

# GREEN, ENVIRONMENT & ENERGY AUDIT

## REPORT | 2021



# GREEN AUDIT REPORT - 2021

is presented to


**KLE LAW COLLEGE**

CA-2, Sir M. Vishweshwaraiah Layout, V Block, Ullal, Bengaluru – 560091,  
Karnataka.

has successfully demonstrated knowledge on Energy conservation,  
Water conservation, Bio diversity, Waste management, Indoor  
Environmental quality, Carbon footprint.

10.01.2022

DATE



**NISCHAY N**  
GREEN BUILDING CONSULTANT



## Acknowledgement

Green Audit Assessment team thanks the management of K.L.E. Law College for assigning this important work of Green Audit, Environment and Energy audit. We appreciate the cooperation to us for completion of study.

Firstly, we would like to pay my obeisance to Dr. J.M. Mallikarjunaiah, Principal. We are also thankful to other staff members who were actively involved in giving us necessary inputs to carry out this very vital exercise for Green Audit.



**Submitted to:**

The Principal,  
K.L.E. Law College  
CA-2, Sir M. Vishweshwaraiah Layout,  
V Block, Ullal, Bengaluru – 560091,  
Karnataka.



**Audited by:**

Green Aura,  
692F, 12<sup>th</sup> A cross Bel layout,  
Bengaluru- 560091.

## Disclaimer

Green Audit team has prepared this report for K.L.E. Law College based on input data submitted by the representatives of the Institute and is 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 calculations are arrived following best estimates 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.

The detailed Information and analysis presented in this report are valid as on the date of visit and period of study at the site. The work presented represents our best efforts and judgments based on the information available at the time this report was prepared. Green Aura makes no assurances as to the accuracy of any such information or any conclusions based thereon. The observations made in this report are only an indication of the performance of the facility based on our assessment and should not be considered as the comment on the functioning of the facility. The observation is purely based on the data recorded at that point of time.

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## Executive Summary

Institutions have broad impacts on the world around them, both negative and positive. A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with the environment. The activities pursued by Institutions can create a variety of environmental impacts. A clean and healthy environment aids effective learning and provides a conducive learning environment. K.L.E. Law College is very sensitive to environmental factors as more concepts are being introduced to make them eco-friendly.

K.L.E. Law College expresses its commitment to sustainability in many ways. It has taken a number of positive steps to reduce its environmental impact. But many areas remain in which substantial improvements can be made. This report serves to highlight K.L.E. Law College's many accomplishments, and to make recommendations for improving the Institute's environmental sustainability. The Institute has conducted the Green Audit, Environment and Energy Audit for the year **2021** and strives to maintain eco-friendly atmosphere on the campus.

The aim of the report is to identify scope for improvement and recommend implementable and economically viable solutions in achieving the most optimized utilization of energy and water in the campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Therefore, it is imperative that the Institute evaluate its own contributions toward a sustainable future.

The initiatives taken by the Institution to make the campus Ecofriendly:

1. Energy conservation
2. Water conservation
3. Efforts for carbon neutrality
4. Hazardous and E-waste waste management
5. Health and Well- Being
6. Plantation

KLE has undertaken various activities through N.S.S. and Green Lawyers Club to create eco-friendly awareness among the students, Institute arranges special programs by inviting the eminent personalities, who in turn train and educate public. Students are encouraged to participate in eco-friendly activities.

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## Green Auditing

The term “Green” means eco-friendly or not damaging the environment. This can acronymic ally is called as '**Global Readiness in Ensuring Ecological Neutrality**' (GREEN). 'Green Audit' can be defined as 'systematic identification, quantification, recording, reporting and analyzing of components of ecological diversity and expressing the same in financial or social terms'. 'Green Auditing', an umbrella term, is known by another name 'Environmental Auditing'. To implement the green audit other important aspects such as objective of green audit, Drivers of green audit, future scope, benefits, and advantages are necessary to understand. The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, and efforts of carbon neutrality, plantation. The concept of Green Audit, institutions are using it as a management tool to evaluate the environmental standards; Institution can perform better and better for the sustainable development of the organization. The experiments on the nature by avoiding natural rules, this can be a one major reason behind that is Green Audit.



