

GREEN AUDIT REPORT

of

R. C. Patel Art's Commerce and
Science College, Shirpur

(April 2023)

Prepared by



Nature Adobe Systems
Environment Management System



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R.C.P.A. Logo

Date: 01/05/2023

To
The Principal
R. C. Patel Art's Commerce and Science College, Shirpur

Green Audit Report of R. C. Patel Arts, Commerce & Science College Shirpur Dist.- Dhule has been prepared by Nature Adobe System based on survey of the college campus, checking records and interactions with Teaching, Non-Teaching staff and students.

The audit was conducted on 20/04/2023. The green audit report presents green initiatives taken up by the institution and provides suggestions and recommendations to improve environmental sustainability.

The data prepared for the R. C. Patel Arts, Commerce & Science College Shirpur will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the college. Existing data will allow the college to identify areas in need of improvement and prioritize the implementation of future projects.

We expect that the management will be committed to implement the green audit recommendations. We are happy to submit this green audit report to the R. C. Patel Arts, Commerce & Science College Shirpur authorities.

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1. About the College

The R. C. Patel Arts, Commerce and Science College, Shirpur, was established in 19/09/1991 under the R. C. Patel Education Trust, Shirpur. The R. C. Patel Education Trust is a profound educational movement offering secondary and tertiary education since the last 25 years to rural and tribal students of this region. The R. C. Patel Arts, Commerce and Science College, Shirpur (Dist. Dhule), Maharashtra is located in the rural and tribal area of Maharashtra. The college works with a clear vision to be a pre-eminent institute which brings out the best amongst students. The college is affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon (Maharashtra)



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 Auditor) observed the college premises on 20th of April 2023 for Green Audit. Prior to Audit, the 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 a 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.

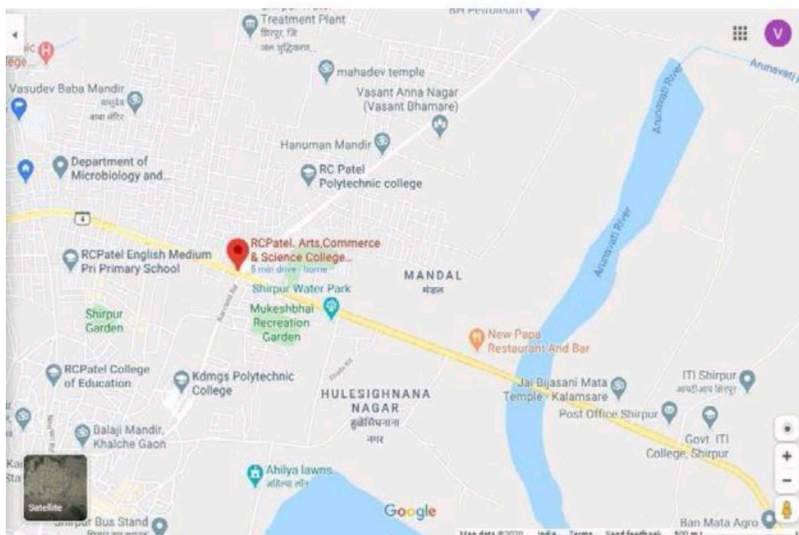
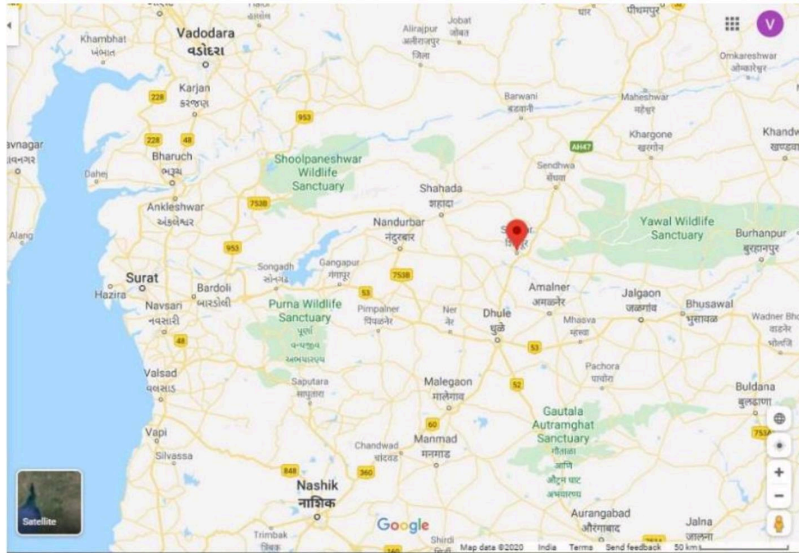
4. Scope and Goals of Green Auditing

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 is the part of economic, financial, social, environmental factor. It is necessary to conduct green audits 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

R. C. Patel Arts, Commerce and Science College, Shirpur. The total built area of is around 5000 sq. meter. Total a campus of 15.5 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.



