



Nature Adobe Systems  
Environment Management System

**GREEN / ENVIRONMENT  
AND  
ENERGY AUDIT REPORT**

**of**

**RANI LAXMIBAI MAHAVIDYALAYA, PAROLA.**

(February 2023)  
Prepared by



Nature Adobe Systems  
Environment Management System

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## 1. About the College

The Rani Laxmibai Mahavidyalaya, Parola was established in June 1992 under the Rani Laxmibai Mahavidyalaya Education Trust, Parola. The Rani Laxmibai Mahavidyalaya Education Trust is a profound educational movement offering quality education since the last 31 years to rural and tribal students of this region. The Rani Laxmibai Mahavidyalaya, Parola. (Dist. Jalgaon), Maharashtra is in the rural and tribal area of Maharashtra. The college works with a clear vision to be a preeminent institute which brings out the best amongst students. The college is affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon (Maharashtra)



The Green Auditor Team came to the location.



## 2. Introduction

The green audit aims to analyse environmental practices within and outside the Institute campuses, which will have an impact on the eco-friendly atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of Institute environment. The environment pollution, inefficient use of resources, improper waste management, climate change, degradation of ecosystems and loss of biodiversity this has led organizations to adopt a systematic approach to environmental management by implementing environmental management systems in the organizations.

Environmental auditing is a process whereby an organization's environmental Performance is tested against its environmental policies and objectives set by Government of India. Intention of Green audit is identifying the effects of its practices on the Environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus. On this background it becomes essential to adopt the system of the Green Campus for the institute. The environmental auditor appropriately monitors the system for safe disposal of waste in the Institutes to ensure the safety of the natural resources.

Nature Adobe System (Environmental and Energy Auditor) observed the college premises on month of **13/02/2023** for Audit. Prior to Audit, team prepared questionnaire and checklists. During the audit, the team visited entire college campus i.e., classrooms, library, washrooms, seminar hall, staff rooms, administration office, department, Practical labs etc. During the audit the institute was functioning normally. A systematic approach to environmental management can provide management the information to build success over the long term and create options for contributing to sustainable development by

1. Protecting the environment by preventing adverse environmental impacts.
2. Studying the potential adverse effect of environmental conditions on the organization.
3. Assisting the organization in the fulfilment of compliance obligations.



4. Determine how well the environmental management information systems and equipment are performing.
5. Minimize human exposure to risks from environmental, health and safety problems.

### **3. Methodology for Environmental Impact Assessment**

Environmental Impact Assessment (EIA) is a systematic process to identify, predict and evaluate the environmental effects of proposed actions to aid decision making regarding the significant environmental consequences of project on environment.

To perform green audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation, and review of the greenery, interviewing key persons and recommendations. It works on the several levels of 'Green Campus' includes Water Conservation, Water management, Energy Conservation, Tree Plantation & Waste Management, E-waste management, Green area management, Paperless Work etc. The specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability. It can make a tremendous impact on student health and learning environment.

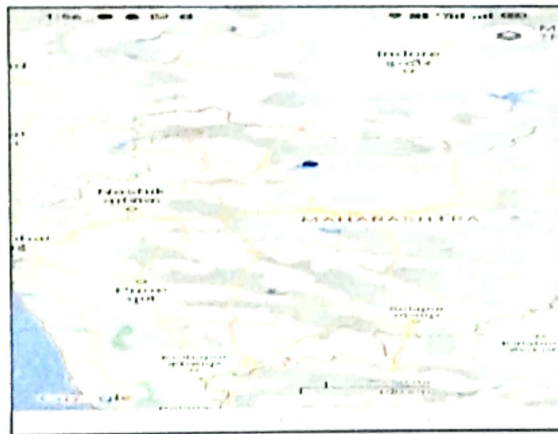
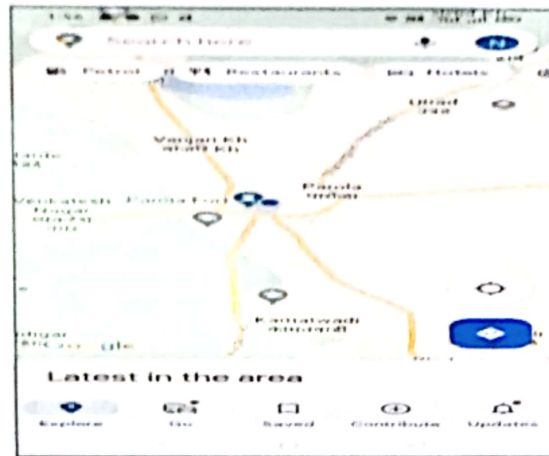
### **4. Scope and Goals of Green Auditing**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of everyone who are the part of economic, financial, social, environmental factor. It is necessary to conduct green audit in college campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus, Green audit becomes necessary at the college level. The intended outcome of an environmental management system includes,

1. Enhancement of environmental performance.
2. Fulfilment of compliance obligation.
3. Achievement of environmental objectives.

## 5. Location for Green Audit

Rani Laxmibai Mahavidyalaya, Parola. The total built area of college is around 14800 sq. meter. Total a campus of 55/65 acres. The approach road is busy as it's a side by National highway and there is considerable traffic. The land use of the area is mainly institutional and residential.



RLM Geographical location

## 6. Green Audit Procedural Steps

The Green Audit Procedural Steps covered 14 major areas, which were further divided into subareas. The compliance was checked in following areas and assessment is done by using different assessment tools, like Visual inspection, Questionnaires, Check list.

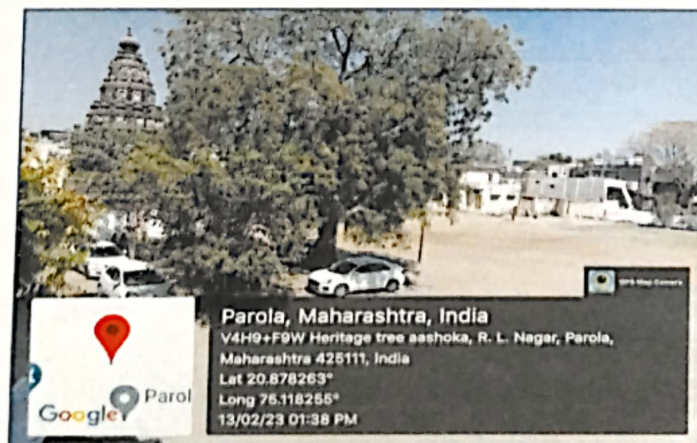
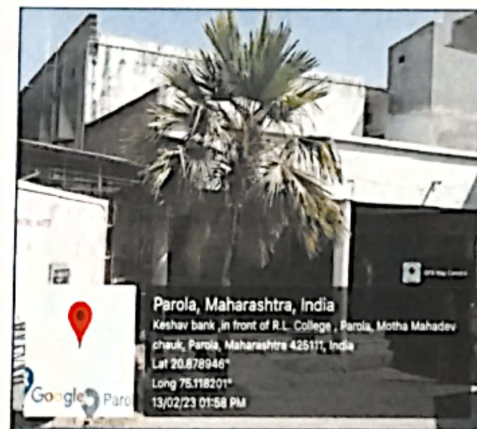
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- Water Efficiency
- Rainwater Harvesting
- Indoor Air Quality
- Temperature and Acoustic Control
- Wastewater Management
- Paper Waste Management
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- Solid Waste Management
- Liquid Waste Management
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- Rain Water Harvesting
- Green Belt
- Botanical Garden
- Green Programs (Green initiatives)
- Energy Efficiency