**K.L.E. Law College - Campus.**

## Approach & Methodology

During the study, the entire campus was visited and studied in detail. The audit involved carrying out various measurements and analysis covering all major energy, water and resource consuming sections, to realistically assess losses and potential for savings. The study focused on improving energy, water resource, waste management and other green initiatives and identifying other saving opportunities. A very simple indigenized system has been devised to monitor the environmental performance of K.L.E. Law College. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and completely voluntary. The aim of this auditing report is to help the Institute set environmental examples for the community and to educate the young learners.

The major areas of study are broadly categorized into:

1. Site Selection
2. Built Environment
3. Water Audit
4. Energy Audit
5. Good Health and Well-Being
6. Waste Management
7. Green Education

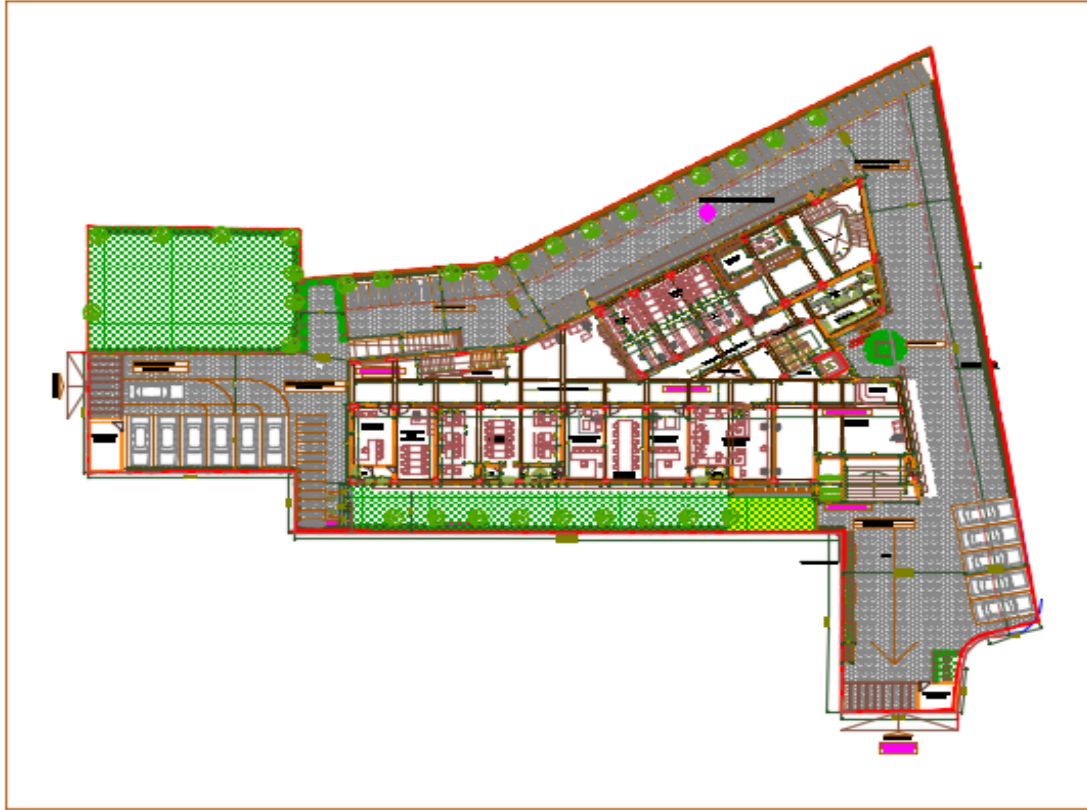
During the audit, there was continuous interaction among the college officials, faculties and students to ensure that the suggestions made are realistic, practical and implementable to allow for possible concurrent implementation.