RCP ACS Geographical location

6. Green Audit Procedural Steps

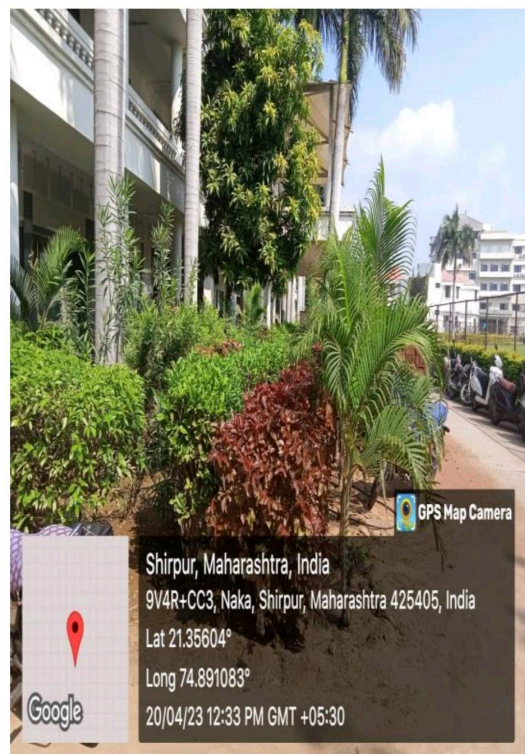
The Green Audit Procedural Steps covered 14 major areas, which were further divided into subareas. The compliance was checked in the following areas and assessment is done by using different assessment tools, like Visual inspection, Questionnaires, Check list.

1. Day light Design and Ventilation
2. Water Efficiency
3. Rainwater Harvesting
4. Indoor Air Quality
5. Energy Efficiency
6. Temperature and Acoustic Control
7. Wastewater Management
8. Paper Waste Management
9. E-Waste Management
10. Solid Waste Management
11. Liquid Waste Management
12. Universal Access and Efficient Operation and Maintenance of Building
13. Green Belt
14. Botanical Garden
15. Green Programs (Green initiatives)

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.
- Computer labs have air conditioners.
- Washrooms have windows to disperse heat, fumes and odors



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, Physics, Botany, Zoology Microbiology and Biotechnology, 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. Rainwater Harvesting

Rainwater harvesting facility is available 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 percolation rate of a recharge pit is much less than of an open well. The water percolates slowly because there is no hydrostatic pressure in the pit. The soak pit is covered with concrete to avoid the inconvenience. The covered soak pit also provides extra space for student parking. The rainwater harvested thus helps to recharge the ground water. A ground water recharge pit allows the rainwater to replenish the bore well and groundwater by recharging the underground aquifers.



10. 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
- a) Washrooms are without exhaust fan.
- b) More Indoor plants are needed in the entire campus.



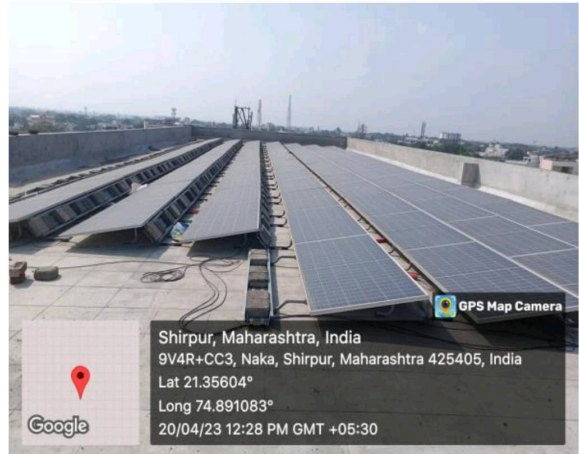
11. Energy Efficiency

The areas of major consumption of electricity are:

RCPASC is digitized to a large extent.