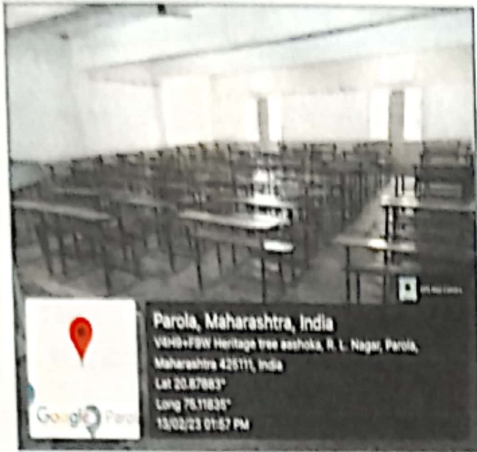


## 7. Good day light Design and Ventilation

Well ventilated classrooms with wide doors and large glass windows. However, the windows are closed to avoid noise.

- Corridors are wide with high ceiling.
- Light coloured curtains are provided on the windows to avoid glare, but it allows the sunlight.
- LED tube lights are provided in the classrooms & corridors, which save electricity.
- Classrooms have fans, which help in ventilation.
- Washrooms have windows to disperse heat, fumes and odours.



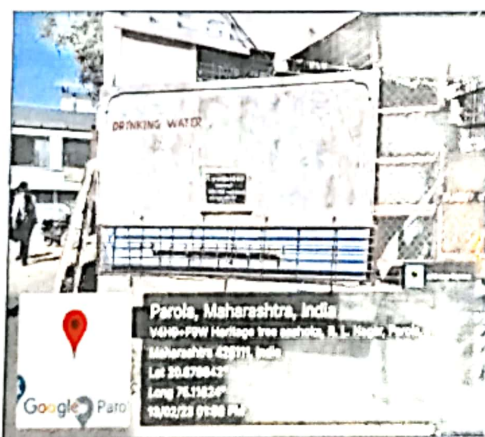


## 8. Water Efficiency

The main source of water is Boar well to the institute. Water used in institute for many purposes like drinking, flushing, cleaning the toilets, and in various labs are chemistry, Botany and Zoology.

Major observation during the audit is listed below:

1. Each floor has drinking water coolers with water purifiers.
2. Water is used for toilet flushing.
3. Water is used for floor cleaning. (Mops are used for floor cleaning)
4. Wash basins are provided with well working conditions.
5. In all water coolers eco-friendly refrigerants are used.
6. No leaking faucets were seen anywhere. If water leakage is observed, maintenance department is called immediately to attend to the complaints.
7. Rainwater harvesting, a sustainable source of water, is practiced.





## 9. Indoor Air Quality

Indoor Air Quality (IAQ) refers to the air quality within and around buildings & structures, and it relates to the health and comfort of building occupants. Some common indoor pollutants are listed below:

1. Ammonia- Produce at the time of chemistry practical.
2. Hydrogen Sulphide- Produce at the time of reaction.
3. Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels.
4. Carbon dioxide – Due to human respiration
5. Particulate matter – Due to construction and maintenance activities

It is observed that Institute has

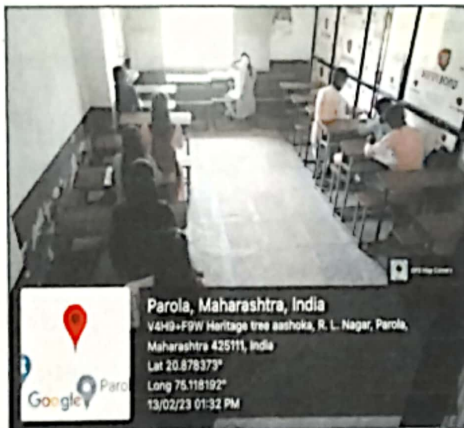
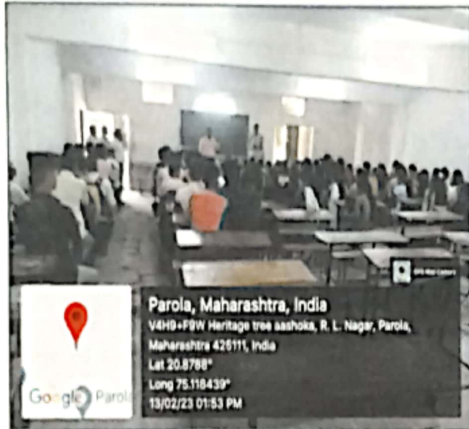
- a) Washrooms are without exhaust fan.
- b) More Indoor plants are needed in the entire campus.



## 10. Temperature and Acoustic Control

It is observed that Institute has

1. White-washed rooms & passages improve the lighting conditions.
2. Acoustic control walls are provided in seminar hall and meeting rooms, which are designed to minimize the exposure to sound .



## 11. Wastewater Management

Major observations under wastewater management are listed below:

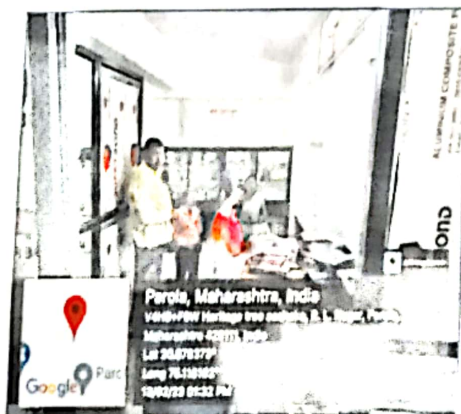
1. Sanitary wastewater generated from washrooms is connected to the main channel and that main channel is connected to the ground water recharge tank.
2. Wastewater generated from college is also connected to the sewerage system.
3. In addition, wastewater is generated from chemical lab which is also connected to sewerage system.

## 12. Paper Waste Management

The institution has taken steps to minimize and avoid paper usage because, waste paper is the main solid waste generated in the premises of institution.

It was observed that:

1. Many official processes such as sanctioning the leave, accounting etc. are made paper less and use of technology is promoted. As per the policy of Government of Maharashtra.
2. All communication with all departments and internal notices are majorly through E mail & SMS.
3. Prints and photocopies are taken on both sides of the pages to avoid excess paper usage.
4. Important paper notices are displayed on the notice boards as well as communicated through bulk sms services available in our institution, all students and faculty members are informed through it.
5. Library using Microsoft software. Library database gives detailed information about library books. Several thousand e-books are also available. It is help to reduce paper waste.

