

## GREEN CAMPUS INITIATIVES

Creating environmentally conscious campuses is essential for sustainable development and fostering a sense of responsibility among students and faculty. Here are some initiatives of the TKM School of Architecture:

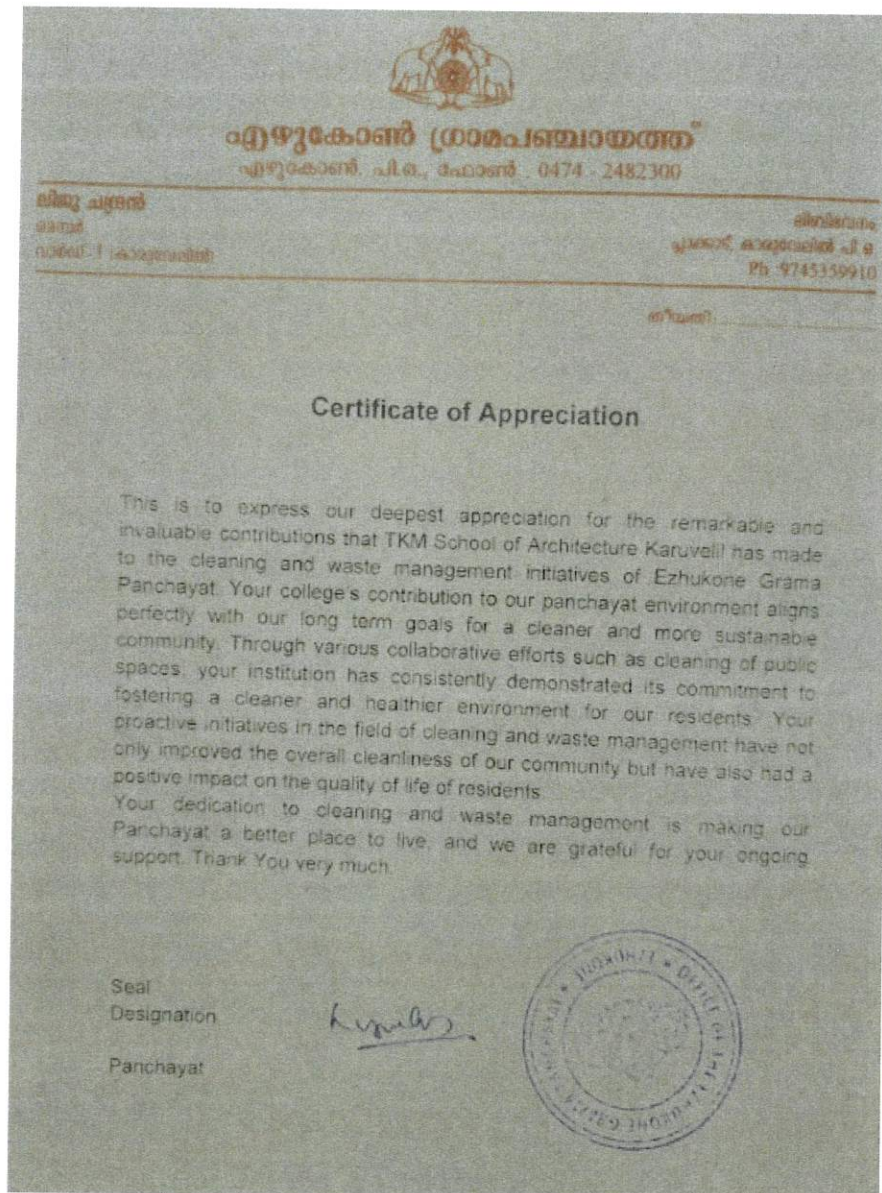
### 1. Environmental Promotion Activities:

- **Campus Gardens:** Encouraging students and faculty to participate in campus gardening can enhance green spaces, promote biodiversity, and provide fresh produce.
- **Tree Plantation Drives:** Regular tree planting events contribute to cleaner air, carbon sequestration, and overall well-being.
- **Waste Management:** Implementing efficient waste segregation, recycling, and composting systems reduces the environmental impact of the campus.

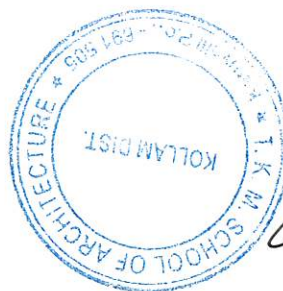



*Cleaning and waste management initiatives by students of TKMSA under the Nature Club*



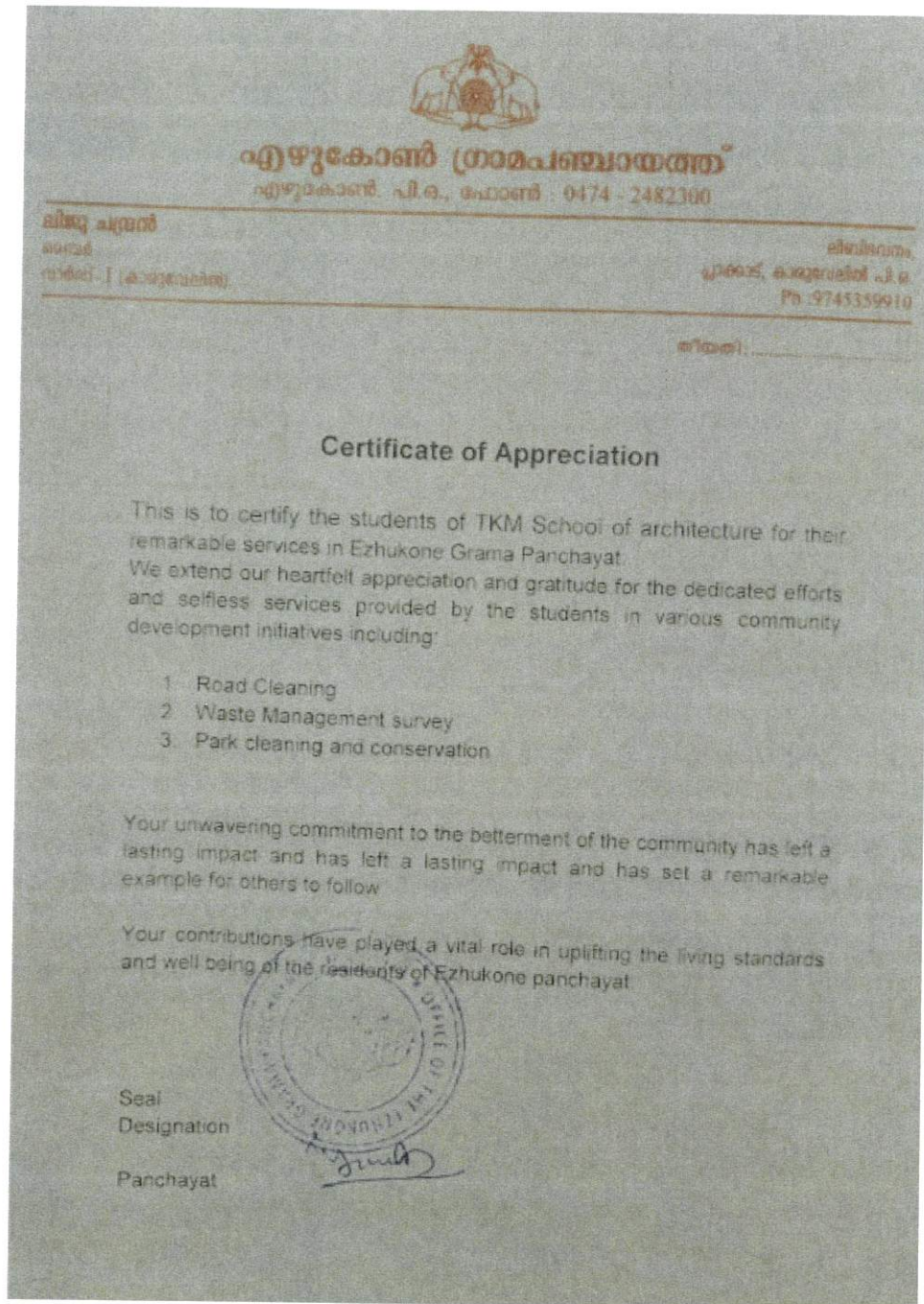


*Appreciation certificate for TKMSA from Ezhukone Grama panchayat for cleaning and waste management initiatives*



  
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*Appreciation certificate for students of TKMSA from Ezhukone Grama panchayat for community development initiatives: road cleaning, waste management survey and park cleaning and conservation*



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Architecture  
Karuvelli P.O., - 691 505  
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**എഴുകോൺ ഗ്രാമപഞ്ചായത്ത്**  
എഴുകോൺ, പി.ഒ., കോളം - 0474 - 2482300

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വിജ്ഞാപനം  
തീയതി: 11/05/2019  
വർഷം: 1 (കാലാവസ്ഥ)

ലിഖിതം  
പ്രൊഫ. കാമറേഷൻ പി.ഒ.  
Ph. 9745359910

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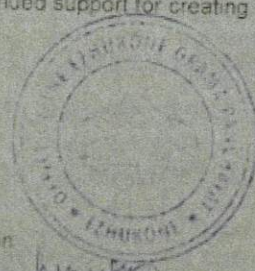
To  
The Principal  
TKM School of Architecture

തീയതി: \_\_\_\_\_


Dear Sir,

I take this opportunity to appreciate the Principal and Management of TKM School of Architecture, Kollam for adopting Ezhukone village for the reforms made through the students to the village at the times of need, conducting various awareness programmes on waste management, water conservation, health and conducting skill development activities to the common people. We were delighted at the services that such a dynamic and passionate group provided for the village.

We hereby acknowledge and applaud the efforts and we look forward to your continued support for creating a better and more inclusive society.



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Architecture  
Karuvelil P.O., - 691 509  
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*Appreciation for TKMSA from Ezhukone Grama panchayat for adopting Ezhukone village reform for waste management, water conservation, health and conducting skill development activities for the community*





*Cleaning and waste management initiatives by TKMSA*

## 2. Energy Efficiency Measures:

- **Solar Power:** Installing solar panels on rooftops or open areas can generate renewable energy for the campus.
- **LED Lighting:** Replacing conventional bulbs with energy-efficient LED lights reduces electricity consumption.
- **Smart Building Design:** Incorporating passive design principles minimizes energy use for heating, cooling, and lighting.



