



# GREEN AUDIT REPORT



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Dr. G. T. Thampal  
PRINCIPAL  
Thadomal Shahani Engineering College  
Bandra (W), Mumbai - 400 050.

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## ACKNOWLEDGEMENT

VARSHASOOKT CONSULTANTS Green Audit Team thanks the management of THADOMAL SHAHANI ENGINEERING COLLEGE for assigning this important work of Green Audit. Our special thanks are to:

- Honorable Principal G.T. Thampi.
- Teaching & Supporting Staff of Collage for giving us necessary inputs to carry out this very vital exercise of Environmental Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

The Green audit conducted by the THADOMAL SHAHANI ENGINEERING COLLEGE is an internal audit that aims towards looking after a healthy environment. Though nascent, the initiative is taken up to foster the concept of environmental sustainability. Sincere thanks to all for providing us necessary amenities and co-operation during the audit that helped in making the audit a success.



# GREEN AUDIT

## CERTIFICATE

This is to certify that a "Green Audit" for Thadomal Shahani College of Engineering, Linking Rd, TPS III, Bandra West, Mumbai, Maharashtra 400050, has been conducted in March 2021 to assess the green initiatives planning and efforts implemented in the college **campus like** Green Campus Management. Carbon Footprint, plantations, waste management and rainwater harvesting, conservation of energy. This green audit is also aimed to assess **impact of green** initiatives for maintenance of eco-friendly campus.

**Place: Bandra**

**Date: 12th March 2021**



**Ms. Chitralkha Vaidya**

**(Lead Auditor)**



## 1. EXECUTIVE SUMMARY

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institute which will lead for sustainable development.

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. The methodology included: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and Mapping of Biodiversity. With this background, 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. It can make a tremendous impact on student health and learning Institute operational costs and the environment. The criteria, methods and recommendations used in the audit were based on the identified risks.



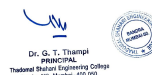
## 2. INTRODUCTION

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Green audit can be a useful tool for an Institute to determine how and where they are using the most energy or water or resources; the Institute can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on 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. Thus, it is imperative that the Institute evaluate its own contributions toward a sustainable future. 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.

1. Green Audit is a systematic approach.
2. Audit is conducted objectively.
3. Auditor obtains and evaluates evidence.
4. Evidence obtained and evaluated by the auditor concerns assertions about economic actions and events.
5. Auditor ascertains the degree of correspondence between assertions and established criteria.
6. Goal, or objective, of the audit is communicating the results to interested users.

### **About the college**

Thadomal Shahani Engineering College (TSEC) is an engineering college in Mumbai, India. Founded in 1983, it is the first and the oldest private engineering institute affiliated with the University of Mumbai. TSEC was founded by the Hyderabad (Sind) National Collegiate Board (HSNC Board) in the year 1983. It is named after one of Mumbai's most respected philanthropists, Dada Kishinchand T. Shahani's father, Thadomal Shahani. The HSNC board is a charitable trust established by the Sindhi Community in 1922. With active support and encouragement from one of Bombay's influential Barrister H.G. Advani, the HSNC Board came into existence in 1949 at Bandra, Mumbai.



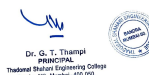
The Late Barrister became the Founder-President, whereas Vidyasagar Principal K.M. Kundnani was the Founder-Secretary and Founder-Principal of the first college started by the board was R.D National College. Since then the Board has been offering unique pre-degree study, undergraduate and post graduate degrees in a wide range of programs. It has produced professionals' par excellence in the fields of Arts, Science, Commerce, Management, Education, Law, Engineering, Technology and Para-Medical

### **Vision**

- Contributing to evolving supply chain of human capital for National Economy
- Creating entrepreneurs and 'game changers' to support heightened level of economic activities underpinning ever increasing human aspiration
- Helping the Nation evolve as a total solution provider
- Value and wealth creation for the mankind

### **Mission**

- Product and processes innovation
- Leveraging human cognitive and behavioural science for creating instructional content
- Pervasive and ubiquitous Information Communication Technologies for customized content for learning
- Acknowledge and facilitate various learning styles and learning abilities
- Migrating from teaching paradigm to learning paradigm
- Every day discourse shall inculcate research culture and further the cause of societal advancement
- Understand various markets and cultures
- Collaborative learning and emotional integrity
- Sensitizing about opportunities in Energy, Education, Environment and Health care sectors
- Extensively promoting computer aided design, analysis and manufacturing procedures



