	kLPD	75
4	No. of working days per year	days	250
5	Annual Quantity of water reused (saved)	kLPD	18750
6	Average water cost	Rs./Litre	0.086
7	Annual cost savings achieved	Rs. lakh/year	16.125

Table 4-5: Annual water and cost savings by installation of STP

4.2.8. Maintenance Team

The college management has formed separate operations & maintenance team, house-keeping team and security personnel's for maintaining the cleanliness of various areas inside the campus.

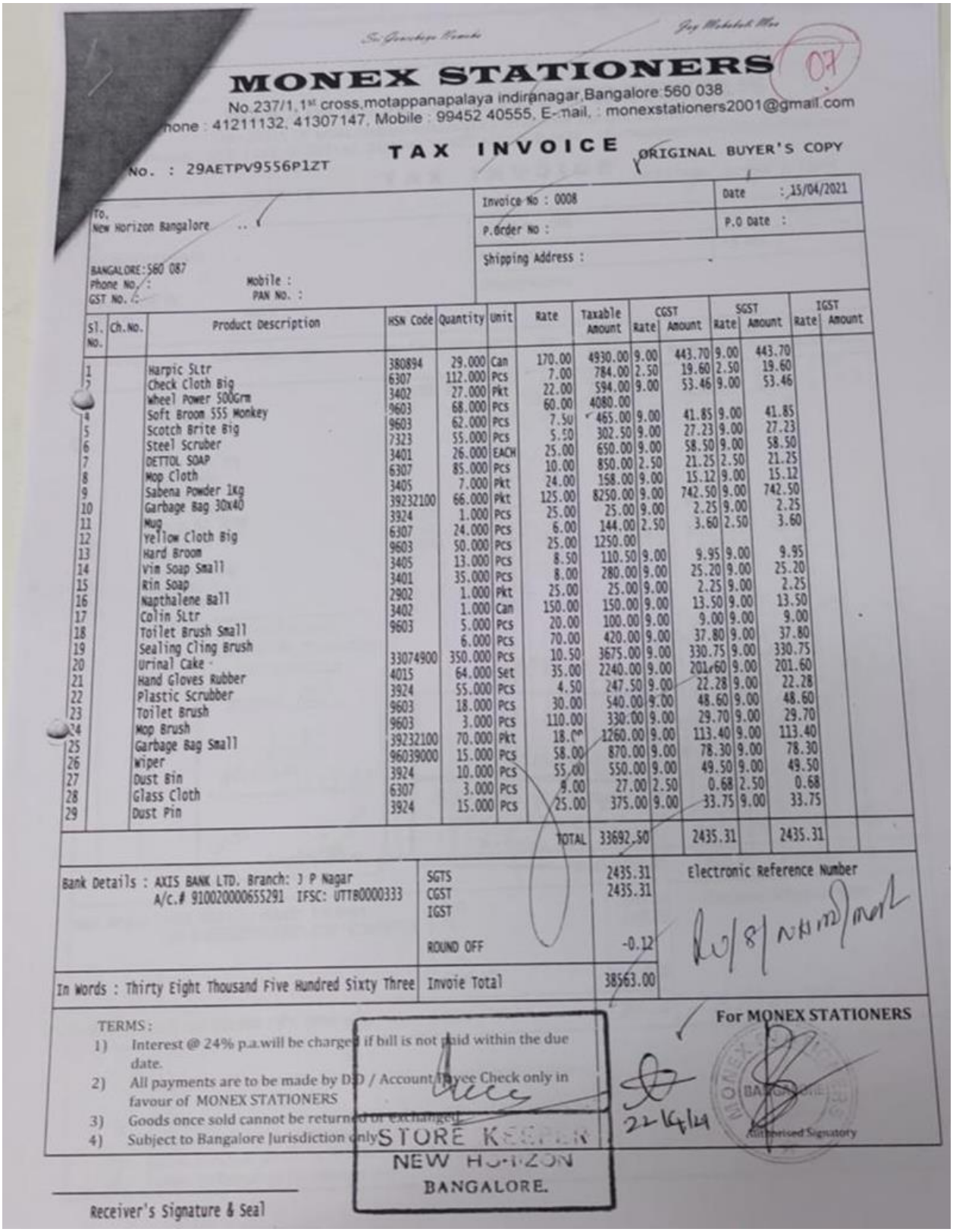
During the audit, walk through survey was carried out to observe the maintenance of the electrical panels, water distribution system, housekeeping and log book/ records for maintenance and housekeeping.

The entire campus is maintained clean and tidy. The electrical panels, panel rooms in each block, sub-station, DG set area, water distribution system, STP area, terrace water tanks, solar water heaters, SRTPV systems, class rooms, office rooms, hostels, kitchen and dining area, canteen, auditorium, library, playground, corridors, walk ways, and toilets & wash rooms, is found to be well maintained and cleaned on regular intervals.

The college campus has a dedicated team for maintenance of the campus. The breakup of the maintenance team members are given in table 4.6. Sample bill copy of list of items purchased for housekeeping and maintenance is given in figure 4.21.