*Smart Building Design applied to minimize energy consumption- Cross-Ventilation for classroom, Maximize Daylight: Large windows, skylights, and light shelves bring in natural light via classroom and corridor*



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### 3. Water Conservation:

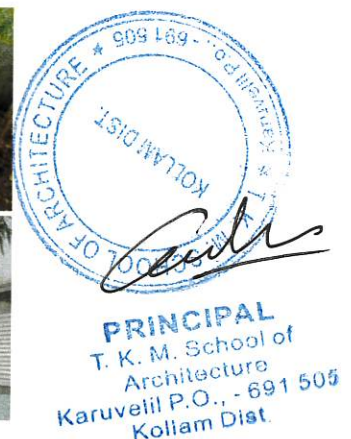
- **Rainwater Harvesting:** Collecting rainwater for irrigation and other non-potable uses conserves water resources.
- **Low-Flow Fixtures:** Installing water-saving faucets, toilets, and showers reduces water wastage.
- **Awareness Campaigns:** Educating students about water conservation practices fosters responsible behaviour.



### *Awareness Campaigns on water conservation practices*

### 4. Biodiversity and Green Spaces:

- **Native Plant Landscaping:** Using native plants in landscaping supports local ecosystems and requires less maintenance.
- **Drip Irrigation for Sunshades:** drip lines installed along the edges of sunshades

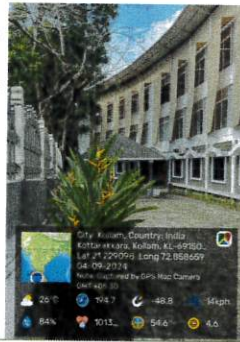


*TKMSA promotes environmental awareness and sustainable practices- trees with identification tags*





**Drip Irrigation for Sunshades:** drip lines installed along the edges of sunshades



**Campus landscape and greenery**



**Landscape features in and around TKM School of Architecture**

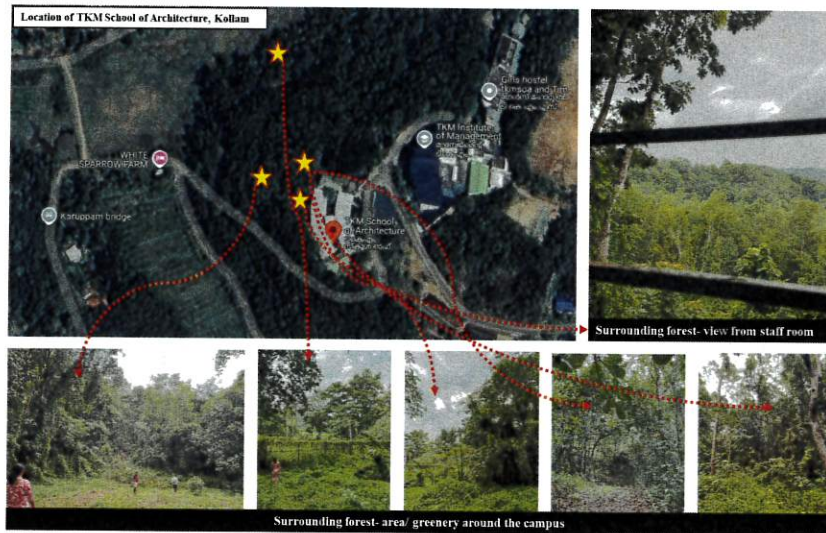
### Green Spaces of campus



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### *Biodiversity around the campus*

#### 5. Awareness and Education:

- **Workshops and Seminars:** Organizing sessions on environmental awareness, sustainable practices, and climate change.
- **Student Clubs:** Forming eco-clubs or sustainability groups encourages student involvement.

*Nature Walk conducted by the SSA - Nature Club.*



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Other relevant documents:

- Green policy- [CLICK TO VIEW](#)
- Green Audit Report- [CLICK TO VIEW](#)
- Water Management Policy- [CLICK TO VIEW](#)
- Waste management policy- [CLICK TO VIEW](#)
- Landscape project at TKMSOA- [CLICK TO VIEW](#)



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## GREEN POLICY

### Introduction

TKM School of Architecture (TKMSA) embraces a "green campus" approach, intertwining eco-friendly practices with educational initiatives. The institution's enduring connection with nature resonates with both students and staff. TKMSA efficiently manages waste, water resources, solar and electric energy, and actively conserves natural resources. Additionally, they minimize paper usage, creating an environmentally conscious campus. As part of their broader sustainability plan, the college aims for self-sufficiency in power, water, and cleanliness.

### Scope of the Policy

The Green Campus, Energy, and Environment Policies will inspire students to drive positive change through new co-curricular and extracurricular initiatives. These programs require a comprehensive review of administrative and infrastructure tasks related to energy efficiency, sustainability, and the environment.



  
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## Objectives

- To spread reputable environmental management principles and procedures across the university.
- To enhance environmental performance trou goals.
- To conduct business in a manner that is socially responsible, commercially viable, and environmentally sustainable.
- To ensure a thorough awareness of the state of the environment today.
- To ensure resource sustainability and stop destructive or wasteful behaviours.
- To exercise appropriate control over all of society's actions in order to preserve and maintain the environment.
- To lessen and stop contamination of the environment.

## Strategies of Implementation

### 1. Automobile admission is restricted

- a. All college staff and faculty cars must have a current Pollution Under Control (PUC) certification before entering the campus.
- b. The college actively encourages the use of bicycles and public transit to reduce emissions.

### 2. Plastic usage ban

- a. The college is committed to maintaining a plastic-free campus.
- b. Dustbins and signboards are strategically placed to support this goal.
- c. The 3R policy (reduction, recycling, and reuse) is rigorously implemented.
- d. Single-use plastics are prohibited in classrooms, laboratories, and academic buildings.

### 3. Creating a landscape with trees and plants

- a. The college increases tree planting both inside and outside the campus, aiming for a greener institution.
- b. Medicinal plants and fruit trees contribute to cleaner air.
- c. Students and staff actively participate in tree-planting campaigns.

### 4. Energy saving

- a. Certified energy audits are conducted.
- b. Natural sunlight is maximized in infrastructure planning.
- c. Energy-saving habits include turning off lights and fans when not in use.
- d. Digital initiatives and LED lighting reduce energy consumption.

### 5. Noise pollution

- a. Designated silence zones in areas like the library minimize noise pollution.
- b. Awareness boards reinforce the importance of maintaining silence.

### 6. Biodiversity

- a. Reusing water instead of relying solely on freshwater.
- b. Prominent display of environment protection messages.
- c. Scientific composting of biodegradable waste.
- d. Implementation of rainwater harvesting techniques.




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## 7. Review and Implementation of Green Policy

- a. The Environment Cell periodically evaluates the policy.
- b. Stakeholders are informed, and the policy is posted on the college website.
- c. Ensuring compliance benefits campus residents and supports educational expenses.



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**TKM SCHOOL OF ARCHITECTURE**

**NAAC**

**Criteria VII**

***7.1.6 Quality audits on environment and energy regularly undertaken by the Institution***

**Green Audit Report**





# TKM SCHOOL OF ARCHITECTURE

(Approved by All India Council for Technical Education (AICTE) & Council of Architecture (COA), Recognized under the Cochin University, Cochin) Musaliar Hills, Karuveilil P.O. Kollam - 691 505

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# GREEN AUDIT REPORT

TKM SCHOOL OF ARCHITECTURE  
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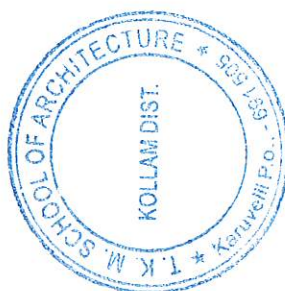
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# 1.Executive Summary

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The future of humankind depends very much on our ability to change our lifestyles and agree to follow a low consumption pattern of living in terms of resources taken from the globe and return to a sustainable development path at the earliest. The opportunity window for restoring nature to its prolonged state of hosting life forms to flourish under its caring environs is according to scientists, very short and lasting only up to 2030. Within this time, with the willing actions of every citizen wherever they are, coordinated and directed actions should start and continue thereafter till a balancing stage is reached where moderate use of resources and mitigation actions for healing the hurts already inflicted, balance positively to a sustainable nature.

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment. TKM School of Architecture believes that there is an urgent need to address these fundamental environmental problems and reverse the trends. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution.

Green Auditing of a Higher Education Institution is required as a part of Criterion VII (of the 7 criteria prescribed) under the Guidelines for Submission of the mandatory annual Internal Quality Assurance Report (IQAR) by Accredited Institutions.

It works on the several facets of Green Campus including Water Conservation, Tree Plantation, Waste Management, Paperless Work, and Alternative Energy. With this in mind, the specific objectives of the audit were to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards.

Initially a questionnaire survey was conducted to know about the existing resources of the campus and resource consumption pattern of the students and staff in the college. In order to assess the quality of water and soil, water and soil samples were collected from different locations of the college campus and analyzed for its parameters. Collected data was grouped, tabulated and analyzed. Finally a report pertaining environmental management plan with strength, weakness and suggestion on the environmental issue of campus is documented.



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T. K. M. School of  
Architecture  
Karuvellil P.O., - 691 505  
Kollam Dist.

## 2.Introduction

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Environmental audit or Green audit reflects evaluations that help us to identify environmental compliance and management system, implementation gaps, along with related corrective actions. Green audit is a useful tool to determine how and where the most energy or water resources are being used, the type and volume of waste generated and can then considerations be given on how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. Overall, it plays a vital role in imparting a better understanding of Green impact on campus to staff and students.

### 2.1 Need for green audit

As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. In this context, it becomes imperative to adopt the system of the Green Campus for the Institutes which will lead to sustainable development. Besides, it also reduces a sizable amount of atmospheric carbon dioxide from the environment.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation. NAAC has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

### 2.2 Objectives of the audit

- Understanding the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc
- Establishing a baseline of existing environmental conditions with focus on natural and physical environment;
- Creating awareness among students and staff concerning real issues of environment and its sustainability;
- To create a report that document baseline data of good practices and provide strategies and action plans towards improving environmental quality for future.



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Kollam Dist.