- Theoretical rigor to develop conceptual clarity
- Modelling and design of experiments to inculcate culture of investigation
- Helping foot print on Project management and collaborative human endeavour
- Interdisciplinary studies and exposure to functional areas

#### Other Facilities

- Library
- Seminar Hall
- Laboratory
- Canteen
- Wi-fi and 3G communication enabled campus
- Spacious student lounge

No. of Buildings	2
No. of Floors in Building-1	11
No. of Floors in Building-2	6

### 3. OBJECTIVE OF THE STUDY

The main objectives of the green audit are to promote the environment management and conservation in the Institute campus. The purpose of the audit is to identify. Quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards.

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The „Green Audit“ aims to analyze environmental practices within the Institute campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment.





Later on, it is implemented as a measure to enhance a healthy environment to almost all the organizations. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Green audit is assigned to the criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

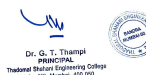
**The main objectives of carrying out green audit are**

To introduce and make aware students to real concern of environment and its sustainability.

To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.

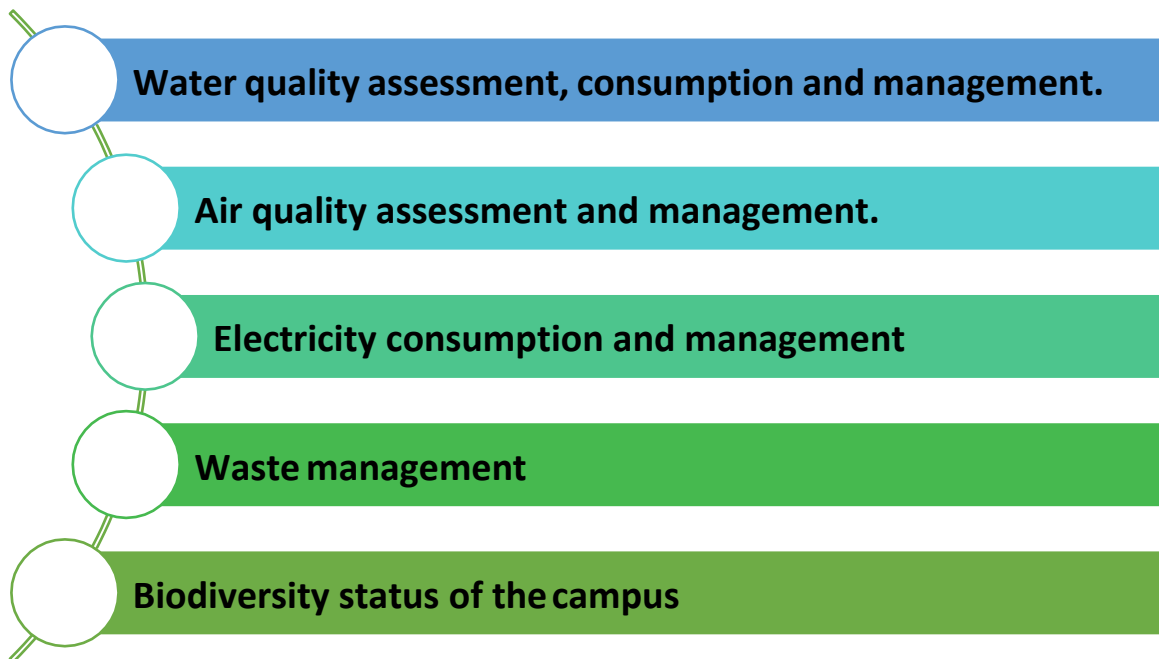
To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost.

To bring out a present status report on environmental compliance.