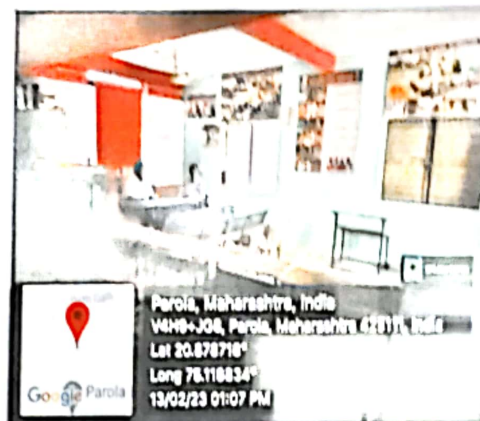
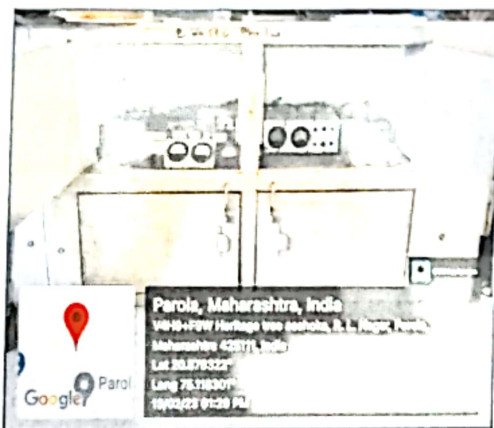




### 13. E-Waste Management

It was observed that:

1. E- Waste is collected and resold to the retailers who contact the college and thus the college ensures recycling.
2. Electrical waste like damaged electrical board, switches, cut wires are collect by electrician and replace this with new one and remaining wastage is sold as scrap.
3. Electrical waste related to computer, key boards and mouse is collected for repairing and replaces the damaged one and remaining wastage is sold as scrap.



### 14. Solid Waste Management

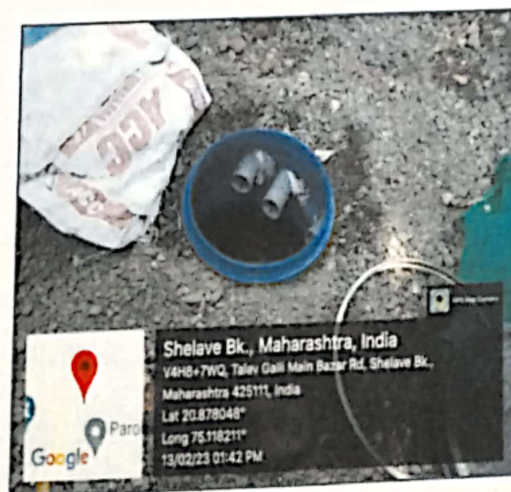
Solid waste management at the college level involves managing the waste generated by students, staff, and faculty on campus. This waste includes food waste, paper, plastics, and other materials. Effective solid waste management is critical to reducing the environmental impact of the college and promoting sustainability.

It was observed that

1. The combined waste is directly handed over to Waste collector van of Municipal Corporation.
2. Composting: Colleges can also compost food waste, yard waste and other organic materials to produce fertilizer for gardens and landscaping.
3. Waste reduction: Colleges can reduce waste by using digital documents instead of paper, encouraging reusable water bottles, and promoting a culture of sustainability.

4. Hazardous waste management: College should also properly dispose of hazardous waste, such as batteries and chemicals to prevent environmental damage.
5. The biodegradable waste is subjected for processing by vermi- composting in collaboration with Municipal Corporation.
6. Separate bins are provided for wet biodegradable and dry recyclable waste.
7. Education: College should educate students, staff, and faculty on the importance of Solid waste management and how they can help to reduce waste and promote sustainability.
8. Vermicomposting - Vermicomposting is the process of using worms to break down organic waste into nutrient-rich compost. It is a sustainable and environmentally friendly way to manage organic waste, and it can be a great topic to explore in a college-level setting. Build a vermicomposting system: Students could work together to design and build a Vermicomposting system. They could experiment with different bedding materials, food sources, and worm populations to see how they affect the composting process.

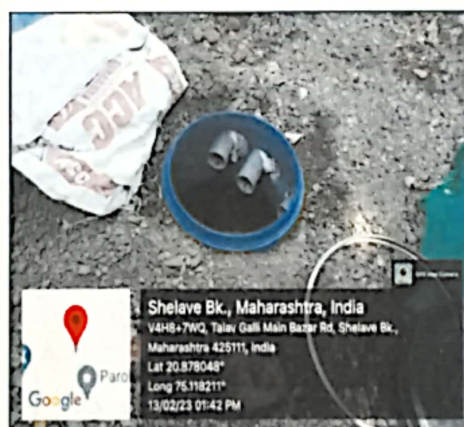
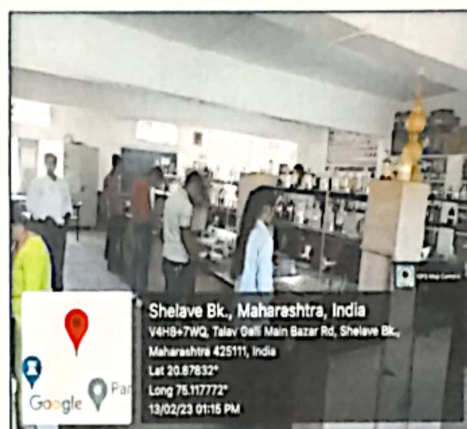
Overall, solid waste management at the college level is an essential aspect of promoting sustainability and reducing the environmental impact of higher education institutions





## 15. Liquid Waste Management

1. Liquid waste from the Chemistry, Botany and Zoology laboratories is processed as per the guidelines.
2. Dripping and leaking taps are repaired time to time for effective use of water,
3. Processed water is used for garden and maintenance of lawn.



## 16. Universal Access and Efficient Operation and Maintenance of Building

1. There is wide and easy access to the institute from the main road.
2. Ramp facility is available for differently abled individuals



3. Since the access and staircases are wide and free from clutter, it is possible to have a safe evacuation in case of emergency.
4. Handrails are provided on one side of staircase for safety.
5. There are wide windows
6. Fire extinguishers and fire hydrants are provided for emergency.