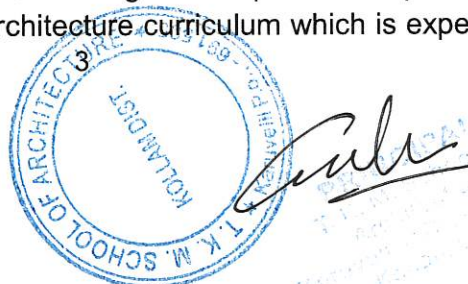
### 3.About the college

**TKM SCHOOL OF ARCHITECTURE** is managed by the TKM college Trust, a renowned educational institution founded by the late Janab Thankal Kunju Musaliar. The trust has a rich history of over 60 years and is known for its commitment to academic excellence, innovation, and social responsibility. It has established its reputation in not only imparting high quality education but also in emphasizing discipline. The College maintains high standards of excellence in the academic sphere and in the physical amenities and facilities intended to implement the educational program. The College endeavors to enroll students who hold high standards of performance, discipline and achievement.



*Fig 1.1 TKM School of Architecture*

In addition, the institution takes care to impart updated and high-quality technical education throughout the year. Special care is taken in the matter of students becoming qualified as well as competent to face the challenges of leading corporate in the present world. Every effort is taken to transform the students into well rounded personality with strong confidence and sound character making no compromise in perfection, morality, dedication and commitment. Being Architecture curriculum which is expected to provide





a broad foundation of general education and a reasonable amount of specialization, a diversified program of campus activities-social, recreational, cultural and spiritual-supplements and complements the academic study and provides facilities and opportunities for the development of individual talent, personal relationship and creative group life with high moral standards.

The campus is spread over an area of 348.81 acres of land with the green belt area of 276.91 acres. The college offers B.Arch. Course. There are 200 students and 20 teaching faculty in the college which is promising to grow rapidly. The College offers job-oriented courses, extra-curricular activities of various clubs and technologically advanced facilities accessible to the faculty, the students and the support staff. Here, each individual is encouraged to step beyond the confines of academic and administrative disciplines to explore and intervene in the larger interests of the TKM community that thrives on participation and the desire to venture into newer vistas.

### **3.1 INFRASTRUCTURAL FACILITIES**

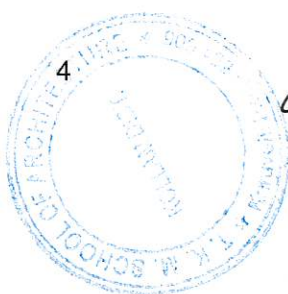
TKM School of Architecture has adequate infrastructural facilities as per the Council of Architecture requirements. There are separate amenity centers for male and female students, which are used strictly during intervals throughout the week. The canteen provides quality foods for school has unique and high-class hostel facilities, with separate complexes for boys and girls. The infrastructure facilities in the hostels are conducive to the highest class of learning environment. There is also a cafeteria utilized for breaks during design studio, and a faculty lounge provided for interaction between students and faculty during non-teaching hours.

### **3.2 Library**

The TKM School of Architecture has a well-equipped library with adequately trained staff. The library houses an impressive collection of books, journals, and e-journals in architecture, design, building science, and interdisciplinary fields, consistent with COA norms. All major newspapers are available daily in the library, and after consulting the catalog, students can directly browse the collection. The working time of library is from 9.00 am to 5.00 pm in working days and from 9.00 am to 4.00 pm in the holiday. Library has 1765 books, 25 Journals and 50 Project reports.

### **3.3 UNDERGRADUATE PROGRAMS**

- Bachelor of Architecture



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### 3.4 VISION

To become a premier institute of architecture and design, promoting creativity, innovation, and design excellence through interdisciplinary learning and research-based education, while maintaining strict ethical standards.

### 3.5 MISSION

To provide a holistic learning environment that encourages creativity, Critical thinking, and innovation among students and faculty, through value-based education and community engagement. Our aim is to prepare students for successful careers in architecture and design, contributing to nation-building.

### 3.6 GOALS

- Provide a rigorous and interdisciplinary education in architecture, emphasizing traditional and contemporary pedagogical approaches.
- Equip students with the latest technological advancements in design and architecture, through hands-on training.
- Develop a research-based education system, encouraging students to participate in research-based activities and collaborate with industry professionals.
- Engage with the community and address real-world problems through design.
- Foster an ethical and inclusive culture that priorities diversity and sustainability in architecture and design.
- Nurture a faculty that is committed to the ethical values of the profession, and the institute and create a conducive collaborative learning environment.

### 3.7 EDUCATIONAL OBJECTIVES

- To provide for instruction in training in such branches of learning as it may deem fit.
- To provide for research and for the advancement of and dissemination of knowledge.
- To undertake extra moral studies, extension programs and field outreach activities to contribute to the development of Society.
- To undertake the activities to strengthen the set objectives



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### 3.8 centre for Design Excellence

The school seeks to impart training to develop a creative mind in students, leading to design innovation for the betterment of society and the nation at large. It prepares students to face real-life, complex problems of the 21<sup>st</sup> century while striving to re-establish the strained human's vs nature relationship in the best possible way.

### 3.9 UNIQUE FEATURES CONTRIBUTING TO SUSTAINABILITY

#### 3.9.1 Natural Ventilation System

In classrooms, we implement a natural ventilation system using a zigzag structure of steel rods, which facilitates natural airflow within the classroom.



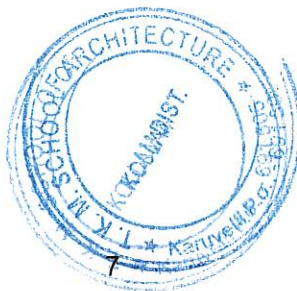
*Fig 1.2 Natural Ventilation System*

### 3.9.2 Gail Fabrics Sheet

In front of the elevation, we use Australian Fiber Glass Fabrics sheets, which filter outdoor air, providing dust-free cool air while protecting from sunlight UV rays and serving daylighting purposes.



*Fig 1.3 Gail Fabric Sheet in Front Elevation*



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## 4. Methodology

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In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.

### 4.1 Onsite Visit

Field visit was conducted by the Green Audit Team. The key focus of the visit was on assessing the status of the green cover of the Institution, their waste management practices and energy conservation strategies etc.

### 4.2 Focus Group Discussion

The Focus Group discussions were held with staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

### 4.3 Energy and waste management

With the help of Teaching, Non- teaching staff, students, administrative officer, Building Management Engineer and electrical Supervisor, the audit team has assessed the energy consumption pattern and waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.



  
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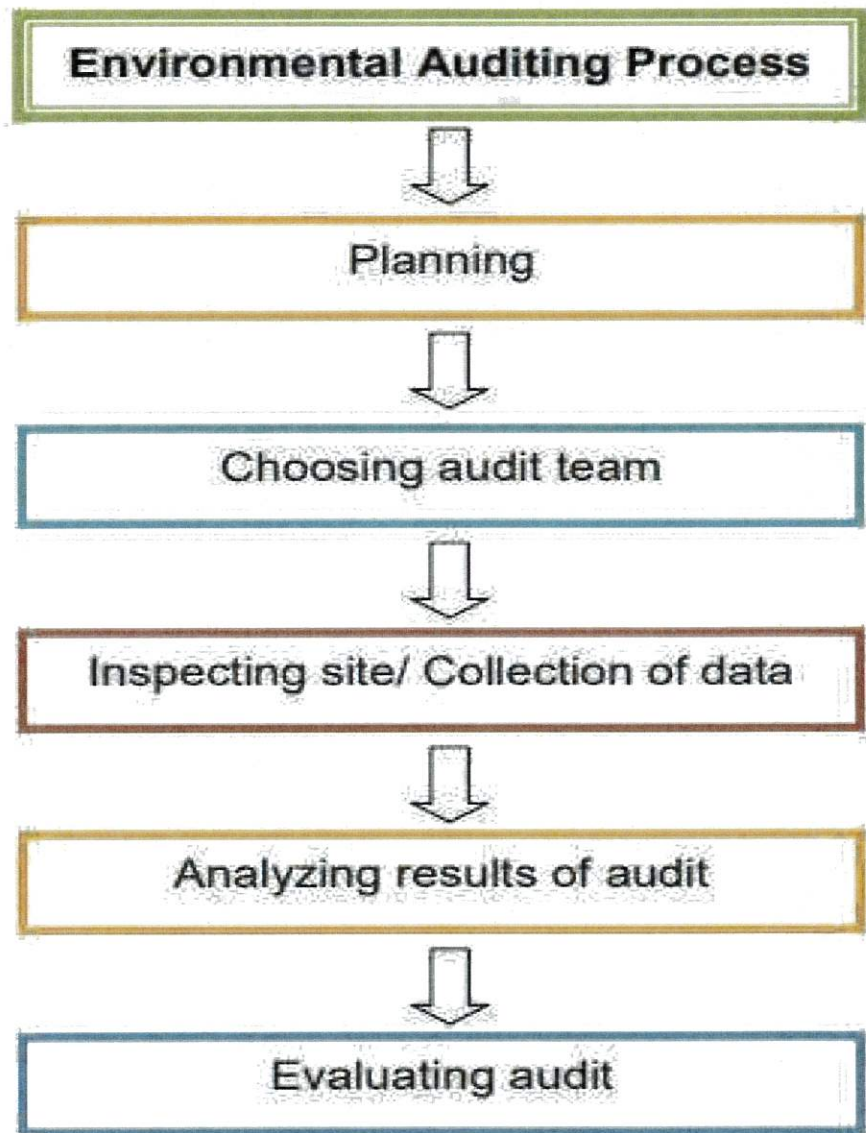


Fig 1.4 Methodology Flow Chart



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/ T.K.M. School of Architecture  
Keruvelli P.O. - 686505  
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## 5.Observations and Recommendations

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### 5.1 Environment management in the campus

The study covered the following areas to summarize the present status of environment management in the campus:

- Water management
- Energy Conservation
- Waste management
- E-waste management
- Green area management
- Environmental Monitoring



  
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# **WATER MANAGEMENT**

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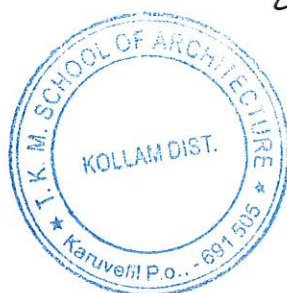
## 6. Water Management

### 6.1 Observations

The study observed that the main source of water for the institute is received from 3 Bore wells and 2 Open wells. Water is used for drinking purpose, toilets and gardening. Before its reaches the campus its gets purified using purification Plants. During the survey, no loss of water is observed, neither by any leakages, or by over flow of water from overhead tanks. The data collected from TKM School of Architecture is examined and verified. On an average the total use of water in the college is 19000L/day, which include 15,000 L/day for domestic, 3,000 L/day for gardening purposes and 1,000 L/day for drinking purpose.