It is observed that Institute has

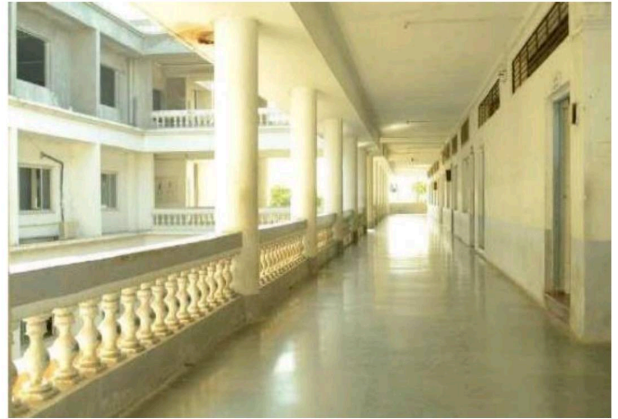
1. Institute has Installed Solar Power System on the Roof Top 160KW
2. The total number of computers available in the college are 120 in working condition
3. LED Lights, Tube lights and fans – approximately 56, 190 and 155 nos. respectively.
4. One Elevators – Common for the staff & students.
5. Air Conditioners – 12 nos.
6. The design of buildings assures maximum usage of natural light and air to save electricity.
7. It was observed that windows with curtains are provided in classroom s , labs, faculty room, and seminar halls, which allow natural sunlight and in turn, leads to electricity conservation.
8. 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.
9. 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.
10. The R. C. Patel Arts, Commerce and Science College is naturally ventilated building
11. Institutes ensure that there is no wastage of electricity as they keep check after classes/lectures are over and office hours end.
12. Use signage encouraging users to switch off light and fans to save electricity.
13. Use posters near electrical switches will help in making students responsible for conservation of electricity.



12. 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



13. 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 canteen is also connected to the sewerage system.
3. In addition, wastewater is generated from chemical lab which is also connected to sewerage system.

14. 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 paperless 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.

15. 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

16. Solid Waste Management

It was observed that:

1. The combined waste is directly handed over to Waste collector van of Shirpur, Municipal Corporation.
2. The biodegradable waste is subjected for processing by vermi- composting in collaboration with municipal corporation Shirpur.
3. The Department of Microbiology coordinated the vermicomposting of solid waste in several housing societies during the Swachh Bharat Abhiyan by providing the microbial culture for waste management. The efforts of the college helped Shirpur Municipal Council
4. Separate bins are not provided for wet biodegradable and dry recyclable waste.
5. Canteen generates major biodegradable and non-biodegradable waste but are not disposed properly.

17. Liquid Waste Management

1. Liquid waste from the Chemistry, Microbiology and Biotechnology 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 law

18. Universal Access and Efficient Operation and Maintenance of Building

4. There is wide and easy access to the institute from the main road.
5. Ramp and lift facility is available for differently abled individuals
6. Since the access and staircases are wide and free from clutter, it is possible to have a safe evacuation in case of emergency.
7. Handrails are provided on one side of staircase for safety.
8. There are wide windows
9. Fire extinguishers and fire hydrants are provided for emergency.



19. Green Belt

RCPASC 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

Green Campus: The campus is totally green. The green landscaping is spread across the ground. The lawn is surrounded by evergreen trees. The lawn is nourished by the sprinklers. A special staff is recruited for the maintenance of the lawn and the trees



20. Botanical Garden

Institute has a Botanical Garden.

Local Flora is recorded in the Botanical Garden.

Preserved Specimen which were need for study and research are kept in collection here



21. Green Programs (Green initiatives)

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

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.

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', cleanliness programs at campus area, Karvand naka, and Civil Cottage Hospital Shirpur
4. Students actively take part in bus stand cleaning as well as public places cleaning activities.
5. NSS conduct Student rallies for awareness about cleanliness in public.



22. Recommendations/ Suggestions

1. *For Improving Energy Consumption:*

1. 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.
2. Conduct awareness program for students and staff for energy conservation.
3. Notices/signage can be put up/ displayed near switches and on notice boards, informing students and staff to switch off all electricals when not in use

2. *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.

3. *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 canteen can be used for composting.

4. *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 canteen 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.

Annexure

1. Institute Layout



2. Green Audit Questionnaire

Which of the following are available in your institute?

1	Garden area	Yes
2	Playground	Yes
4	Toilets	Yes
5	Garbage Or Waste Store	Yes
6	Laboratory	Yes
7	Canteen	Yes
8	Hostel Facility	Yes

Which of the following are found near your institute?

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
	Industry – (Mention the type)	No
8	Bus / Railway station	Faraway from campus
9	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	Partially Present
3	Display of signboards at appropriate places for water conservation	X	
4	Water conservation	√	

Indoor Air Quality

Sr. No	Design Feature	Status	Remarks (If any)
1	Installation of HVAC	√	
2	Monitoring of HVAC system	√	
3	Maintenance of HVAC system	√	
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	√	
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	X	

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/ composing area	X	
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	√	
8	Creation of specified junctions for collection of E-waste(E-waste)	√	
9	Reusing waste to produce new sustainable products	X	
10	Hand over to the organization or recycler who knows proper disposal system	√	Paper waste is handed to Shirpur 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	√	
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)	X	
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	X	



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