## **I. About K.L.E. Law College**

The K.L.E. Law College at Bangalore has been conceived as a nursery and training ground for those seeking to enter the legal profession. Under the umbrella of Karnataka Lingayat Education, the college was established in 1975 to cater to the needs of young students desirous of pursuing legal education in Bangalore. To start with, a three Year LL.B. Degree Course was introduced and in the year 1996, a five year Integrated Degree Course in B.A. LL.B. was introduced to attract young students to commit at their earlier age to a Professional Course. To cater to the needs of the globalised corporate world and prospective corporate lawyers, another Five Year Integrated Course – B.B.A. LL.B. was introduced in the academic year 2011-12. While many successful students of the college from its inception have occupied top positions in the society in various fields like advocacy (trial and appellate), corporate practice, chamber practice, management, government offices, etc., in the recent years most of the students have occupied pivotal positions in many corporate enterprises too. The College has created and maintained an academic atmosphere that enables student's growth to the maximum extent. It is recognized by the Bar Council of India and is affiliated to the Karnataka State Law University, Hubli. The college offers along with Undergraduate programs, various certificate and diploma courses and operates in a modern, well-equipped campus located in the heart of the city. Deeply committed to educational excellence in the field of jurisprudence, the college has earned a good reputation for the quality of its academic programmes, a fact reflected in it being ranked as the 2nd best private law college in South India by "The Week", 8th best private law college in India by "Career 360" and one of the Best Law Colleges in India by "India Today in 2015." Academicians of the college provide a thorough understanding of the subjects and the professional skills that are required. In addition, knowledge is supplemented by guest lectures from leading advocates and former Judges of High Courts and Supreme Courts on a regular basis. The college has suitable facilities for the training of tomorrow's law professionals befitting its place among one of the renowned places of excellence in legal education. Spacious classrooms equipped with comfort seating and LCD facilities for interactive teaching, staff rooms with IT resources for the staff, moot court hall, a very well stacked library, e-library with access to various online and off-line databases for research and other facilities makes legal research easy and enjoyable.

### i. Campus Details

The institute explores a beautiful equipped study environment located in a well-known green city of Bengaluru and has an extensive vicinity of 0.6 acres of land surrounded with congeal learning atmosphere.



**K.L.E. Law College Master plan**

### ii. Area details

Sl.No.	Zone	Total Area in Sq. m
1	Total site area	2573
2	Vegetated area	547
3	Non-roof hardscape area	875
4	Total Built-up area	6636

## II. Built Environment

### i. Development Footprint and Green Cover

K.L.E. Law College has greenery within the campus, thereby providing habitat to and promoting biodiversity. By having a vegetated area of 488 sq.m the soil is protected and preserved, thereby reducing the negative impacts of soil erosion on the site and surroundings.

K.L.E. Law College open space adjacent to the building is more than the building footprint.

Total Site Area: 2573 Sq.m

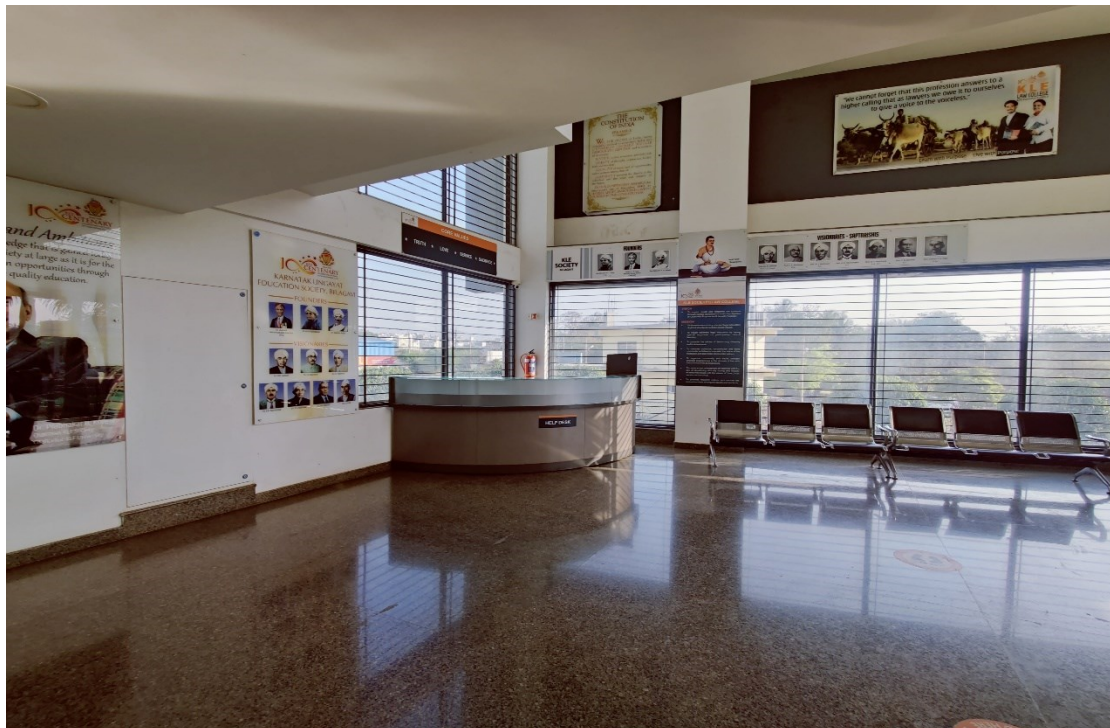
Building Foot print: 1151 Sq.m----- (1)