S.No.	Parameter	
1	Source of water	2 Open wells, 3 Bore wells
2	No of Recharge/Storage Wells	5
4	No of motors used	3
5	Water level	Nominal
6	Any water wastage/why?	No
7	Water usage for gardening	3000L/day
8	Waste water sources	Canteen, Mens hostel, College Building

*Table 1.1 Water management observation table*



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**6.2 Bore Well Inside The Campus**



*Fig 1.5 Bore well - 1*



*Fig 1.6 Bore well - 2*

**6.3 Open Well Inside Campus**

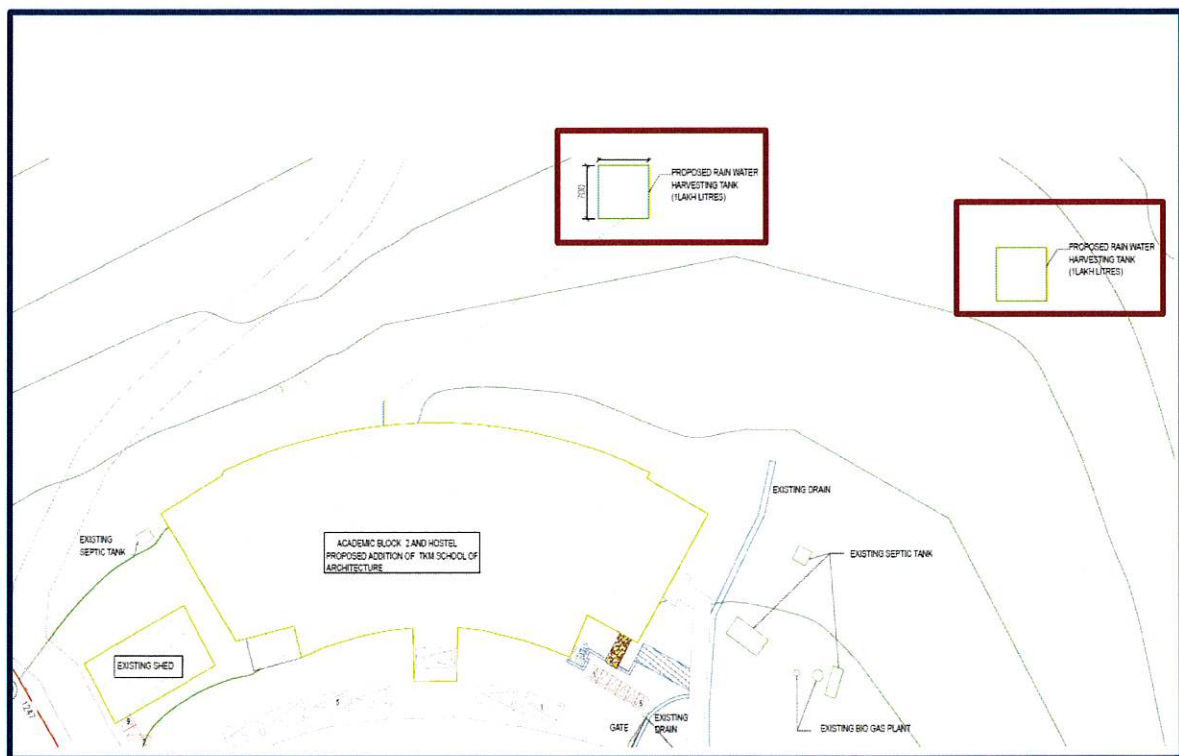


*Fig 1.7 Open well*



#### 6.4 Rainwater harvesting

Rain water harvesting units are Planned to Implement in Future, Storage Capacity 1 Lakh Liters. To improve ground water level and Gardening Purpose. Currently the collected rooftop water and rainwater from paved area are sent to recharge wells through stormwater drains In future we Implement a setup for rainwater harvesting Storage tank and its used for Gardening purpose. The recharge wells are cleaned manually for every year



*Fig 1.8 Proposed Rain Water storage Tank*



**6.5 Drinking water**

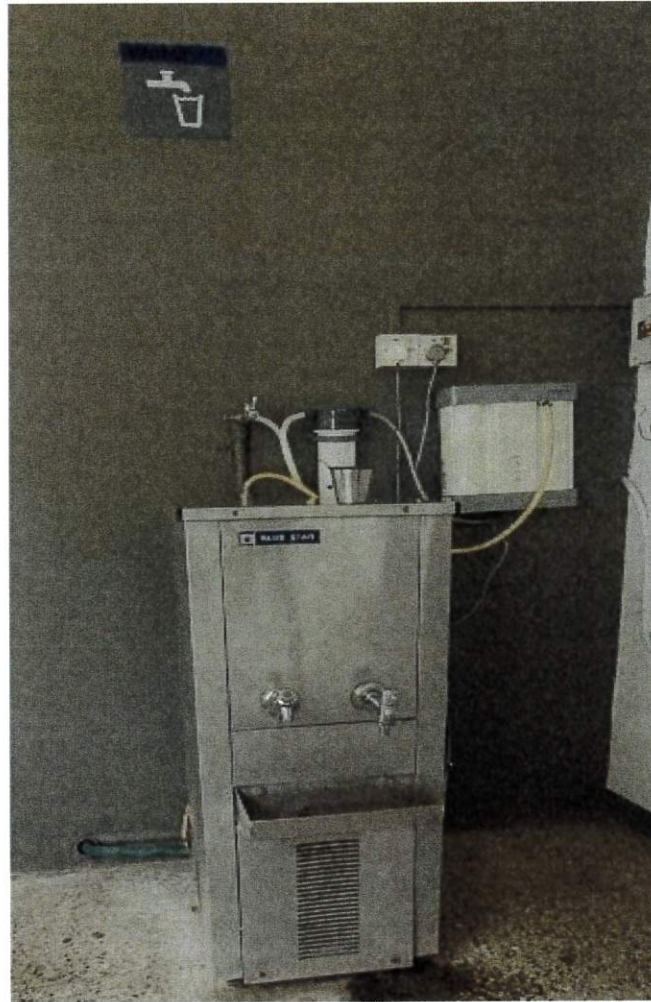
A water purification plant is installed on the TKM campus to ensure clean and well-maintained drinking water. Purified water is stored in a water storage tank and distributed for domestic and drinking purposes across the campus. Additionally, it undergoes further purification through RO systems located near all water dispensers to provide safe drinking water. Water Analysis-  
**Annexure 2**



**FIG 1.9 Water Purification Plant**



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*Fig 1.10 RO Purifier*

### 6.6 Drip Irrigation System

In TKM School of Architecture, we employ a drip irrigation system for indoor potted plants to minimize water usage. The input water lines of the drip irrigation system are connected to rooftop rainwater collection pipelines, allowing rainwater to be utilized for irrigation purposes.







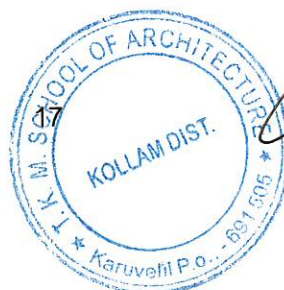
*Fig 1.11 Drip Irrigation System*

### 6.7 Water Quality Assessment

Water samples from the college were collected and analyzed for its quality parameters. The major parameters analyzed include color, odour, turbidity, dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, conductivity, total dissolved solids and salinity. The results are presented in the Annexure 2 of the report.

### 6.8 Recommendations

- ▣ There is a need for monitoring and controlling overflow and periodically supervision drills should be arranged.
- ▣ Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. they are biodegradable and non-toxic, even when this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.
- ▣ Gardens should be watered by using drip/sprinkler irrigation system to minimize water use.
- ▣ Waste water treatment plant should be installed to recycle and reuse the water used for domestic purposes.
- ▣ Minimize wastage of water and use of electricity during the reverse osmosis process and ensure that the equipment used are regularly serviced and in good condition.



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# ENERGY MANAGEMENT

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## 7. Energy Management

### 7.1 Observations

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. The study carried out also analyzed the use of alternate energy resources that are eco-friendly

### 7.2 Biogas Plant

In TKM, kitchen waste is used to generate thermal energy for cooking. The bio-gas produced from food waste, decomposable organic material and kitchen waste, consisting of methane and a little amount of carbon dioxide is an alternative fuel for cooking gas (LPG).

Fermentation produces biogas – a valuable energy source – that is desulphurized by biological means. Also, the waste materials can be disposed of efficiently without any odor or flies and the digested slurry from the bio- gas unit can be used as organic manure in the garden. The major components of the bio-gas plant are a digester tank, an inlet for feeding the kitchen waste, gas holder tank, an outlet for the digested slurry and the gas delivery system for taking out and utilizing the produced gas. The TKM Campus is Equipped with Bio Gas Plant to Promote the Alternate Energy Resources Method, generated fuel is directly used for cooking.



*Fig 1.12 Bio Gas Setup installed in the campus*

Eco-friendly technology allows for the production of renewable natural gas in the form of biomethane. The facility processes about 250kg of kitchen waste every day, mainly the contents of organic waste from College Hostels, as well as leftover food from Campus canteens and expired food.

### **7.3 Observations**

The energy is utilized in the Campus for lighting, space cooling, running of laboratory instruments, appliances, water heating, ground water pumping, cooking and transportation.

The source of energy for all the buildings within the campus is through electricity only. The institution consumes about 947 kW/month.

The campus contains Lights and fans in use. The entire campus including common facility centers are equipped with LED lamps and LED tube lights, except at few locations.

Computers are set to automatic power saving mode when not in use. Also, campus administration runs on switch-off drill on regular basis.