## 17. Rain Water Harvesting

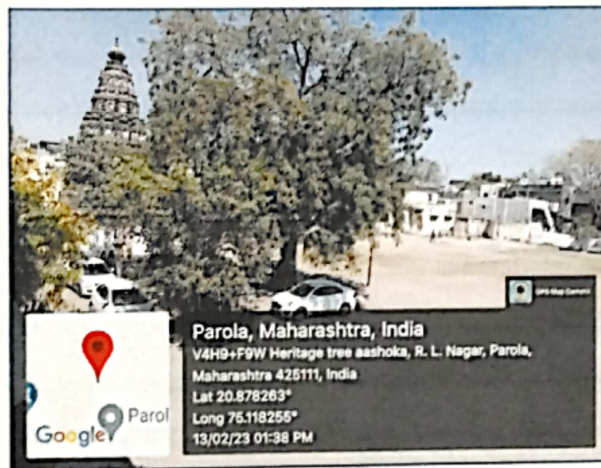
Rainwater harvesting is a process of collecting and storing rainwater for later use. It is a sustainable and environmentally friendly way to conserve water resources, and it can be a great topic to explore in a college-level setting. Rainwater harvesting facility is available in college for recharge of ground water. The college building design has provision for collection of rainwater. The building design includes PVC piping at various points. The rainwater is carried through the pipeline and discharged in the concealed underground well dug back side of the college building. The rainwater is discharged in big soak pit at the back side of the college building. It is filled of pebbles, stones and fully covered (contrary to an open well for example). The water percolates slowly because there is no hydrostatic pressure in the pit. The covered soak pit also provides extra space for student parking. The rainwater harvested thus helps to recharge the ground water. A groundwater by recharging the underground aquifers.





## 18. Green Belt

College has a wide campus, there is much space available for landscaping other than for plants near compound walls. The faculty and the student proactively worked in the Swachh Bharat Abhiyan. Students organized several rallies, media campaigning, clean campus drive etc. A college campus green belt is an area on a college campus that is set aside for preserving and promoting natural habitat, biodiversity, and ecological sustainability.



## 19. Botanical Garden

The botanical garden of the institute comprises of a very large area.

Local Flora is recorded in the Botanical Garden. Overall, recording the local flora in a botanical garden is an important function that helps promote conservation, education, research, and horticulture, and can help protect and preserve native plant species for future generations. A botanical garden is a collection of plants that are grown and maintained for scientific, educational and aesthetic purposes. It can be a valuable resource for a college, providing a living laboratory for students and faculty to study plants and ecosystems.

A botanical garden can be a means for a college, providing opportunities for teaching, learning, and research with careful planning and management, a botanical garden can thrive and become a source of pride and inspiration for the campus community.

Here are some specific ways that a botanical garden can be used at the college level:

**Teaching:** A botanical garden can be used as a teaching tool in a variety of courses, including botany, environmental science, horticulture, and landscape design. Students can study plant anatomy, physiology, ecology, and taxonomy in a hands-on, experiential way.

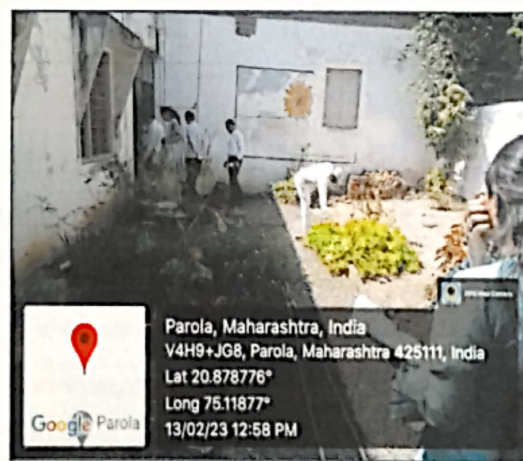
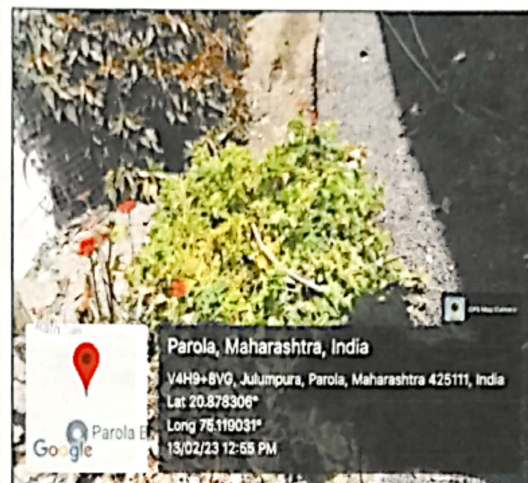
**Research:** A botanical garden can be used for research projects in a variety of fields, including plant taxonomy, plant Morphology, ecology, conservation, and sustainability. Faculty and students can conduct research on topics such as plant adaptation, biodiversity, ecosystem services, and plant-animal interactions.

**Horticulture:** A botanical garden can be used to teach and practice sustainable horticultural techniques such as organic gardening, companion planting, and pest management. Students can learn how to propagate plants, design gardens, and maintain landscapes using environmentally friendly practices.

**Aesthetic value:** A botanical garden can enhance the beauty and aesthetic value of the college campus, creating a welcoming and attractive environment for students, faculty, and visitors.



Overall, a botanical garden can provide numerous educational, research, and outreach opportunities for a college, while also promoting environmental stewardship and enhancing the campus environment. By incorporating a botanical garden into the college curriculum and engaging with the local community, a college can use this valuable resource to promote learning, research, and sustainability.



List of Plants that were present in college campus:

Sr.no.	Botanical Name of Plant	Family	Vernacular Name
1.	<i>Musenda erythrophylla</i>	<i>Rubiaceae</i>	Red flag bush
2.	<i>Ixora coccinia</i>	<i>Rubiaceae</i>	<i>Ixora</i>
3.	<i>Justicia adhatoda</i>	<i>Acanthaceae</i>	<i>Vasaka/Adulsa</i>
4.	<i>Combretum indicum</i>	<i>Combretaceae</i>	<i>Rangoon creeper</i>
5.	<i>Spathodia companulata</i>	<i>Bignoniaceae</i>	<i>Fountain tree</i>
6.	<i>Murraya paniculata</i>	<i>Rutaceae</i>	<i>Pandhari</i>
7.	<i>Plumeria alba</i>	<i>Apocynaceae</i>	<i>Chafa/Temple tree</i>
8.	<i>Adenium obesum</i>	<i>Apocynaceae</i>	<i>King of desert</i>
9.	<i>Catheranthus roseus</i>	<i>Apocynaceae</i>	<i>Periwinkle</i>
10.	<i>Saraca asoca</i>	<i>Fabaceae</i>	<i>Ashoka</i>
11.	<i>Clitoris turnatia</i>	<i>Fabaceae</i>	<i>Gokarn.</i>
12.	<i>Jatropha podagrica</i>	<i>Euphorbiaceae</i>	<i>Gout plant</i>
13.	<i>Acalypha indica</i>	<i>Euphorbiaceae</i>	<i>Acalypha</i>
14.	<i>Hypenoclis litoralis</i>	<i>Amaryllidaceae</i>	<i>lily</i>
15.	<i>Canna indica</i>	<i>Cannaceae</i>	<i>Kardali</i>
16.	<i>Withania somnifera</i>	<i>Solanaceae</i>	<i>Ashwagandha</i>
17.	<i>Asperagus racemosus</i>	<i>Liliaceae</i>	<i>Shatavari</i>
18.	<i>Jasminum sambac</i>	<i>Oleaceae</i>	<i>Jasmine</i>
19.	<i>Bougainvelia spectabilis</i>	<i>Nyctaginaceae</i>	<i>Paper flower</i>
20.	<i>Tradescantia spathacea</i>	<i>Commelinaceae</i>	<i>Rheo Plant</i>
21.	<i>Casuarina equisetifolia</i>	<i>Casurinaceae</i>	<i>Jangali Suru</i>
22.	<i>Rosa indica</i>	<i>Rosaceae</i>	<i>Rose</i>
23.	<i>Sansivera cylindrica</i>	<i>Asparagaceae</i>	<i>Snake plant</i>
24.	<i>Hibiscus rosa sinensis</i>	<i>Malvaceae</i>	<i>Jaswand</i>