## 4. METHODOLOGY

In order to perform green audit, the methodology included different techniques such as physical inspection of the campuses, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following area to summarize the present status of environment management in the campuses



The Green Audit taken up by the Thadomal Engineering College had been divided into three stages

## 5. THE PRE-AUDIT STAGE

In the pre-audit stage, meetings provide an opportunity to support the capacity and objectives of the audit and enable discussions on the feasibility associated with the audit. The meeting provides the first opportunity to meet the audit and deal with several practical knowledge and concerns. The meeting provided the chance to gather information that the audit team can study before arriving on the site. The audit procedure and audit plan were handed over at this meeting and discussed in advance of the audit itself. In Thadomal Shahani Engineering College, the planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the Institute management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The Management of the Institute has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus planting more trees on the campus, etc., after the green auditing. The management of the Institute was willing to formulate policies based on green auditing report.

## 6. THE AUDIT STAGE

The Audit Stage encompasses of the team selection and the field works performed. Looking after the unique structure, location and ambiance of the Institute, the Green Audit Team focused on Material Issues pertaining to Institute which have the highest influence on the Green Attributes of the Institute. The Audit stage also focused on the Methodology adopted. Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader. Discussions were made with the college management regarding their policies on environmental management. Future also discussed, the purpose of plans of the college were the green audit was to ensure that the practices followed in the campus in accordance with the Green Policy adopted by the institution.

College and its premises were visited and analysed by the auditor to gather information. Campus trees were counted and identified. Canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were observed.