S.No.	Energy source		Consumption
1	Electricity	Load	947 kW
2	Fuel	LPG	500
3	Fuel oil	Diesel	50 litres
4	Transformer	100kva	1
5	Generator back up details	125kva	1

*Table 1.2 Energy Consumption details*



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**7.4 Observations**

S.No	Months	Rating/Capacity Units in kWh	Cost (Rupees)
1.	April	529	7339
2.	May	235	3863
3.	June	868	10893
4.	July	2544	38549
5.	August	793	10130
6.	September	2193	27289
7.	October	763	9826
8.	November	532	7425
9.	December	467	6293
10.	January	508	7278
11.	February	671	8980
12.	March	2488	30633

*Table 1.3 Electricity Consumption details*

The sum of electricity usage per year = 12591 kWh

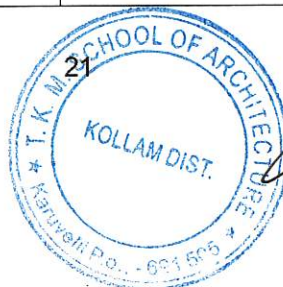
The CO<sub>2</sub> emission from electricity = (Electricity usage per year in kWh/1000) x 0.84

= (12591/1000) x 0.84

= 10.57644 MT per year

**7.5 Utilization Index**

ENERGY PERFORMANCE SUMMARY (April 2023 - March 2024)					
ENERGY TYPE	TOTAL ANNUAL USE	UNITS	CONVERSION MULTIPLIER to kBTU		TOTAL ANNUAL COST (\$.)
				KBtu	



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Electricity	92013	kWh	3.412	313948.4	9201.3
Total				313948	9201.3
				(A)	(B)

Table 1.4 Utilization Index

Energy utilization index (A/Gross Floor Area) = 3.41kBtu/Sq. ft/Yr.

Cost Index (B/Gross Floor Area) = 0.10\$. /Sq. ft/Yr

### 7.6 Energy Performance and Cost Index

Metric	TIM 2024 (Until August)
EUI (kBtu/Sq.ft/Yr)	3.41
Energy Use (kBtu)	313948.356
Cost (INR/Year)	9201.3
Cost Index (INR/Sq.ft/Year)	0.100

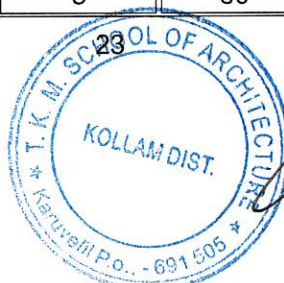
Table 1.5 Energy performance and cost Index



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## 7.7 Total monthly energy consumption for Ceiling Fans

Floor level	Space Name	Number of Ceiling Fans	Power Consumed (Watts)	Power (kW)	Working Time (Hours per Day)	Energy Usage per Month (kWh)
Ground Floor	Staffroom 1	1	60	0.06	7	12.6
	Guest room	1	60	0.06	4	12.6
	Staffroom 2	1	60	0.06	7	12.6
	Corridor 1 - staffroom	0				0
	Main Staffroom	6	60	0.06	7	75.6
	Accounts office	4	60	0.06	7	50.4
	Records room	1	60	0.06	7	12.6
	Corridor 2 - office	0				0
	Reprography room	2	60	0.06	5	25.2
	Jury room	7	60	0.06	5	88.2
	Material museum	4	60	0.06	5	50.4
	Corridor 3 - stair	0				0
	Corridor 4 - main	0				0
	Seminar hall	10	60	0.06	5	126
	Ladies Toilet	0				0
	Gents Toilet	0				0
	Gents Room 1	2	60	0.06	5	25.2
	Gents Room 2	2	60	0.06	5	25.2
	Climatology lab	2	60	0.06	5	25.2
	Principal's Room	3	60	0.06	7	37.8
	Lobby	2	60	0.06	7	25.2
	Classroom 1	6	60	0.06	7	75.2
	Classroom 2	5	60	0.06	7	63
	Ladiesroom 1	2	60	0.06	5	25.2
	Ladiesroom 2	2	60	0.06	5	25.2
	Assistant Administrator	1	60	0.06	7	12.6
	Administrator	2	60	0.06	7	25.2
	Car porch	0				0
First Floor	Lobby	1	60	0.06	7	12.6
	Dean's room	2	60	0.06	7	25.2
	Studio 4	8	60	0.06	7	100.8
	Classroom 4	5	60	0.06	7	63

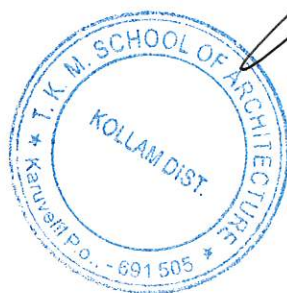


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Floor level	Space Name	Number of Ceiling Fans	Power Consumed (Watts)	Power (kW)	Working Time (Hours per Day)	Energy Usage per Month (kWh)
	Sudio 3	11	60	0.06	7	138.6
	Studio 5	9	60	0.06	7	113.4
Second Floor	Studio 1	4	60	0.06	7	50.4
	Photograpghy	2	60	0.06	7	25.2
	Studio 2	4	60	0.06	7	50.4
	Lobby	0				0
Basement floor	Librray	11	60	0.06	7	138.6
	Lab	2	60	0.06	7	25.2
	Storage	0				0
<b>Total</b>						<b>1575</b>

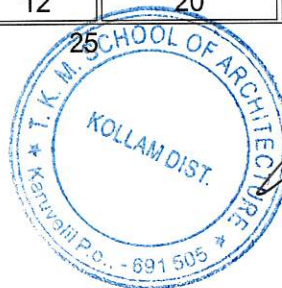
*Table 1.6 Total Monthly energy Consumption for Ceiling fans*



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## 7.8 Total monthly energy consumption for LED Bulbs

Floor level	Space Name	Number of LED Bulbs	Power Consumed (Watts)	Power (kW)	Working Time (Hours per Day)	Energy Usage per Month (kWh)
Ground Floor	Staffroom 1	4	20	0.02	7	16.8
	Guest room	2	20	0.02	4	4.8
	Staffroom 2	4	20	0.02	7	16.8
	Corridor 1 - staffroom	4	20	0.02	7	16.8
	Main Staffroom	5	20	0.02	7	21
	Accounts office	6	20	0.02	7	25.2
	Records room	1	20	0.02	7	4.2
	Corridor 2 - office	3	20	0.02	7	12.6
	Reprography room	1	20	0.02	5	3
	Jury room	7	20	0.02	5	21
	Material museum	4	20	0.02	5	12
	Corridor 3 - stair	2	20	0.02	7	8.4
	Corridor 4 - main	7	20	0.02	7	29.4
	Seminar hall	5	20	0.02	5	15
	Ladies Toilet	4	20	0.02	7	16.8
	Gents Toilet	3	20	0.02	7	12.6
	Gents Room 1	1	20	0.02	5	3
	Gents Room 2	1	20	0.02	5	3
	Climatology lab	1	20	0.02	5	3
	Principal's Room	4	20	0.02	7	16.8
	Lobby	2	20	0.02	7	8.4
	Classroom 1	6	20	0.02	7	25.2
	Classroom 2	4	20	0.02	7	16.8
	Ladiesroom 1	1	20	0.02	5	3
	Ladiesroom 2	1	20	0.02	5	3
	Assistant Administrator	2	20	0.02	7	8.4
	Administrator	2	20	0.02	7	8.4
	Car porch	2	20	0.02	4	4.8
First Floor	Lobby	3	20	0.02	7	12.6
	Dean's room	1	20	0.02	7	4.2
	Studio 4	8	20	0.02	7	33.6
	Classroom 4	12	20	0.02	7	50.4



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Floor level	Space Name	Number of LED Bulbs	Power Consumed (Watts)	Power (kW)	Working Time (Hours per Day)	Energy Usage per Month (kWh)
	Sudio 3	10	20	0.02	7	42
	Studio 5	12	20	0.02	7	50.4
Second Floor	Studio 1	10	20	0.02	7	42
	Photograpghy	1	20	0.02	7	4.2
	Studio 2	10	20	0.02	7	42
	Lobby	2	20	0.02	7	8.4
Basement floor	Librray	17	20	0.02	7	71.4
	Lab	10	20	0.02	7	42
	Storage	5	20	0.02	7	21
<b>Total</b>						<b>764.4</b>

Table 1.7 Total Monthly energy Consumption for LED Bulbs

## 7.9 Total monthly energy consumption for Air conditioners

Floor level	Space Name	Number of AC	Power Consumed (Watts)	Power (kW)	Working Time (Hours per Day)	Energy Usage per Month (kWh)
Ground Floor	Reprography room	1	1500	1.5	5	225
	Seminar hall	5	1500	1.5	5	1125
	Principal's Room	1	1500	1.5	4	225
	Administrator	1	1500	1.5	4	225
Basement Floor	Lab	2	1500	1.5	5	450
<b>Total</b>						<b>2250</b>

Table 1.8 Total Monthly energy Consumption for AC



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### 7.10 Energy Rating

The Completed survey and analysis of the campus as per ISO 50001:2018 Energy Management System Standards.

### 7.11 Recommendations

- ▮ The management should support more for renewable and carbon-neutral electricity options on any energy- purchasing consortium, with the aim of supplying all college properties with electricity that can be attributed to renewable and carbon-neutral sources.
- ▮ More LED lights should be installed to reduce power consumed for lighting.
- ▮ The campus administration should run switch–off drill on regular basis.
- ▮ In campus premises electricity should be shut down from main building supply after occupancy time, to prevent power loss due to eddy current.
- ▮ 5–star rated Air Conditioners, Fans and CFLs should be used.
- ▮ Cleaning of tube-lights/bulbs to be done periodically, to remove dust over it.



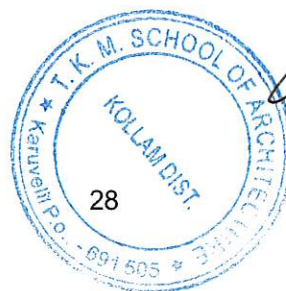
  
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# WASTE MANAGEMENT

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## 8. Waste Management

### 8.1 Observations

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be changed into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

### 8.2 Solid waste management

Waste generated from tree droppings and lawn management are major solid wastes generated in the campus. Separate dustbins are provided for Bio-degradable and Plastic waste in order to segregate them at the source itself.

Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Very less plastic waste (0.1Kg/day) is generated office, garden etc and campus is declared as Plastic Free zone. Metal waste and wooden waste is stored and sent to authorize scrap agents for further processing.

The college has separate bins to collect biodegradable and non-biodegradable waste generated in the campus. Regular meetings are conducted with ground staff regarding the cleanliness of the campus and proper disposal of waste.