Open space provided: 1422 Sq.m----- (2)

Equ. 2 is greater than Equ. 1, thus project has provided open space that is more than the building footprint of the project building.

### ii. Day lighting

Institution has maintained that all regularly occupied spaces are daylit, thereby improving health and well-being of students & teachers.



Maximum use of Daylight



The institution is having more opportunity to save energy in buildings by maximizing the use of daylight there is no need for artificial lighting during daylight hours without causing variation in thermal comfort due to climate and building's design.



**Staffroom view**



**Use of Natural light**

It is maintained that all regularly occupied spaces are daylit, thereby improving health and well-being of students & teachers.

### **iii. Outdoor Light Pollution Reduction**

To Reduce light pollution to increase night sky access and enhance the nocturnal environment. The institute has designed exterior lighting such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir i.e. straight down.

### **iv. Heat Island Reduction, Non-roof and roof**

Urban heat islands" occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning), air pollution levels, and heat-related illness and mortality.



Institution has implemented measures by planting native, drought-tolerant shade trees and smaller plants such as shrubs, grasses, and groundcover wherever possible to reduce the heat islands to minimize impacts on microclimates and human and wildlife habitats. Majority of exposed non-roof impervious areas are under tree cover with turf and open grass pavers and more than 95% of the parking spaces are under cover.

### III. Water Audit

Water audit is an effective management tool for minimizing losses, optimizing various uses and thus enabling considerable conservation of water, the efforts of the institution in water usage and management is seen through following activities it is satisfactory and no unnecessary water wastage is noticed in the campus.

During the survey, no wastages were observed. The open grounds provide means for water percolation as they are not barren due to ample greenery on campus. The campus has a functional rain water harvesting unit and the water collected is used for campus needs. All the waste water from the campus is treated by a fully functional Sewage Treatment Plant and is reused for gardening purposes in the Institute.

Institution has pledged for water conservation by prioritizing the water usage with resource planning and recycling. KLE has guidelines for the safety of storage tanks and water related structures, regulates exploitation of ground water, harvests rain water in order to provide quality of water in the campus.

#### i. Water quality

The quality of Bore well water meets the potable water standards. Institution has adopted UV and RO water filtration system in each floor in each block to provide drinking water to the staffs and students



**RO water filtration system**



## **ii. Rain water recharge pit**

The institution has planned for rain water recharge roof method to enhance ground water table and non-roof method is planned providing more vegetated area.

A 15 feet deep recharge pit is located in the institution. The rain water recharge pit allows the rain water to restore ground water. Considering the catchment area, rate of percolation of the soil and depth of ground water level, the recharge pit is made near to the bore well in order to recharge the underground aquifers and help water infiltration in one area. The recharge pit is filled with stones of different sizes at the bottom from large gaps for the water to pass through. A mesh between sand and stones prevents the sand from escaping. A layer of soil and leaves of plant act as a filter for pure water which percolates through the soil layer and then into bedrock. Thus rain water is used for recharging the ground water level.