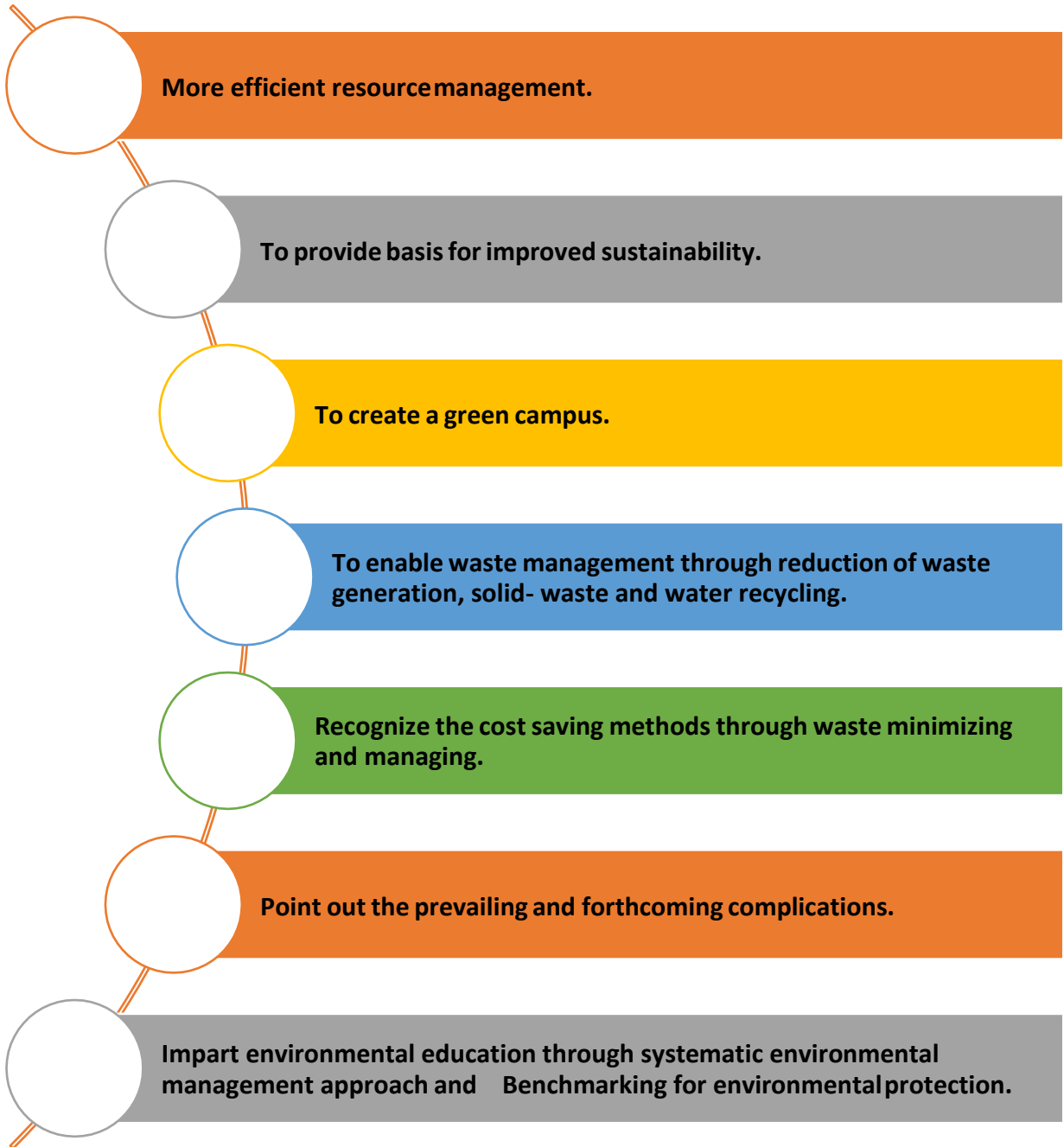
## 7. THE POST AUDIT STAGE

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner. Green audits form a part of a process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. The post-audit stage ensures formulation of Draft findings and sent to management response. Since the audit is done internally, it was important to ensure management approval for the draft. After getting draft approval, the audit team went for final report formulation.



## 8. AUDIT GOALS OF THE INSTITUTE

The Institute, has created green monitoring team that aimed at performing the green audit of the institution. The main objectives of the audit are



## 9. AUDIT FRAMEWORK AND DETAILED FINDINGS

The following audit framework is used for conducting Green Audit in 2021. The framework also lists the findings and observations for every criterion.

Control objective	Control(s)	Audit Observation
<ul style="list-style-type: none"> <li><b>WATER MANAGEMENT</b></li> </ul>	<ul style="list-style-type: none"> <li>Repair sources of water leakage, such as dripping taps.</li> </ul>	<ul style="list-style-type: none"> <li>Regular checking and maintenance of pipelines are done to control Water wastage.</li> </ul>
	<ul style="list-style-type: none"> <li>Encourage to decrease excess water usage.</li> </ul>	<ul style="list-style-type: none"> <li>Though water is used nominal in the Institute, but to ensure a further minimal rate, placards and warnings are not set up in the Institute premise. That must be adopted at every water delivery Point.</li> </ul>
	<ul style="list-style-type: none"> <li>Install water recycling mechanism.</li> </ul>	<ul style="list-style-type: none"> <li>There is no such water recycling mechanism adopted by the college.</li> </ul>
	<ul style="list-style-type: none"> <li>Minimize wastage of water and use of electricity during water filtration process, if used, such as Aqua guard filter</li> </ul>	<ul style="list-style-type: none"> <li>Institute has Aqua guard filter on each floor which gives safe drinking water.</li> </ul>
	<ul style="list-style-type: none"> <li>Rainwater Harvesting project execution</li> </ul>	<ul style="list-style-type: none"> <li>Though Rainwater is collected through underground pipelines, it is recharged to ground water, and it is use for garden purpose.</li> </ul>
<ul style="list-style-type: none"> <li><b>WASTE MANAGEMENT</b></li> </ul>	<ul style="list-style-type: none"> <li>Compost, or cause to be composted, all organic</li> </ul>	<ul style="list-style-type: none"> <li>The Institute has no waste management in college, the municipal collects the waste. Hence, automatic waste composting is strongly</li> </ul>

		<p>recommendation for better waste Management.</p>
	<ul style="list-style-type: none"> <li>• Make full use of all recycling facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Institute does not have any such recycling device to carry on the procedure. Primary segregation is carried out and partly paper, plastic and E waste is sold or shared to local kabadiwalas or few NGOs.</li> </ul>
	<ul style="list-style-type: none"> <li>• Waste, green waste and non-recycled collected from gardens, offices and rooms.</li> </ul>	<ul style="list-style-type: none"> <li>• Compost plant that ensures proper treatment of all organic wastes. However, it is absolutely primary processing. Better and scientific Treatment is expected.</li> </ul>
	<ul style="list-style-type: none"> <li>• Recycle or safely dispose of dry wastes, computers and electrical appliances.</li> </ul>	<ul style="list-style-type: none"> <li>• Recycle or safely dispose of dry wastes, computers and electrical appliances is done at primary level is done. E waste is not given to any authorized E waste recyclers.</li> </ul>
	<ul style="list-style-type: none"> <li>• Provide sufficient, accessible and well-publicized collection points for recyclable waste, with responsibility for recycling clearly allocated</li> </ul>	<ul style="list-style-type: none"> <li>• The Institute has set up separate two bins on each floor to ensure proper segregation and collection of the various wastes. The responsibility of recyclable waste is however still not taken up by the Institute</li> </ul>
	<ul style="list-style-type: none"> <li>• Dispose all waste, whether solid or otherwise, in a scientific manner and ensure that it is not released directly to the environment</li> </ul>	<ul style="list-style-type: none"> <li>• Yes, the Institute is trying to dispose all wastes, whether solid or otherwise, in a scientific manner and ensure that it is not released directly to the environment; however, there is a lot of scope for improvement in current waste handling methods.</li> </ul>