Fig 1.13 Plastic Free zone

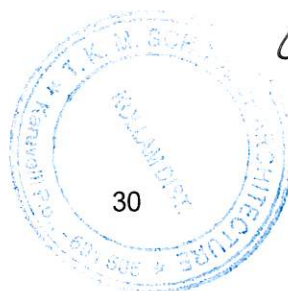


  
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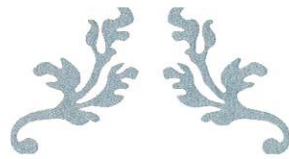




*Fig 1.14 Waste bins for collecting Waste in the campus*



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# **E-WASTE MANAGEMENT**

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### **9. E- Waste Management**

E-waste is a consumer and business electronic equipment that is near or at the end of its useful life. This waste makes up about 5% of all municipal solid waste worldwide. It is hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

E-waste generated in the campus is of minimal quantity. It is being effectively managed, keeping in mind the environmental hazards that may arise if not disposed properly.

The cartridges of laser printers are refilled outside the college campus. Awareness programme was conducted by college regarding E-waste Management. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective Manner.

The dismantled hardware of personal computers are used in PC trouble shooting lab. The dismantled electronic spare parts are immediately sold for reuse. The minimal amount of e- waste that is generated is taken by external vendor with Proper MOU.



*Fig 1.15 E-waste management in the campus*



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### 9.1 Recommendations

- A wastewater treatment plant should be installed to recycle and reuse the waste water generated from domestic use.
- Use reusable resources and containers and avoid unnecessary packaging wherever possible.
- The management should take an initiative to purchase recycled resources when they are available.



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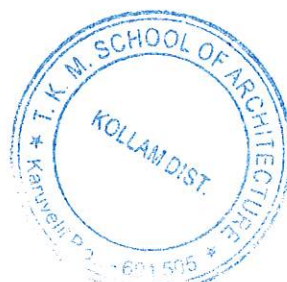


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## GREEN AREA MANAGEMENT

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## 10. Green Area Management

### 10.1 Observations

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy enacted, enforced and reviewed using various environmental awareness programs.

### 10.2 Green space

Many trees are maintained in the campus (around 43 species) to maintain the bio-diversity. Various tree plantation programs are being organized at college campus through Management. This program helps in encouraging eco- friendly environment which provides pure oxygen within the institute and creates awareness among campus students. The plantation program includes various types of indigenous species of ornamental and medicinal wild plant species.

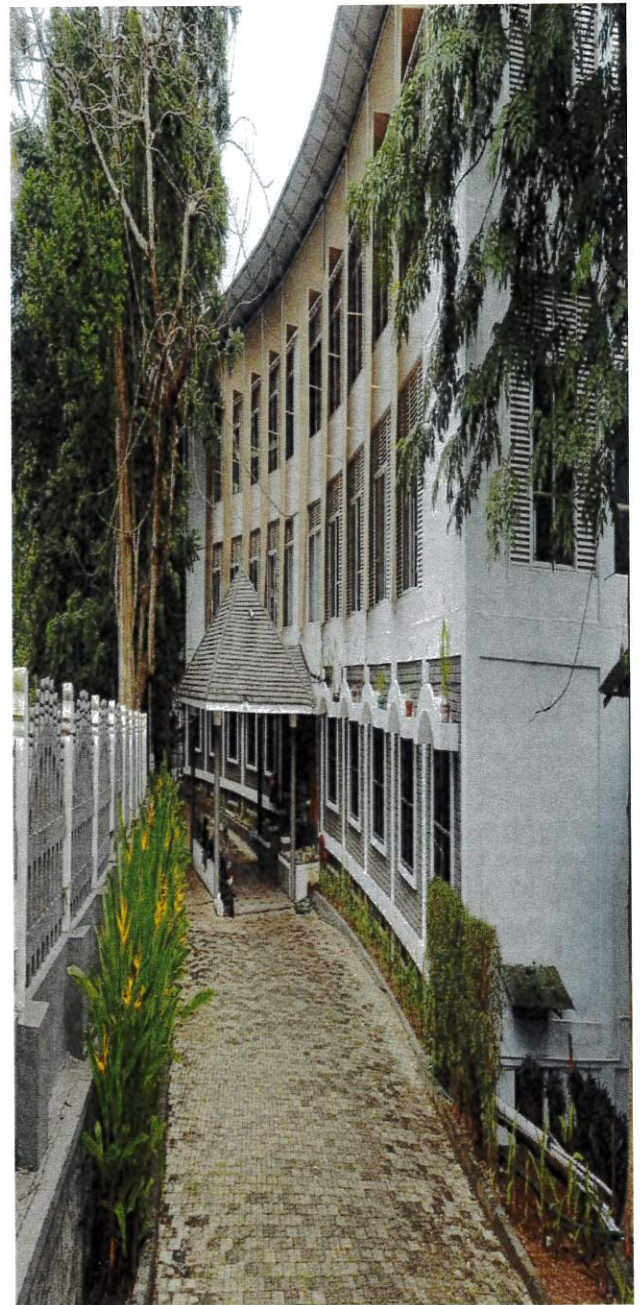


Fig 1.16 Well Maintained Green Area management in the Campus

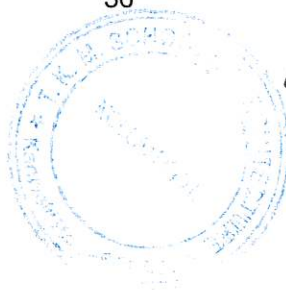


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*Fig 1.17 Well Maintained Green Area management in the Campus*



  
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*Fig 1.18 Well Maintained Green Area management in the Campus*



*Fig 1.19 Well Maintained Green Area management in the Campus*

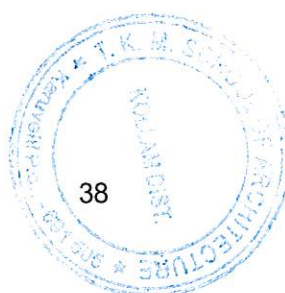


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## 10.3 List of Trees and Shrubs

S.no	Plant/tree name	Botanical Name	Scientific order Name
1	Kanikonna	Cassia fistula	Caesalpinioideae
2	Vaga, Indian Gulmohar	Delonix regia	Caesalpinioideae
3	Teak	Tectona grandis	verbenaceae
4	Charakonna	Peltophorum pterocarpum	caesalpinaceae
5	Badam	Terminalia catappa	Combretaceae
6	Aranamaram	Polyalthia Longifolia	Annonaceae
7	Mahagony	Swietenia macrophylla	Meliaceae
8	Brahmavriksham Chamatha	Butea monosperma	Fabaceae
9	Pappaya	Carica papaya	Caricaceae
10	Rakthachandanam	Pterocarpus santalinus	Fabaceae

Table 1.9 List of tree and shrubs



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**10.3 Use of Bicycle:**

The non-teaching staff residing in and around the campus commute to college by bicycles. The college has constructed a cycle shed to safeguard their vehicles.

**10.4 Transportation:**

All the students and staffs are using college transportation approximately 5% of students and 5% of staff use Own Vehicles. This transport pooling is a greening initiative by college to avoid environmental pollution and reduce Carbon foot printing Levels.

**10.5 Roads:**

Roads in college are laid with provision for rainwater to seep through easily. This enables the easy recharge of ground water.

**10.6 Plastic free campus**

The usage of plastic in college is minimal. The staff and the students are not encouraged to use one time use plastic, plastic bags and disposable plastic things throughout the campus.

**10.7 E - communication**

The principal 's office, all the Examination cell, and laboratories are very well connected with a good and efficient LAN network. Hence all the inter office correspondence is done through email. This reduces the usage of papers.

**10.8 Recommendations**

- ▯ Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- ▯ Establish a College Environmental Committee that will hold responsibility for the enactment, enforcement and review of the Environmental Policy.
- ▯ Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.
- ▯ Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.
- ▯ Indoor plantation to inculcate interest in students, Bonsai can be planted in corridor to bond a relation with nature.



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## 11. Environmental

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As part of green audit of campus, the Green Audit Assessment Team has carried out the environmental monitoring of campus. This includes ventilation and indoor air quality of the class rooms. It was observed ventilation is adequate considering natural light and air velocity present.

The following surveys were conducted:

1. Air Quality Test – Annexure 1

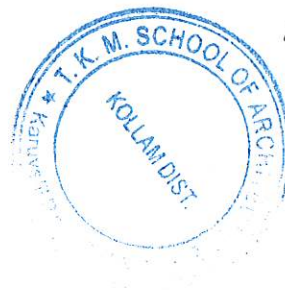


  
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## Conclusion

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While TKM School of Architecture primarily focuses on architectural education, there is notable environmental research conducted by both faculty and students. The management has undertaken significant environmental awareness initiatives, underscoring the institution's commitment to sustainability. Usage of Bio gas are remarkable. Besides, environmental awareness programmes initiated by the administration proves that the campus is going green. The well-maintained college garden is particularly commendable. Several recommendations have been proposed for waste management and reduction, advocating the use of alternative eco-friendly and scientific techniques. These efforts aim to foster a prosperous future for a green campus, contributing to sustainable environmental practices and community.