**Rain water Recharge Pit**

## **iii. Operation and maintenance:**

Proper operation & maintenance of rainwater drain facility has been implemented for their effective use. The following measures will be followed:

- a. Inspection of Recharge Pit after every major storm for the first few months after construction. Annual inspection of filter and recharge pits will be conducted.
- b. Quarterly cleanouts and removal of debris from all drainage inlets and outlets
- c. Periodic removal and disposal of accumulated sediments from rainwater drains running all around the site.

## **IV. Energy Audit**

### **i. About Energy Audit**

An energy audit helps to understand more about the ways energy is used in any college and helps in identifying areas where waste may occur and scope for improvement exists. The overall energy efficiency from generation to the final consumer becomes 50%. Hence one unit saved in the end user is equivalent to two units generated in the power plant.

An energy audit is the most efficient way to identify the strength and weaknesses of energy management practices and to find a way to solve problems. An energy audit is a professional approach to utilizing economic, financial, social, and natural resources responsibly. Energy audits “adds value” to management control and are a way of evaluating the system.

GREEN AURA, Bengaluru, Karnataka carried out the “Energy Audit” at the site to find gaps in the energy consumption pattern for “KLE Law College, Ullal , Bengaluru” A technical report is prepared as per the need and the requirement of the project.

### **ii. Objectives of Energy Auditing**

An energy audit provides a vital information base for an overall energy conservation program covering essentially energy utilization analysis and evaluation of energy conservation measures. It aims at:

- Identifying the quality and cost of various energy inputs.
- Assessing the present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of the thermal and electrical energy economy.
- Highlighting wastage in major areas.
- Fixing of energy-saving potential targets for individual cost centers.
- Implementation of measures for energy conservation & realization of savings.

### iii. Methodology

The methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings includes the following:

- Discussions with the concerned officials for identification of major areas of focus and other related systems.
- A team of engineers visited the site and had discussions with the concerned officials/supervisors to collect data/information on the operations and load distribution within the plant and the same for the overall premises. The data were analyzed to arrive at a baseline energy consumption pattern.
- Measurements and monitoring with the help of appropriate instruments including continuous and/or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- Trend analysis of costs and consumptions.
- Capacity and efficiency test of major utility equipments, wherever applicable.
- Estimation of various losses
- Computation and in-depth analysis of the collected data, including utilization of computerized analysis and other techniques as appropriate, were done to draw inferences and to evolve suitable energy conservation plan's for improvements/reduction in specific energy consumption.

## POWER SUPPLY SYSTEM

### iv. Power Supply System

College has meter connection from Bangalore Electricity Supply Company Limited

Details are given following table

Sr.No.	Detail of Consumer	Connection detail
1	ConsumerName	Principal KLE Law College
2	Bill No.	409372487052
3	Tariff Category	1HT2C2
4	ContractDemand	125 KVA