<ul style="list-style-type: none"> <li><b>GREEN CAMPUS</b></li> </ul>	<ul style="list-style-type: none"> <li>Encourage the faculties and students to plant trees in the garden.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage the faculties and students to plant trees in the garden. Existing plantation is not marked properly. However, more plantation can be adopted with more native trees.</li> </ul>
	<ul style="list-style-type: none"> <li>Establish a Garden in the campus</li> </ul>	<ul style="list-style-type: none"> <li>Institute already has a well-Maintained garden.</li> </ul>
	<ul style="list-style-type: none"> <li>Disposal of the chemical waste generated from the laboratories in a scientific manner</li> </ul>	<ul style="list-style-type: none"> <li>There is no as such treatment is given to the laboratories waste generated.</li> </ul>
	<ul style="list-style-type: none"> <li>Minimize the use of fertilizers and Pesticides in Institute ground &amp; garden.</li> </ul>	<ul style="list-style-type: none"> <li>Moderate amounts of bio-fertilizers are used in the Institute.</li> </ul>
<ul style="list-style-type: none"> <li><b>ENERGY MANAGEMENT</b></li> </ul>	<ul style="list-style-type: none"> <li>Look in to the possibility of on-site micro-generation of renewable electricity.</li> </ul>	<ul style="list-style-type: none"> <li>Institute has installed Solar wall Lights.</li> </ul>
	<ul style="list-style-type: none"> <li>Give preference to the most energy efficient and environmentally sound appliances available, this includes only using energy-saving light bulbs</li> </ul>	<ul style="list-style-type: none"> <li>The Institute is using LED lights as much as practicable as well as CFL.</li> </ul>
	<ul style="list-style-type: none"> <li>Ensure that all cleaning products used by Institute staff have a minimal detrimental impact on the environment, i.e. are biodegradable and non-toxic</li> </ul>	<ul style="list-style-type: none"> <li>Negligible amounts of washing liquids are used in the Institute and all the toilet cleaners are eco-friendly</li> </ul>



**Fig.1 Solar Wall Lights**



## Green Campus:

Total number of plants in the campus- 26

- **New Building**

Particulars	Quantity
Almond	1
Java Plum	1
Mango	2
Ashoka	1
Goose Berry	1
Chikoo	1
Peepal	1
Curry Patta	1
<b>TOTAL</b>	<b>09</b>

- **Old Building**

Particulars	Quantity
Almond	2
Peepal	1
Coconut	3
Java Plum	1
Mango	2
Ashoka	8
<b>TOTAL</b>	<b>17</b>



## Water Management

The source of water used in the college are municipal water supply.

Sr.No.	Parameters	Response
1	No of wells	Nil
2	No of water tanks	8
3	Any wastage/why	Nil
4	Water used for gardening	1000 cu.mt.
5	Waste water sources	Canteen, washrooms
6	Rain water harvest available?	Yes
7	Any leaky taps?	Nil
8	Amount of water lost per day	Nil