## 20. Green Programs (Green initiatives)

Green programs conducted by colleges are initiatives taken by educational institutions to promote environmental sustainability and reduce their carbon footprint. These programs aim to educate students, faculty, and staff about sustainable practices and encourage them to adopt eco-friendly habits. Some examples of green programs conducted by colleges include:

**Plastic Free Campus:** Use of plastic is prohibited in the campus. Accordingly, the Principal and Staff of college has undertaken several green initiatives and the campus is declared as Plastic free campus.

**Environmental education programs:** The College tries to educate the students through the environmental course and counselling to prevent the use of plastic. The students willingly participate in "No to Plastic" campaign.

**Use of Bicycle:** Nowadays, environmental consciousness is growing among the students. As a result, there are increasing numbers of students and staff members who prefer using bicycles.

**Transportation programs:** Colleges can promote sustainable transportation options such as biking, walking, or carpooling to reduce greenhouse gas emissions.

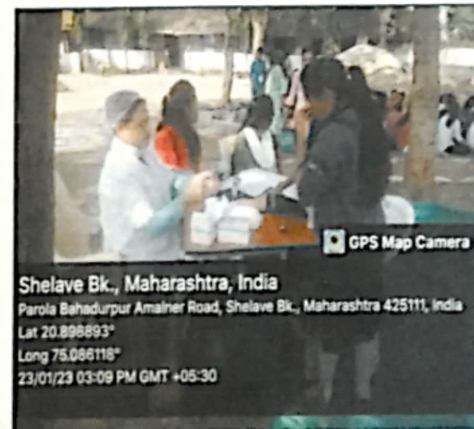
**Pedestrian friendly roads** - Students, staff were using pedestrian road.

**National Service Scheme (NSS)** - National Service Scheme aims to include social welfare in students and to provide service to society without bias. NSS volunteers take care of blood donation camp, cleanliness, health awareness issues and any other activities.

1. The NSS unit of the college initiated a village adaption initiative.
2. Tree plantation programs were carried out by staff & students every year.
3. Under NSS, students have participated in 'Swachh Bharat Abhiyaan'
4. NSS conduct Student rallies for awareness about cleanliness in public.
5. Every week college celebrate non vehicle day

Overall, these green programs can help colleges reduce their environmental impact and promote a culture of sustainability among students, staff, and the wider community.





## 21. Energy Audit

An energy audit is an evaluation of how energy is used in a building or facility, with the goal of identifying opportunities to increase energy efficiency and reduce energy costs. The audit typically involves a thorough examination of the building's energy consumption patterns, as well as a review of its energy-related systems and equipment. An energy audit at the college level involves a systematic review of a college's energy consumption and efficiency to identify areas for improvement. The goal of an energy audit is to identify opportunities for reducing energy use and cost while maintaining or improving the quality of services provided by the college. Here are some steps to conduct an energy audit at the college level:

The process of conducting an energy audit for a college typically involves the following steps:

**Planning:** The first step in the energy audit process is to develop a plan that outlines the scope of the audit, the goals and objectives, and the timeline for completing the audit.

**Data Collection:** The auditor will collect data on the college's energy consumption patterns, including utility bills, building plans, and equipment specifications. This may involve reviewing historical energy data, conducting interviews with facility managers, and conducting on-site measurements of energy use.

**Site Inspection:** The auditor will conduct a visual inspection of the college's buildings and equipment to identify areas of energy inefficiency. This may involve inspecting HVAC systems, lighting, insulation, windows, and other building systems.

**Analysis:** The auditor will analyse the data collected and the findings from the site inspection to identify opportunities for energy savings. This may involve using computer modelling software to simulate energy usage and identify potential energy-saving improvements.

**Recommendations:** The auditor will develop a report that outlines recommendations for energy efficiency improvements, including low-cost and no-cost measures, as well as more significant capital investments. The report may also include a financial analysis of the potential energy savings and return on investment for each recommendation.

**Implementation:** Once the energy audit report has been completed, the college can begin implementing the recommended improvements. This may involve retrofitting buildings with energy-efficient lighting and HVAC systems, upgrading insulation, and improving building automation and control systems.

**Monitoring:** The final step in the energy audit process is to monitor energy consumption and track the results of the implemented improvements. This will help to ensure that the college is achieving the desired energy savings and identify any additional opportunities for energy efficiency improvements.

Overall, an energy audit can provide valuable information and insights into a building's energy usage patterns, and can help building owners and managers identify opportunities to reduce energy costs and improve energy efficiency.

## 22. Energy Efficiency

The areas of major consumption of electricity are:

It is observed that Institute has

1. The total number of computers available in the college are 30 in working Condition.
2. LED Lights, Tube lights, CFLS light, and fans, Table fan, Exhaust fan – approximately 4, 72, 5 and 70 , 9 , 5 nos. respectively.
3. The design of buildings assures maximum usage of natural light and air to save electricity.
4. It was observed that windows with curtains are provided in classrooms, labs, faculty room, and seminar halls, which allow natural sunlight and in turn, leads to electricity conservation.
5. The classrooms are spacious and have large windows which allow all time fresh air to move in and out and thus it requires minimum electricity.
6. LED lights are provided in the campus which are eco-friendly and consume less energy. LED lights can save energy up to 75% and they are 25 times durable than incandescent lights.
7. The college has naturally ventilated building.