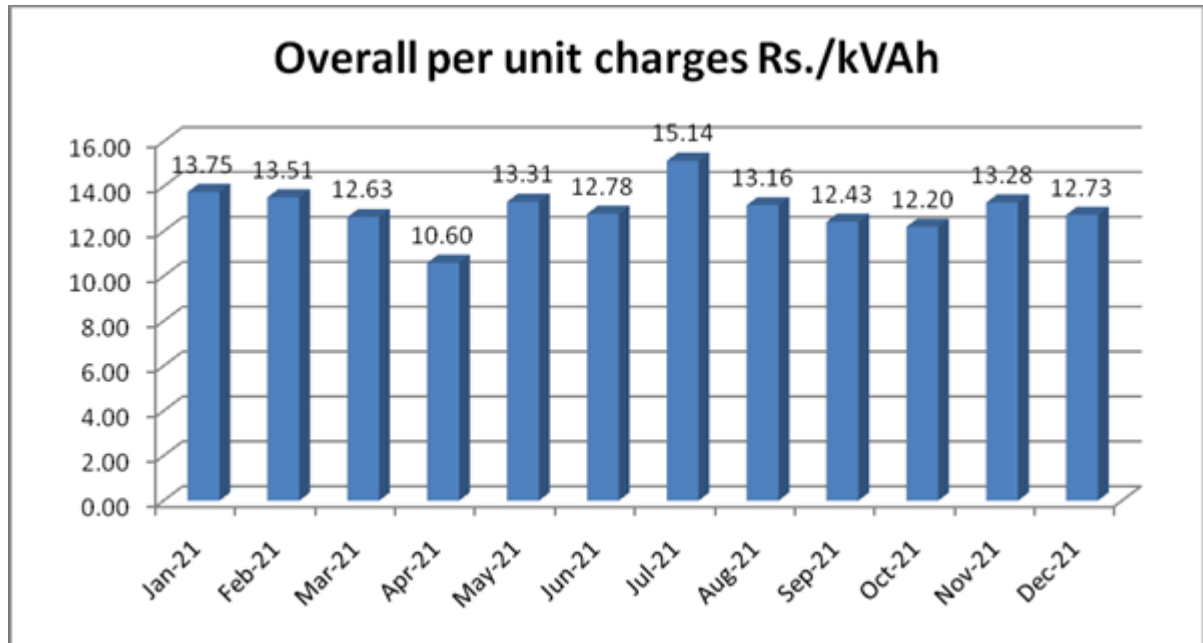
**Photograph of Electric Substation**

## **Electricity BILL ANALYSIS**

### **v. Monthly Electrical Energy Consumption 2021**

The Monthly electrical consumption for the college is given in the table

Sr. No.	Month & Year	Contract Demand (KVA)	Maximum demand (KVA)	Billing Demand (KVA)	Unit Consumption (kWh)	Unit consumption kVAh	Power Factor	Amount (Rs/-)	Overall per unit charges Rs. / kVAh
1	Jan-21	125	28	106	3725	4,251	0.79	58,450	13.75
2	Feb-21	125	18	106	3,455	4,251	0.82	57,451	13.51
3	Mar-21	125	29	106	4,762	5,670	0.85	71,631	12.63
4	Apr-21	125	35	106	2,954	4,012	0.88	42,510	10.60
5	May-21	125	26	106	5,070	5,850	0.87	77,890	13.31
6	Jun-21	125	28	106	5,122	4,754	0.89	60,745	12.78
7	Jul-21	125	16	106	1,890	2,828	0.67	42,810	15.14
8	Aug-21	125	20	106	4,754	3,985	0.88	52,450	13.16
9	Sep-21	125	26	106	5,626	4,012	0.56	49,850	12.43
10	Oct-21	125	30	106	4,980	4,740	0.52	57,840	12.20
11	Nov-21	125	32	106	5,130	5,910	0.87	78,479	13.28
12	Dec-21	125	36	106	6,060	6,252	0.91	79,604	12.73
					<b>53,528</b>	<b>56,515</b>	<b>0.7925</b>	<b>7,29,710</b>	<b>12.96</b>



**Graphical presentation of per unit charges for the year 2021**

**Observation:**

It was found that in the last 12 months overall per unit charge is Rs 12.96 /kWh.

**vi. Connected Load detail of College**

KLE Law College has connected load in following table

Items	Quantity
Tube Light	363
LED Tube Light	113
Fan	266
AC	4
Computers	135
Printers	7
Projector	23
Scanner	4
Photocopy Machine	2
Exhaust Fan	5
Street Lights	41
Solar Street Light	7



## V. Good Health and Well-being.

### vii. Campus design caters to differently able people

The campus design ensures to caters differently abled and senior citizens. Following measures are being implemented for differently abled and senior citizens,

- Non-slippery ramps.
- Lifts with braille assistance.
- Preferred parking for differently abled.
- Wheel chair.
- Uniformity in floor level for hindrance-free movement in exterior common areas
- Easy access to the main entrance of the buildings
- Appropriately designed preferred car park spaces having an easy access to the building's main entrance or closer to the lift lobby



**Lift with braille assistance**



**Disabled friendly parking**



**Pedestrian-friendly path ways**

**viii. Tobacco Smoke Control**

The institution has taken care to eliminate exposure of students & teachers to tobacco smoke thereby reducing health impacts caused due to passive smoking.