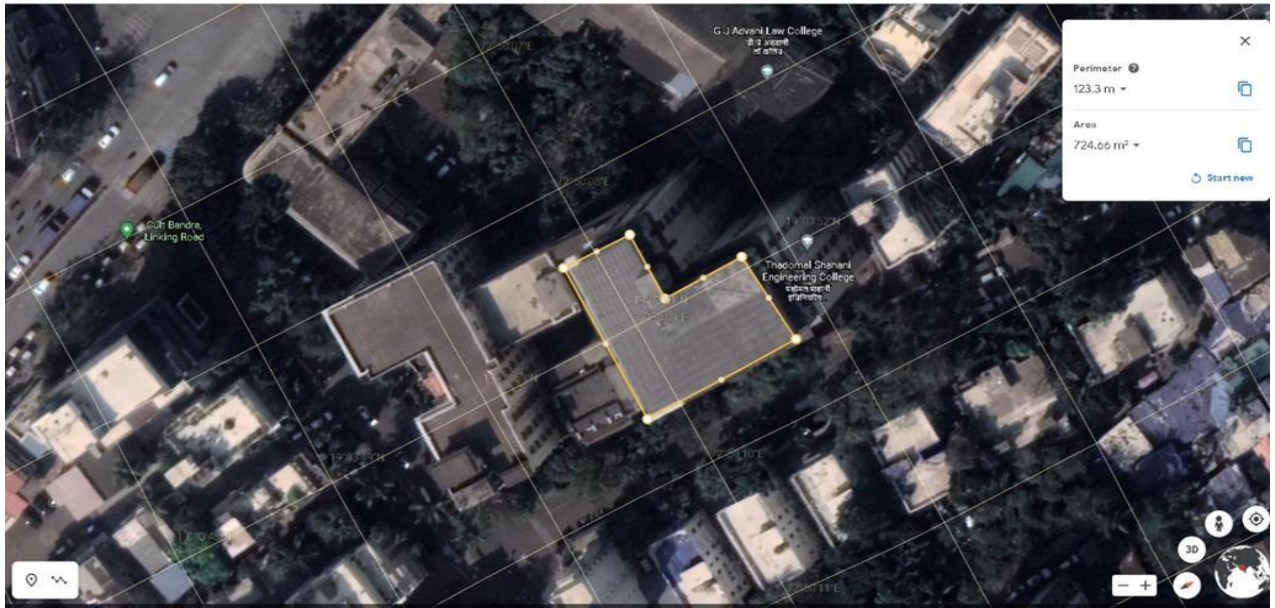
## Waste management

Waste management is important for an eco-friendly campus. In a college, different types of wastes are generated, its collection and management are very challenging. The following data provide the details of the waste generated and the disposal method adopted by the college.

Types of waste	Particulars	Disposal method
E-Waste	Computers, electrical and electronic parts	Pick up by municipal corporation
Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.	Pick up by municipal corporation
Solid wastes	Damaged furniture, paper waste, paper plates	Pick up by municipal corporation
Waste water	Washing, urinals, bathrooms	Municipal sewer line
Food waste	Food waste from canteen	Pick up by municipal corporation

# 10. THADOMAL ENGINEERING COLLEGE LOCATION

- **New Building**



- **Old Building**



[Type here]



## 11. SUGGESTIONS AND RECOMMENDATIONS

A few recommendations are added to curb the menace of all management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of green campus and thus sustainable environment and community development. It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to management of the campus.

### CRITERIA WISE RECOMMENDATIONS

#### Green Campus

- All trees in the campus should be named scientifically and name should be placed on each tree.
- Not just celebrating environment day but making it a daily habit.
- Beautify the college building with indoor plants.
- Providing funds to the any Nature Club for making campus greener.
- Encouraging students not just through words, but through action for making the campus green.
- Conducting competitions among departments for making students, teaching-non teachingstaffs more interested in making the campus greener.
- In order to increase the carbon credit and greenery of the campus, it is recommended to plant more indigenous and Fruit and medicinal plants species inside the campus like Guava, Amla, Kaju, Tulsi, Alovera and Ashvagandha.

#### Water management

- The college should arrange awareness programs for water conservation. The campaign should be on proper monitoring of water consumption patterns in the campus and can alsoconduct water quality monitoring during specific intervals.
- Install display boards to control over exploitation of water.



## **Energy management**

- The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances(for example five stars rated Air conditioner) in the college. The potential of renewable energy sources has to be explored. As the college has a very large roof area for installing solar panels so that it can be effectively used for generating power.
- It is recommended to install the following solar powered appliances in the campus;
- Solar powered water heater and cooker in the college canteen.
- Solar powered street lights and LED display board.
- Observe a power saving day every year
- Conduct more save energy awareness programs for students and staff.
- Use energy efficient light-emitting diode (LED) bulbs instead of incandescent and CFL bulbs
- Maintain appliances and replace old appliances.
- Use computers and electronic equipment in power saving mode.