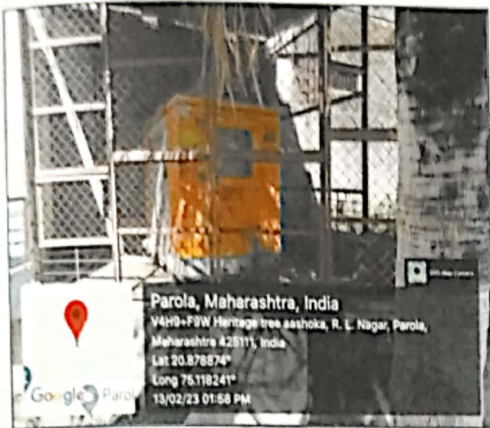
8. Institute ensure that there is no wastage of electricity as they keep check after classes/lectures are over and office hours end.
9. Use signage encouraging users to switch off light and fans to save electricity.
10. Use posters near electrical switches will help in making students responsible for conservation of electricity.
11. Most of places, sign board of 'Switch ON' and 'Switch OFF' are kept towards saving energy.
12. Electrical wires, switch boxes and stabilizers are properly covered without any damage which will cause any problems to the staff and student members.
13. Best Energy Conservation Practices followed in the Organization.
14. D G SETS: There is a DG set available in the college of capacity 14 kVA for in house generation of electricity. As the power supply is very good in the area so the running hour of DG set is very less.
15. Solar panels installation: College has their own solar panel system. Solar panels are devices that convert sunlight into electrical energy using a process called the photovoltaic effect. Solar panels are made up of multiple photovoltaic cells that are connected together to form a solar panel.

Solar panels can be installed on the rooftops of buildings, on the ground, or even in space. They are a popular source of renewable energy because they do not emit greenhouse gases, have no moving parts that can break down, and require very little maintenance.

The amount of electricity that a solar panel can produce depends on factors such as the size and efficiency of the panel, the amount of sunlight that it receives, and the temperature. Solar panels are typically rated in watts, which indicates the amount of power that they can produce under standard test conditions.

Overall, solar panels are a clean and sustainable way to generate electricity, and they are becoming increasingly popular as the technology becomes more efficient and cost-effective.

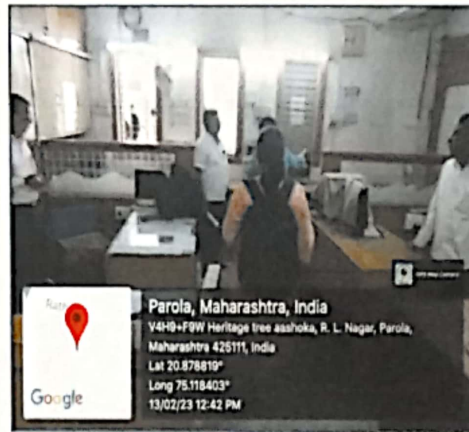




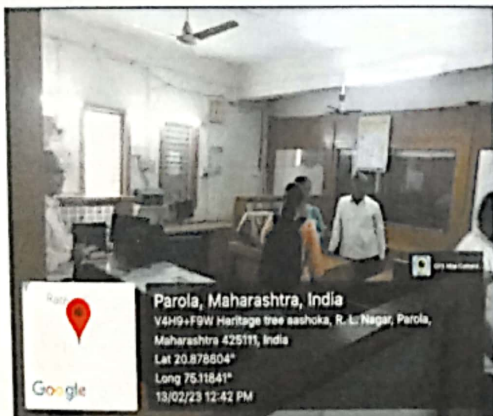
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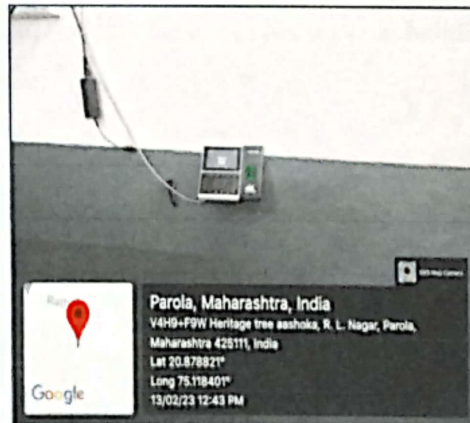
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## 23. Energy Consumption:

College campuses can consume significant amounts of energy, as they typically have multiple buildings, large facilities such as laboratories, and high levels of occupancy. Here are some of the areas where energy is typically consumed on college campuses:

**Lighting:** Lighting is another significant source of energy consumption on college campuses. Many buildings on campus have large numbers of lights that need to be powered, and lighting can be left on in unoccupied rooms.

**Electronics and Appliances:** College campuses typically have a large number of electronics and appliances, including computers, printers, and laboratory equipment. These devices can use significant amounts of energy, particularly if they are left on when not in use.

**Transportation:** Transportation is another source of energy consumption on college campuses. This includes not only the transportation of students and faculty to and from campus but also the use of campus vehicles and shuttle buses.

**Water Usage:** Water usage can also be a significant source of energy consumption on college campuses, particularly for heating water. This includes not only the use of hot water in buildings but also the use of water for irrigation and landscaping.

### 1. Energy consumption : Electrical Energy

Objective: To save electrical energy.

Activity: Installation of Solar Panel at college building.

Observation: The College has their own Solar Panel System to conserve energy and promote an eco-friendly approach in the college.



## 2. Energy consumption : Electrical Energy

Objective: To save electrical energy.

Activity: planning LED lighting installation.

Observation: In the Planning Phase, college administration must install LED lighting in the office area. It will preserve electricity as opposed to tube lights.

## 3. Energy consumption : Electrical Energy

Objective: To save electrical energy.

Activity: Conservation of electrical energy at departmental level.

Observation:

- All laboratories have a panel board with switch to control the electricity within the department.

It is the responsibility of non-teaching staff to turn off this switch at the end of the day so that no electricity is wasted.

- Since most of the college building gets sunlight all day, this reduces the need for electricity.

Natural light from the sun is used in the practical lab, classroom, administration office, etc.

- Departments display signs reminding people to turn off lights and fans when not in use.
- Water forms are periodically maintained to use as little electricity as possible.
- Solar panel system is in progress for entire college campus
- To reduce consumption, branded fans and five-star rated AC systems with LCD monitoring are used.

#### 4. Energy consumption : Transportation

Objective: To save the fuel energy.

Activity: Motivate to students and faculties for reduce the use of vehicle in college campus.

Observation: College authority encourage and educate students about minimising vehicle use in college campus.

The college faculty organises the “No Vehicle Day” every month.

The college faculty organises the “Cycle Day” every month.

#### 5. Energy consumption : LPG cylinder

Objective: To save LPG energy activity

Activity: Conserve the LPG at department level

Observation:

- The gas burner tubes are routinely inspected for prevent the leakages of gas.
- Slow flame is adjusted during practical operations to reduce gas access use.
- The practical is classified according to LPG use and non-use.
- The use and requirements of each department regarding LPG are tracked by controlling sheets and sent to the office.
- The empty cylinders are stored at side and labelled as “ Empty”.