**ix. Ozone Depletion**

The refrigerant selected for the Air Conditioning System eliminates the emission of compounds that contribute to ozone depletion and global warming. The Air conditioning equipment has been selected with HFC based refrigerant R 410A.

**x. Fire suppression system**

The main fire suppression system used is hand held fire extinguishers and are Halon free. Institution has not used any Halon based fire suppression system. Carbon dioxide B C Fire Extinguisher.

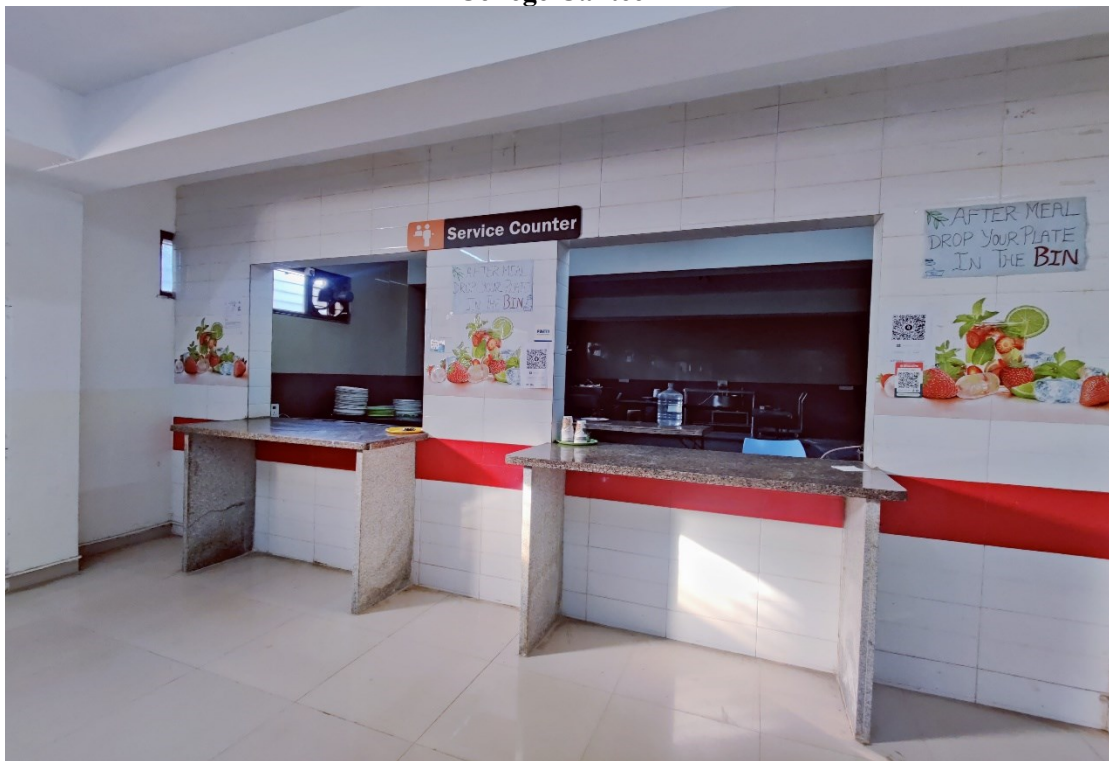


### xi. Basic Amenities

Institution has Provide access to basic amenities, so as to reduce negative impacts caused from automobile use and also make it easy for students, basic amenities such as bank, cafeteria, canteen, bus stop in front of the college, railway station within 1.5km and several other basic amenities, within a walking distance of 1 km from the building.



**College Canteen**





## **xii. Breakout spaces**

To enhance physical, emotional and spiritual well-being of campus occupants, the campus has breakout spaces by providing facilities such as, but not limited to gymnasium, yoga, meditation, indoor games, outdoor games, playground, etc.,



**Gymnasium**



**Table tennis**

## VI. Waste Management Audit.

Institution facilitate segregation of waste at source to encourage reuse or recycling of materials, thereby avoiding waste being sent to landfills. The waste management is in order with the installation of dust bins. The waste is segregated at source by providing separate dust bins for Biodegradable and Plastic waste. Daily cleaning is carried out and most of the non-biodegradable waste is lifted by the City Municipal service.