## **Waste management**

- Try to avoid the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Ban on single use plastic such as carry bags, food packaging, bottles, straws, containers, cups and cutlery. Instead use steel plates. Avoid using paper cups and plate too.
- Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.
- Recycle the paper waste instead of incinerate or burning.
- Practice of waste segregation to be initiated.
- Establish a functional bio gas plant.



## Carbon footprint

- Increase a system of car-pooling among the staff to reduce the number of four wheelers coming to the college.
- Introduce college bus services to the students and staff members.
- Encourage students and staff member to use public transport as possible.
- Establish a more efficient cooking system to save gas.
- College observe “no own vehicle day” every month. The any day of every month must be dedicated for it. Teachers and students are not allowed to take their private vehicles on that day and are supposed to reach college via public transportation methods. The no own vehicle day is widely accepted among students and teachers and is hugely appreciated by the community.
- College also can promote car and bike pooling system. Teachers/ students coming from the same area share their vehicles to reach the college. This also reduces the number of private vehicles used in the college campus



## 12. CONCLUSION

The green audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college. The green audit reports assist in the process of attaining an eco-friendly approach to the sustainable development of the college. A green audit report is a very powerful and valuable communications tool to use when working with various students who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur. The audit has identified several observations for making the campus premise more environment friendly. The recommendations are also mentioned with observations for campus team to initiate action. The audit team opines that the overall site is maintained well from environmental perspective, certain changes if implemented the college will be benefited by various environmental ways.

### **The audit was conducted to check following aspects**

- More efficient resource management.
- Provide basis for improved sustainability.
- Creating a green campus.
- Enable waste management through reduction of waste generation, solid- waste and water recycling
- Recognition of the cost saving methods through waste minimizing and managing.
- Point out the prevailing and forthcoming complications.
- Impart environmental education through systematic environmental management approach and Benchmarking for environmental protection.

Allow targets are fairly achieved in executed green audit report.



## Amenities at College



- Entrance of Old Building



- Dustbins in backyard of College, which pick up by BMC



- Parking area in the campus



- Fire extinguisher on each Floor





- Two Separate Dustbins on each floor



- Electrical room in the college



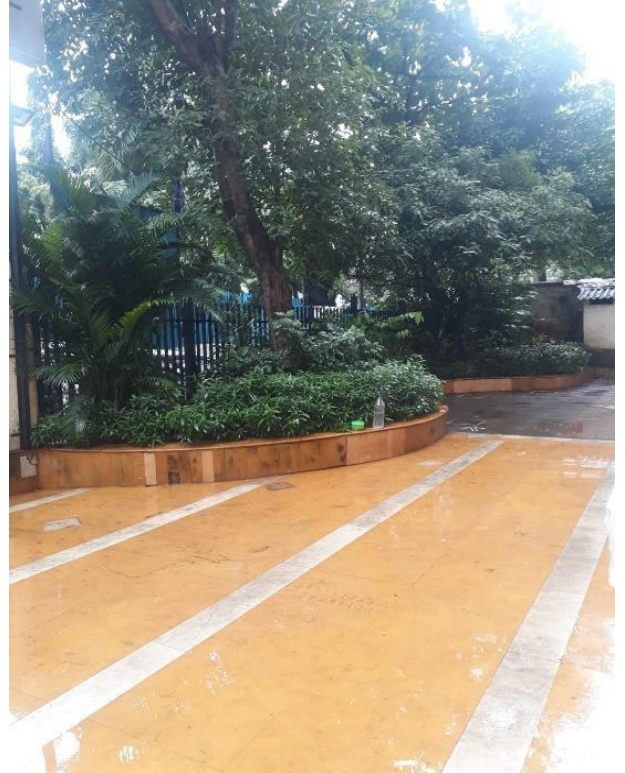
- Aqua gaurd filter on each floor



- Library in the college



- Fire Hose Box to extinguish fire in the campus



- Planted trees in campus



- Computer Lab



- Biotech Laboratory