## 24. Recommendations/ Suggestions

### I] For Improving Energy Consumption:

To reduce energy consumption on college campuses, there are several strategies that can be employed, including:

1. Energy Audits: Conducting energy audits can help identify areas where energy is being wasted and identify opportunities for energy efficiency improvements.
2. Every classroom and lab with central switch board should have a diagram linking place of tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.
3. Conduct awareness program for students and staff for energy conservation.
4. Notices/signage can be put up/ displayed near switches and on notice boards, informing students and staff to switch off all electrical when not in use.
5. Number of solar panels, solar lights, solar water heaters, electric water heater installation required.
6. Use LED lights and Solar street lights for energy conservation.
7. Replaced old generation computers and TVs with LED monitors.
8. Celebrate "No Vehicle Day" every week in campus.
9. Building Upgrades: Upgrading buildings with energy-efficient lighting, HVAC Systems, and insulation can help reduce energy consumption.
10. Energy Conservation Programs: Implementing energy conservation programs, such as turning off lights and electronics when not in use, can help reduce energy consumption.
11. Renewable Energy: Installing renewable energy systems, such as solar panels or wind turbines, can help reduce energy consumption and greenhouse gas emissions.
12. By employing these strategies and others, college campuses can reduce their energy consumption and contribute to a more sustainable future.



### III] Water Conservation:

1. In campus small scale/medium scale/large scale reuse and recycle of water system is necessary
2. Reduce water usage by installing water saving faucets such as tap aerators, dual flushing system in toilets etc.
3. Installation of waterless urinals can be considered to reduce water consumption.
4. Encourage efficient water use Provide information on water usage and savings to students/ staff through notices, screen savers in computer labs.
5. Wastewater is conserved and recycled by filtration process.
6. Water Conservation: Implement water conservation measures such as low-flow toilets and faucets, and consider using rainwater harvesting systems for irrigation.

### III] Paper and other Solid Waste Reduction:

1. Solid waste generated in the premises must be maintained by awareness in students, staff (Teaching and non-teaching).
2. Enhance recycling. This can be done by creating a group where students can recycle books, personal clothes and other material to needy students. This can be an initiative under green program.
3. Training as well as awareness programs should be organized on segregation of biodegradable waste and recycling of waste
4. Biodegradable waste from college can be used for composting.

### IV] Others:

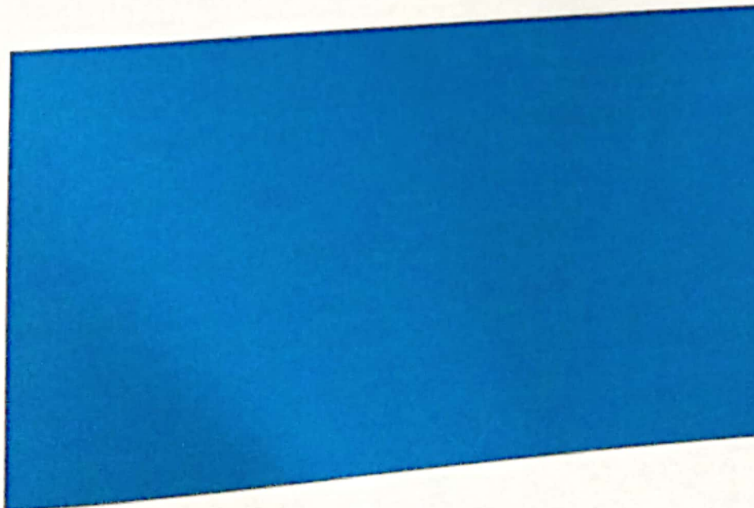
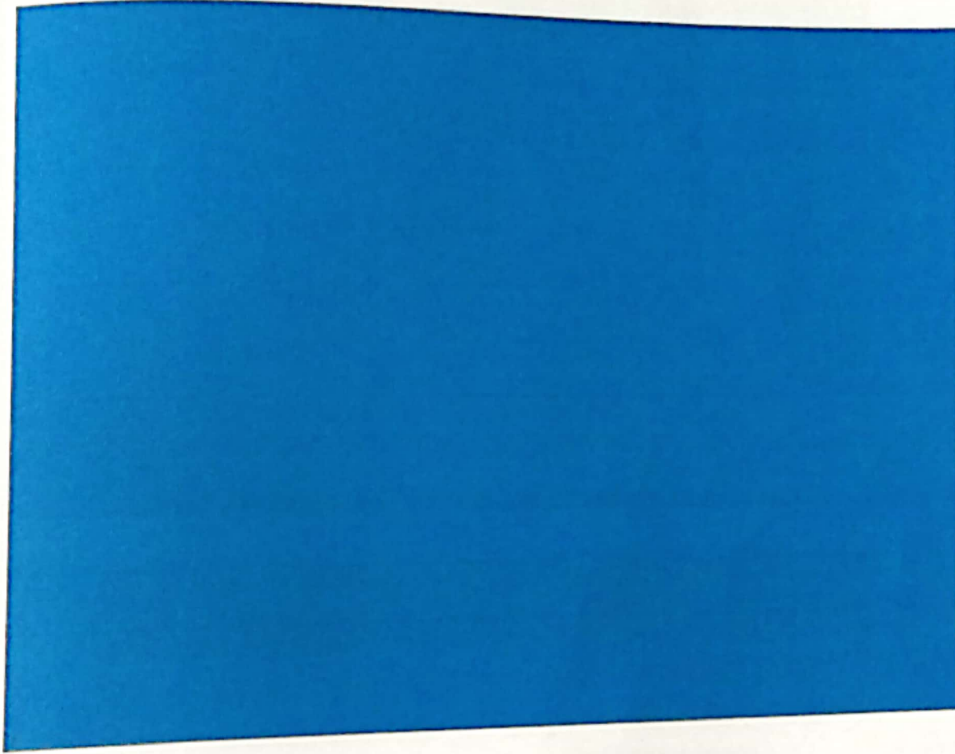
1. Environmental advisory committee could be formed.
2. Promote environmental awareness as a part of course work in various curricular areas.
3. Implement research projects, and community service.

4. Adopt environmentally responsible purchasing policy, and work towards creating and implementing a strategy to reduce environmental impact of its purchasing decision.
5. Small Bio-gas project can be provided for college to treat the biodegradable waste.
6. Ensure that an audit is conducted annually, and action is taken based on audit report, recommendation, and findings.
7. Establish a College Environmental Committee that will hold responsibility for the Enactment, enforcement, and review of the Environmental Policy.
8. Celebrate every year 5th June as 'Environment Day' and plant trees on this day to make the campus Greener.
9. Waste Reduction: Implement waste reduction programs such as recycling, composting, and reducing the use of disposable products. Encourage the use of reusable items such as water bottles and coffee cups.
10. Sustainable Transportation: Encourage the use of sustainable transportation options such as biking, walking, or public transit. Provide bicycle storage and encourage carpooling.
11. Sustainable Purchasing: Encourage the purchase of environmentally friendly products such as those made from recycled materials or products with minimal packaging. Consider using eco-friendly cleaning products.
12. Education and Awareness: Promote environmental awareness and education among staff and stakeholders. Provide training on sustainable practices and encourage staff and stakeholders to participate in sustainability programs.