The E-waste and defective item from computer lab is being stored properly. The institution has decided to contact approved E- waste management and Disposal facility in order to dispose E-waste in scientific manner. Hazardous Waste, Radioactive Waste not found.

The waste management is in order with the installation of dust bins. The waste is segregated at source by providing separate dustbins for biodegradable and plastic waste. Daily cleaning is carried out and most of the non-biodegradable waste is lifted by the City Municipal service.

Institution strongly believes in 3R's **Reduce, Reuse and Recycle** of waste as follows,

**Reduce:** Institution has replaced the use of paper in admissions of the candidates, filling of the examination forms, cash book etc. This has drastically helped in reduction of use of paper. The students also encouraged to use both the sides of the paper for writing tests and are asked to use the paper binding for their academic practical records instead of plastic. Notice and circulars are shared to faculty through email.

**Reuse:** The E-waste and defective item from computer lab is being stored properly. The institution has decided to contact approved E- waste management and Disposal facility in order to dispose E-waste in scientific manner, which can be reused.

**Recycle:** The waste management is in order with the installation of dust bins. The waste is segregated at source by providing separate dust bins for Biodegradable and Plastic waste. Students and staff members are given sufficient information regarding the effective management of the waste generated in the campus.

Sanitary waste: The institution has installed the sanitary napkin burning machine called as “Incinerator” in the ladies washroom so as to enable ladies to drop the used sanitary napkins into the incinerator where it is burnt into sterile ash in seconds and flushed down for a greener tomorrow.

The institution has made an arrangement with a local farmer, Sri.Ramakrishnappa, who collects wet waste generated in the college including the leftover food every evening and uses the same as fodder for his livestock.

Vermicomposting pit is made and composting is done using earthworms for organic waste.

The institution has entered into an MOU with Environmental & Recycling Solutions India, which collects wastes like cardboard, newspaper and magazines, shredded papers, old office records, dust bin papers, plastics, metal etc once a month. Then these materials are taken to a recycling plant. The house keeping staff, selected students & staff members are oriented by the Environmental & Recycling Solutions India regarding waste segregation and management. Further, these selected students will in turn motivate other students, so that it leads to a continuous process of effective waste management and awareness.



## **VII. Observation and Recommendation**

### **Observations of the Green Audit**

1. Signage's have been well maintained at all applicable places in all campuses
2. Paper consumption is monitored in all buildings
3. Waste bins/containers are available at appropriate places. Separate bins are kept for different types of wastes. Waste quantity is monitored
4. E-waste is returned to suppliers for disposal
5. Used Lead-acid batteries are returned to manufacturers or their agents during replacement
6. More 50 number of saplings are planted as a part of NSS and other activity in and around the campus
7. First aid kits are available in all campuses on each floor at convenient places and monitored for availability of all the items
8. Institute is successfully implementing majority of the suggestions and recommendation provided in previous 4 years' audit.

### **Recommendation**

1. Training on sustainability should be provided.
2. Energy monitoring to be done strictly by conducting energy auditing every year.
3. Every year Environmental Day, Earth Day and Water Day to be celebrated to create awareness about Environment.
4. Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations
5. Lighting system: Replacement of conventional FTL Tubeligh (50 Wat) by energy efficient LED light in class rooms , Laboratories nad faculties cabin have great potential for energy saving.
6. Ceiling fan: Replacement of conventional ceiling fan (50 Watt) by energy efficient star rated fan or BLDC based energy efficient fan (28 Watt) in class rooms, laboratories and faculties cabin have great potential for energy saving.
7. Power factor: The Average Power Factor of the college is 0.86 .So it is recommended to maintain the power factor to 0.999
8. Timer controlled street lights : It is recommended to installation of "Timer control on street lighting" in the collage campus.
9. Motion sensor : It is recommended to installation of motion sensor in faculty cabins, offices toilet and non working areas to conserve energy.









*Built Environment Sustainability & Transformation*