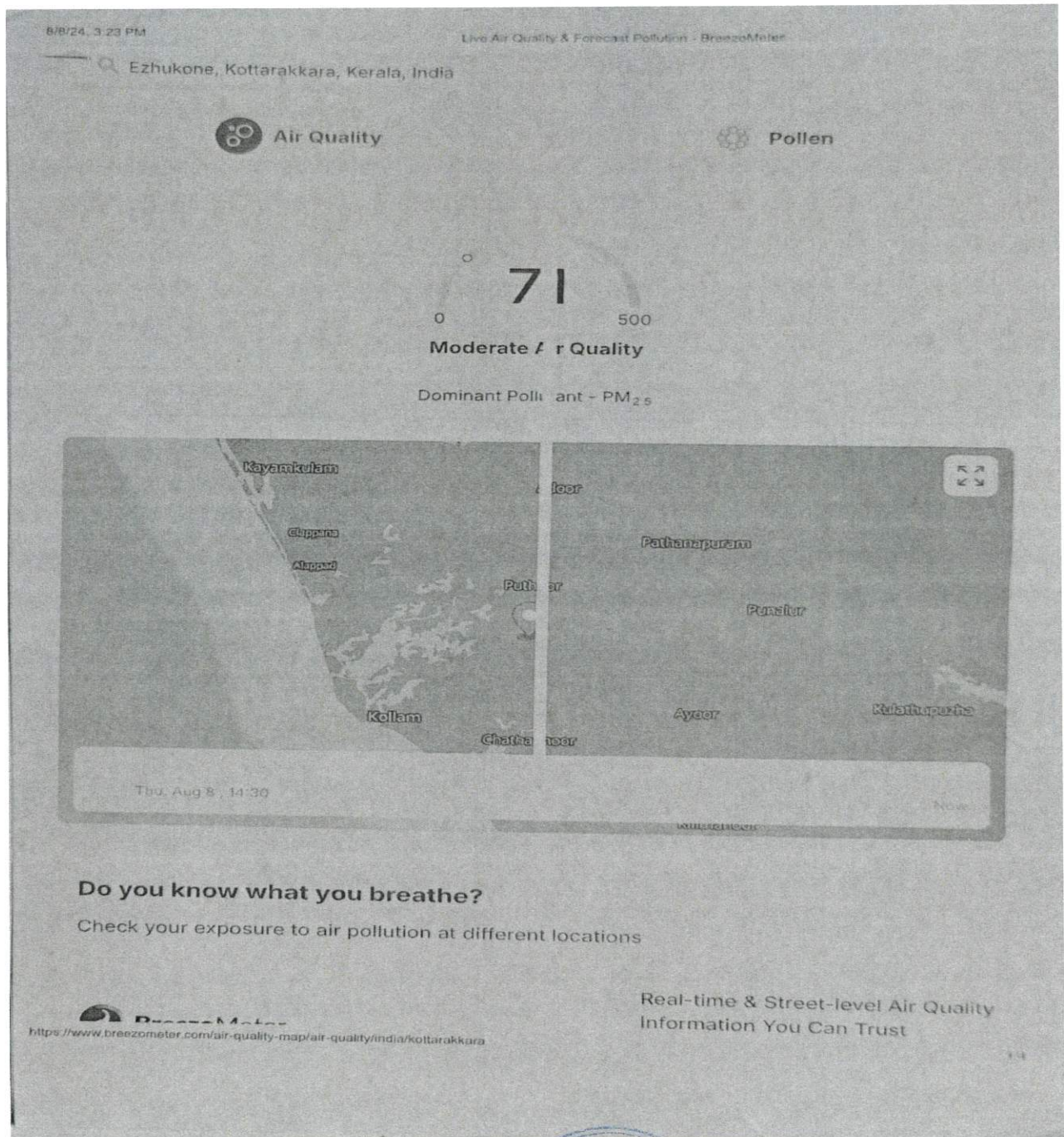


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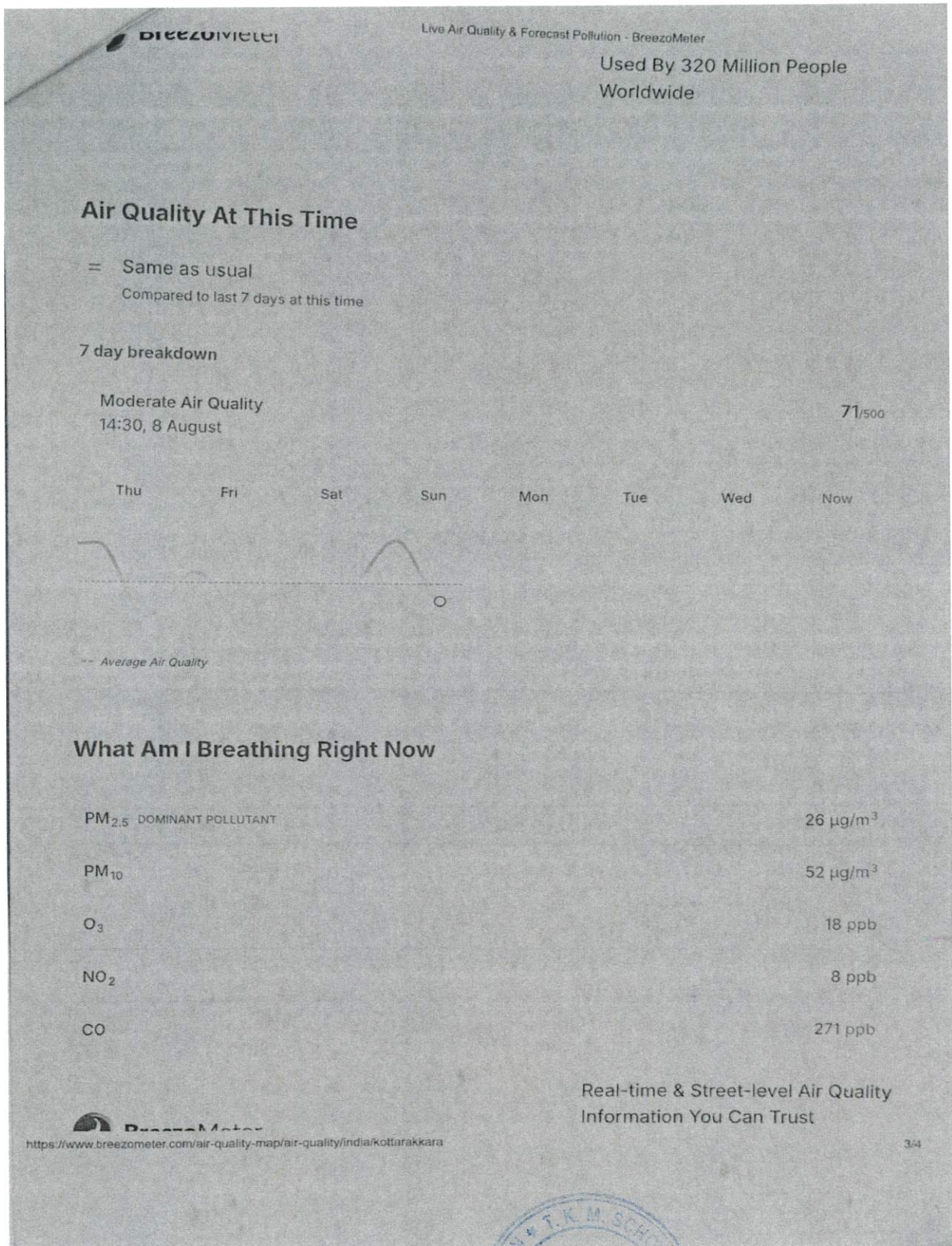


## Annexure – 1

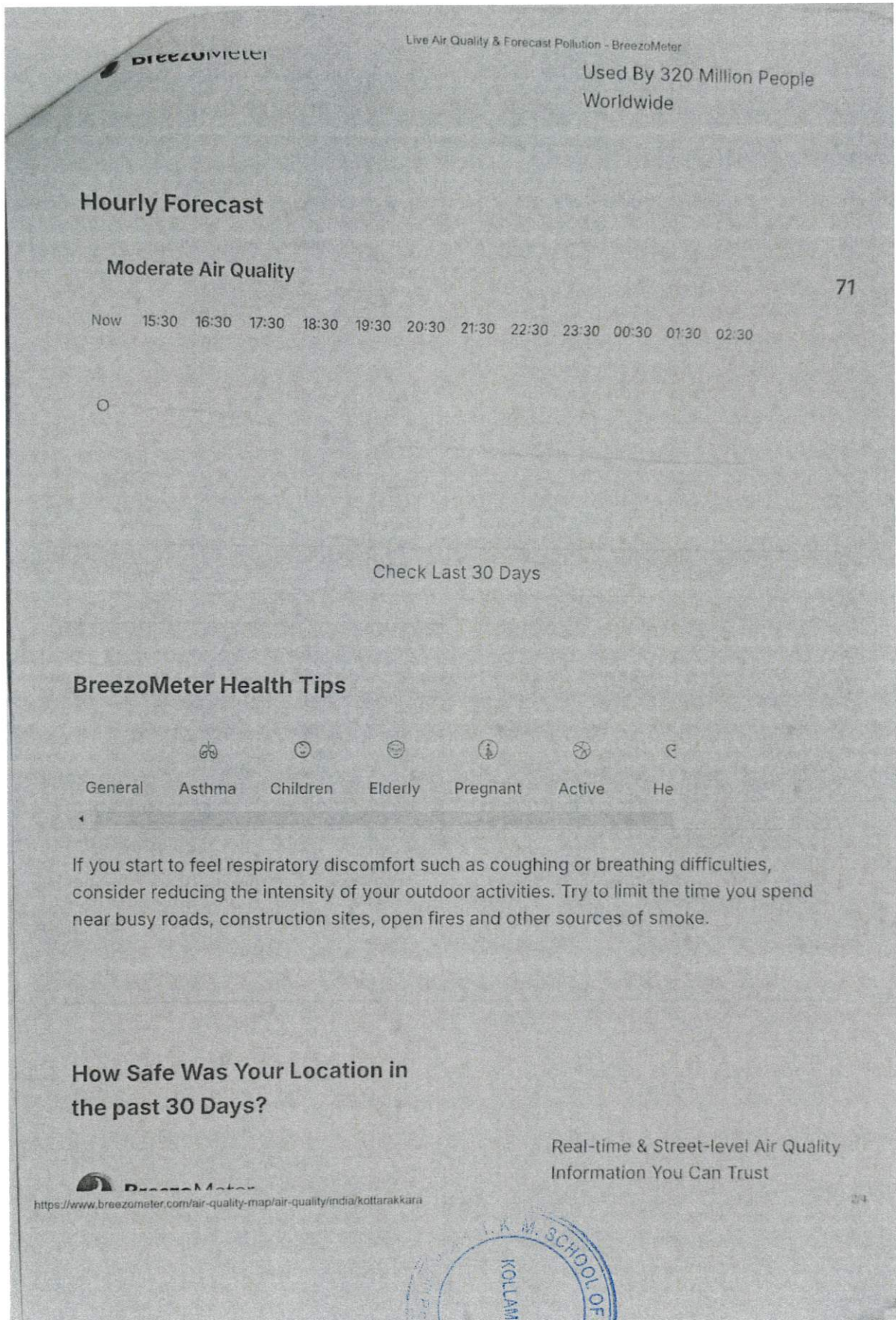


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Kollam Dist.