Overall, the recommendations and suggestions made as a result of a green audit will depend on the specific organization or facility being audited. By implementing sustainable practices, organizations can reduce their environmental impact, save money, and contribute to a more sustainable future.

# Annexure

## 1. Institute Layout





## 2. Green Audit Questionnaire

Which of the following are available in your institute?

Sr. No.	Design Feature	Status
1	Garden area	Yes
2	Playground	Yes
4	Toilets	Yes
5	Garbage Or Waste Store	Yes
6	Laboratory	Yes
7	Canteen	No
8	Hostel Facility	No

Which of the following are found near your institute?

Sr. No.	Design Feature	Status
1	Municipal dump yard	Not in vicinity of institute
2	Garbage heap	No Garbage heaps
4	Public convenience	Yes , public convenience is available
5	Sewer line	Sewer line within campus
6	Stagnant water	No stagnant water
7	Open drainage	No
8	Industry – (Mention the type)	No
9	Bus / Railway station	Near to campus
10	Market / Shopping complex / Public halls	Not So Close

### 3. Green Audit Checklist

#### Daylight & Ventilation

Sr. No.	Design Feature	Status	Remarks (If any)
1	Broad door opening	√	
2	High windows	√	
3	Rectangular building so that sunlight can reach all areas	√	
4	Light coloured fabric curtain or blind for window covering	√	
5	Use of glass as facilitator of natural light	√	
6	High ceiling	√	
7	Wide corridors	√	
8	Use of exhaust fans	√	

#### Water Efficiency & Wastewater Management

Sr. No.	Design Feature	Status	Remarks (If any)
1	Aerators to water taps	X	
2	Automatic toilet faucets	X	
3	Display of signboards at appropriate places for water conservation	X	
4	Water conservation	√	
5.	Rain Water Harvesting	√	

#### Indoor Air Quality

Sr. No.	Design Feature	Status	Remarks (If any)
1	Installation of AC	X	
2	Monitoring of AC system	X	
3	Maintenance of AC system	X	
4	Installation smoke detectors	X	

## Energy Efficiency and On-site Energy Generation Mechanism

Sr. No.	Design Feature	Status	Remarks (If any)
1	Use of natural day light	√	Efficiently
2	Use of energy efficient equipment	√	
3	Use of energy saving bulbs (LED lights)	√	
4	Use of very low ozone depleting refrigerants	√	
5	On-site energy generation (Solar Panel Installed)	√	
6	Regular maintenance of electrical system	√	
7	Computerized monitoring of electrical system	X	
8	Solar panel	√	
9	Display of signboards at appropriate places for energy conservation	√	

## Temperature and Acoustic Control

Sr. No.	Design Feature	Status	Remarks (If any)
1	Use of daylight design (Building is constructed in such a way that diffused sunlight allows light but not the heat )	√	
2	Special walls for temperature control and noise barrier (Thick/ Double/ Composite/ Acoustic control)	X	
3	Roof with reflective glass	X	
4	Use of cool roofing material during construction (mineral wool, rock wool, vermiculite, foams, expanded polystyrene, extruded polystyrene etc.)	X	



## Waste Management

Sr. No.	Design Feature	Status	Remarks (If any)
1	Segregation of dry and wet waste	√	
2	Use of coloured bins with code to collect garbage	√	
3	Setting up recycling area/ composting area	√	
4	Avoid use of paper by going digital (Paper)	√	
5	Printing on both sides of paper	√	
6	Reuse of printed paper/ envelopes for other applications	√	
7	Donation of computers to NGO's to refurbish and give it to needy schools/people	X	
8	Creation of specified junctions for collection of E-waste(E-waste)	√	
9	Reusing waste to produce new sustainable products	√	
10	Hand over to the organization or recycler who knows proper disposal system	√	Paper waste is handed to Municipal corporation waste collector van

## Universal Access and Efficient Operation and Maintenance of Building

Sr. No.	Design Feature	Status	Remarks (If any)
1	Easy access to the main entrance of the building	√	
2	Provision of Lift/Elevators	X	
3	Ramp/ stairs with handrails on at least one side	√	
4	Restrooms (toilets) in common areas	√	
5	Uniformity in floor level	√	
6	Follow standard procedures for commissioning of electrical/plumbing system	√	
7	Regular maintenance of building	√	
8	Use of chemical free products for cleaning	√	
9	Purchase of standardized and quality material for repair	√	
10	Visual warning signage in common and exterior areas	√	

## Green Program

Sr. No.	Design Feature	Status	Remarks (If any)
1	Green education to improve environmental awareness	√	
2	Outreach relationships with local groups interested in environmental concern and satisfy their information needs	√	
3	Reduce, Reuse and recycle the products (At the time of de-selection and disposal of library material)	√	
4	Digitization of majority of processes	√	
5	E-resources : E books, Online Journals, membership of consortium	√	
6	Subscription to databases	√	
7	Contribute library information on sustainability resources to a campus publication, blog or website	√	

## Quantitative Measurement of Energy Utilization

Sr. No.	Design Feature	Status	Remarks (If any)
1.	Have internal Energy audit procedures been developed and implemented in the Organization?	√	
2.	Has the organization ensured that personnel performing environmental specific tasks have the required knowledge on energy audit (e.g. education, training programme, seminar, workshop, camp, etc.)?	√	
3.	Fluorescent (tube) lights, Incandescent lamp and sodium vapour lights are replaced with CFL / LED	√	Planned
4.	Number of solar panels, solar lights, solar water heaters, electric water heater installed	X	Partially present
5.	Automatic sprinkler system used for irrigation purpose	X	

6.	Ultra-violet lights and any other harmful lights used with safety precautions	X	
7.	Attempt in reducing the energy expense and carbon footprint	√	
8.	Natural light used in Outdoor auditorium, stadium, seminar halls, etc.	√	
9.	Sign boards indicating Switch OFF / ON, Danger at Electrical equipment and Power transformers in the campus	√	
10.	Steps taken to take care of daylighting and eco-friendly Refrigerators, etc.	√	
11.	Steps taken to celebrate no vehicle day	√	
12.	Transformer, Generators and UPS are protected properly with fencing and kept awareness boards on 'Dangers' and 'Warnings'	X	
13.	Solar street lights are used.	X	
14.	Installed automatic switches with sensors.	X	
15.	HVLS Fans are fitted in the auditorium.	X	
16.	Replaced old generation computers and TVs with LED monitors.	√	
17.	Adopted Sprinkler Irrigation.	X	
18.	Availability of e-vehicle inside the campus.	X	No Need
19.	Are there any areas with excessive lighting levels or unneeded lighting?	X	
20.	Are there any areas where lighting could be improved to increase energy efficiency?	X	