S. No.	Department	No. of Staffs
1	Electrical	16
2	Maintenance	12
3	House Keeping	101
4	Security	63
5	Transport	18
	Total	**210**

Table 4-6: Details of maintenance staffs



MONEX STATIONERS

No.237/1,1st cross,motappanapalaya indiranagar,Bangalore 560 038
Phone : 41211132, 41307147, Mobile : 99452 40555, E-mail, : monexstationers2001@gmail.com

07

TAX INVOICE

ORIGINAL BUYER'S COPY

GST No. : 29AETPV9556P1ZT

To,
New Horizon Bangalore ..
BANGALORE:560 087
Phone No. :
GST No. :
Mobile :
PAN NO. :

Invoice No : 0008
Date : 15/04/2021
P.Order No :
P.O Date :
Shipping Address :

Sl. No.	Ch.No.	Product Description	HSN Code	Quantity	Unit	Rate	Taxable Amount	CGST Rate	CGST Amount	SGST Rate	SGST Amount	IGST Rate	IGST Amount
1		Harpic 5Ltr	380894	29.000	Can	170.00	4930.00	9.00	443.70	9.00	443.70		
2		Check Cloth Big	6307	112.000	Pcs	7.00	784.00	2.50	19.60	2.50	19.60		
3		Wheel Power 500Grm	3402	27.000	Pkt	22.00	594.00	9.00	53.46	9.00	53.46		
4		Soft Broom 555 Monkey	9603	68.000	Pcs	60.00	4080.00						
5		Scotch Brite Big	9603	62.000	Pcs	7.50	465.00	9.00	41.85	9.00	41.85		
6		Steel Scruber	7323	55.000	Pcs	5.50	302.50	9.00	27.23	9.00	27.23		
7		DETTOL SOAP	3401	26.000	EACH	25.00	650.00	9.00	58.50	9.00	58.50		
8		Mop Cloth	6307	85.000	Pcs	10.00	850.00	2.50	21.25	2.50	21.25		
9		Sabena Powder 1kg	3405	7.000	Pkt	24.00	168.00	9.00	15.12	9.00	15.12		
10		Garbage Bag 30x40	39232100	66.000	Pkt	125.00	8250.00	9.00	742.50	9.00	742.50		
11		Mug	3924	1.000	Pcs	25.00	25.00	9.00	2.25	9.00	2.25		
12		Yellow Cloth Big	6307	24.000	Pcs	6.00	144.00	2.50	3.60	2.50	3.60		
13		Hard Broom	9603	50.000	Pcs	25.00	1250.00						
14		Vim Soap Small	3405	13.000	Pcs	8.50	110.50	9.00	9.95	9.00	9.95		
15		Rin Soap	3401	35.000	Pcs	8.00	280.00	9.00	25.20	9.00	25.20		
16		Napthalene Ball	2902	1.000	Pkt	25.00	25.00	9.00	2.25	9.00	2.25		
17		Colin 5Ltr	3402	1.000	Can	150.00	150.00	9.00	13.50	9.00	13.50		
18		Toilet Brush Small	9603	5.000	Pcs	20.00	100.00	9.00	9.00	9.00	9.00		
19		Sealing Cling Brush		6.000	Pcs	70.00	420.00	9.00	37.80	9.00	37.80		
20		Urinal Cake	33074900	350.000	Pcs	10.50	3675.00	9.00	330.75	9.00	330.75		
21		Hand Gloves Rubber	4015	64.000	Set	35.00	2240.00	9.00	201.60	9.00	201.60		
22		Plastic Scrubber	3924	55.000	Pcs	4.50	247.50	9.00	22.28	9.00	22.28		
23		Toilet Brush	9603	18.000	Pcs	30.00	540.00	9.00	48.60	9.00	48.60		
24		Mop Brush	9603	3.000	Pcs	110.00	330.00	9.00	29.70	9.00	29.70		
25		Garbage Bag Small	39232100	70.000	Pkt	18.00	1260.00	9.00	113.40	9.00	113.40		
26		Wiper	96039000	15.000	Pcs	58.00	870.00	9.00	78.30	9.00	78.30		
27		Dust Bin	3924	10.000	Pcs	55.00	550.00	9.00	49.50	9.00	49.50		
28		Glass Cloth	6307	3.000	Pcs	9.00	27.00	2.50	0.68	2.50	0.68		
29		Dust Pin	3924	15.000	Pcs	25.00	375.00	9.00	33.75	9.00	33.75		
						TOTAL	33692.50		2435.31		2435.31		

Bank Details : AXIS BANK LTD. Branch: J P Nagar
A/c.# 910020000655291 IFSC: UTTB0000333

SGTS	2435.31
CGST	2435.31
IGST	
ROUND OFF	-0.12
Invoie Total	38563.00

Electronic Reference Number

In Words : Thirty Eight Thousand Five Hundred Sixty Three

TERMS :
1) Interest @ 24% p.a.will be charged if bill is not paid within the due date.
2) All payments are to be made by D.D / Account Payee Check only in favour of MONEX STATIONERS
3) Goods once sold cannot be returned or exchanged
4) Subject to Bangalore Jurisdiction only

For MONEX STATIONERS

STORE KEEPER
NEW HORIZON
BANGALORE.

22/4/21

Authorised Signatory

Receiver's Signature & Seal

Figure 4-21: Sample procurement bills for housekeeping and maintenance items

4.2.9. Other measures implemented for water conservation

- Regular checking and maintenance of pipelines are done to control water wastage
- Water conservation awareness campaigns are organized, dedicated staff members have been deputed for this activity and support of trust members is also extended
- Usage of sign boards in all the wash rooms are posted to create awareness for water conservation, sample photos are taken during the audit and are shown in figure 4-22.

Figure 4-22: Posters to conserve water

4.3. Recommendations for Water Audit

- Installation of water flow meters for individual blocks and monitoring the block wise water consumption
- Regular checking of taps and valves to avoid leaks and water wastage
- Conduct seminars, workshops and exhibitions on water conservation