**PRINCIPAL**  
 T.K.M. School of  
 Architecture  
 Karuvella P.O.  
 Kollam Dist.  
 691 505



## Annexure – 2

Telephone No:0474 - 2918112  
E-mail - qcSDLktr@gmail.com



**QUALITY CONTROL SUB DISTRICT LABORATORY**  
**KERALA WATER AUTHORITY**  
**VALAKAM P. O, KOTTARAKKARA, KOLLAM 691532**

**REPORT ON ANALYSIS OF WATER**

Report No - 2024/QCSDL/KTR/1315		Date: 02/08/2024		
Customer Name & Address		1. Date of Sample received: 01/08/2024		
<b>TKM SCHOOL OF ARCHITECTURE</b> <b>MUSALIAR HILLS</b> <b>KARUVELIL P O 691505</b> <b>EZHUKONE</b> <b>KOLLAM</b> <b>PH : 9961593395</b>		2. Sampling done by: CUSTOMER		
		3. Sample Quantity : 250 ml		
		4. Source of Sample : WELL WATER		
		5. Sample Code : 2024/QCSDL/KTR/1315		
		6. Test Performing Dates from : 1/08/2024 To: 02/08/2024		
SL NO	Parameters	Acceptable limits as per IS 10500 - 2012	Test Method	Result
1	Total Coliforms/100 ml	Shall not be detected/100 ml	IS 15185 : 2016	ABSENT
2	E. Coli/100 ml	Shall not be detected/100 ml	IS 15185 : 2016	ABSENT

NB:- The results stated above related only to the sample(s) submitted for testing. This test certificate shall not be reproduced except in full without the written approval of the Laboratory.

Authorized By *Hima*

**BACTERIOLOGIST**  
**QUALITY CONTROL SUB DISTRICT LAB**  
**KERALA WATER AUTHORITY**  
**KOTTARAKKARA**

\* End of Report \*

KWA/QCSDL/KTR/R/19 Issue No. 01 Issue Date: 10.01.2024 Rev.No. 00 Rev. Date: 00



*Archer*  
TKM School of Architecture  
P.O. - 691505  
Kollam Dist.

E-mail: qcslab@kwa.gov.in  
Telephone No: 0474 2918112



QUALITY CONTROL SUB DISTRICT LABORATORY  
KERALA WATER AUTHORITY  
VALAKAM P.O, KOTTARAKKARA, KOLLAM 691532

Test Report

Report No - 2024/QCSDL/KTR/L315			Date of issue : 02/08/2024		
Customer Name & Address			1. Date of Receipt : 01/08/2024		
TKM SCHOOL OF ARCHITECTURE MUSALIAR HILLS KARUVELIL P O 691505 EZHUKONE KOLLAM PH : 9961593395			2. Sampling done by: CUSTOMER		
			3. Sample Code : 2024/QCSDL/KTR/1315		
			4. Source of Sample : WELL WATER		
			5. Sample Description : DRINKING WATER		
			6. Sample Quantity : 2 Litres		
			7. Test Performing Dates		
			From: 02/08/2024 To: 02/08/2024		
SL NO	Characteristics	Unit	Test Method	Maximum Acceptable limits as per IS 10500 - 2012	Result
1	Turbidity	(NTU)	IS 3025 (Part 10): 2023 Nephelometric Method	1	
2	pH at 25 °C	-	IS 3025 (Part 11): 2022 Electrometric Method	6.5 to 8.5	5.86
3	Total Hardness (as CaCO <sub>3</sub> )	(mg/L)	IS 3025 (Part 21): 2009 EDTA Method	200	
4	Chloride (as Cl)	(mg/L)	IS 3025 (Part 32) : 1988 Argentometric Method	250	

NB:- 1. The results stated above related only to the sample(s) submitted for testing. 2. This test certificate shall not be reproduced except in full without the written approval of the Laboratory. 3. The results apply to the sample as received. 4. Sample will be retained only for 7 days after reporting the test results.

*Dhanya*  
2/8/24

Authorized By  
Name: DHANYA.V  
Sanitary Chemist

KWA/QCSDL/KTR/R/19

Issue No. 01

\* End of Report \*

Issue Date: 01.01.2023

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Rev. No. 05

SANITARY CHEMIST  
QUALITY CONTROL SUB DISTRICT LAB  
KERALA WATER AUTHORITY  
KOTTARAKKARA



*[Signature]*  
PRINCIPAL  
T. K. M. School of  
Architecture  
Karuvellil P.O. - 691 505  
Kollam Dist.



# WATER MANAGEMENT POLICY

**PREFACE:** TKM School of Architecture recognizes the critical importance of water management in achieving sustainability and environmental stewardship on campus. With a commitment to ensuring a reliable supply of freshwater resources for approximately [insert number] individuals daily, including the campus flora and fauna, the School aims to implement an efficient and sustainable water management policy.

**WATER CONSERVATION STRATEGIES:** The Water Management Policy of TKM School of Architecture emphasizes proactive water conservation strategies integral to sustainable campus operations. These strategies include:

- **Rainwater Harvesting Systems:** Installation of rainwater harvesting systems across campus to capture and utilize rainwater for non-potable purposes.
- **Water Reuse Mechanisms:** Implementation of water reuse systems to recycle and reuse water efficiently within campus facilities.
- **Natural Water Retention Measures:** Preservation and enhancement of natural water sources through measures such as maintaining green spaces, restoring ecosystems, and promoting biodiversity.
- **Water Quality Monitoring:** Regular testing and monitoring of water quality to ensure compliance with health and safety standards.

**PRESERVATION OF NATURAL WATER SOURCES:** TKM School of Architecture places a high priority on preserving natural water sources to sustain campus water needs while protecting water quality. Measures include:

- **Rainwater Retention:** Utilization of natural features like green areas and permeable surfaces to retain rainwater and recharge groundwater.
- **Natural Reservoirs:** Preservation of natural features like forest islands (Pachathruttu) to act as reservoirs for rainwater retention and recharge.

**PRINCIPLES OF WATER MANAGEMENT:** The Water Management Policy of TKM School of Architecture is guided by the following principles:

- **Ecosystem Preservation:** Protecting and promoting natural water retention measures and ecosystems integral to water management.
- **Sustainability Goals:** Contributing to green impact and sustainability goals through nature conservation, biodiversity restoration, and sustainable landscaping practices.



- **Enhanced Storage Capacity:** Safeguarding and enhancing the storage potential of landscapes, soils, and aquifers through natural processes.
- **Green Solutions:** Prioritizing green infrastructure solutions such as green roofs, permeable paving, and Sustainable Drainage Systems (SuDS) over traditional gray infrastructure.
- **Optimal Water Use:** Implementing water-efficient technologies such as sensor-based taps to optimize water consumption and reduce wastage.

**IMPLEMENTATION STRATEGIES:** To ensure the effective implementation of the Water Management Policy, TKM School of Architecture will:

- Establish a Water Management Committee responsible for policy oversight, implementation, and periodic review.
- Conduct regular audits and assessments of water usage and conservation efforts on campus.
- Educate and engage the campus community in water conservation practices through awareness campaigns, workshops, and educational programs.
- Collaborate with local authorities, experts, and stakeholders to enhance water management strategies and practices.

**MONITORING AND REPORTING:** TKM School of Architecture will monitor the effectiveness of the Water Management Policy through:

- Regular reporting on water usage, conservation achievements, and challenges.
- Annual reviews and updates to the policy based on feedback, data analysis, and evolving sustainability practices.

**CONCLUSION:** By adhering to these principles and strategies, TKM School of Architecture aims to ensure a sustainable and efficient water supply system that supports campus operations while preserving natural resources and contributing to environmental stewardship.

# WASTE MANAGEMENT POLICY

**PREFACE:** TKM School of Architecture is committed to minimizing its environmental impact through an efficient waste management policy that prioritizes waste reduction, recycling, and responsible disposal practices. The policy is designed to align with sustainability initiatives, reduce the campus's carbon footprint, and optimize waste disposal costs. By implementing comprehensive waste management practices, the School aims to foster a culture of environmental stewardship and sustainability among its community.

## PRINCIPLES OF WASTE MANAGEMENT AT TKM SCHOOL OF ARCHITECTURE:

1. **Color-Coded Waste Collection:** TKM School of Architecture employs clearly labeled, color-coded bins across campus to facilitate proper waste segregation. This includes bins for recycling, general waste, organic waste, e-waste, hazardous waste, and other specific waste streams.
2. **Waste Minimization:** The School emphasizes waste prevention and reduction strategies, encouraging departments and individuals to minimize waste generation through efficient resource use and responsible purchasing practices.
3. **Recycling Initiatives:** Recycling bins are strategically placed throughout campus to collect paper, cardboard, plastics, metals, glass, and other recyclable materials. The School promotes recycling as a primary method of waste management to divert materials from landfills.
4. **Organic Waste Management:** Dedicated bins for food waste are located in hostels and the campus canteen. Organic waste is collected and processed through anaerobic digestion to generate energy and produce soil improvers for organic farming initiatives.
5. **Specialized Waste Streams:** Separate collection systems are in place for e-waste, batteries, ink and toner cartridges, hazardous chemicals, and clinical waste. These streams ensure that hazardous materials are managed safely and not mixed with recyclables or general waste.
6. **Education and Awareness:** TKM School of Architecture conducts regular awareness programs and training sessions for staff and students on proper waste management practices. This includes guidance on waste segregation, recycling procedures, and the importance of environmental conservation.
7. **Partnerships and Collaboration:** The School has established partnerships with waste management service providers and governmental agencies to enhance waste collection efficiency, monitor waste production, and improve recycling rates.



8. **Water and Liquid Waste Management:** Liquid waste from laboratories and sewage water from canteens, hostels, and other buildings are utilized for irrigation and organic farming, promoting water conservation and sustainable practices.
9. **Continuous Improvement:** TKM School of Architecture is committed to continuous improvement in waste management practices. This includes ongoing evaluation, updates to procedures based on feedback and technological advancements, and striving towards zero waste goals.

#### **IMPLEMENTATION STRATEGIES:**

- Establish a Waste Management Committee responsible for overseeing policy implementation, conducting audits, and evaluating waste reduction initiatives.
- Ensure sufficient and accessible waste bins across campus, with clear signage and instructions for proper use.
- Monitor and report on waste management metrics regularly to track progress towards sustainability goals and identify areas for improvement.

**CONCLUSION:** By adhering to these principles and strategies, TKM School of Architecture aims to achieve sustainable waste management practices that contribute to environmental conservation, resource efficiency, and a cleaner campus environment. Through education, collaboration, and innovation, the School continues to advance its commitment to responsible waste management and environmental stewardship.

