GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2021 – 2022 & 2022 - 2023

Sustainability study

AUDIT REPORT

Studied for

Acharya Prafulla Chandra Roy Government College

Himachal Vihar, Matigara, Siliguri - 734 010, District Darjeeling (West Bengal), India

Studied in the capacity of

Accredited and Certified Green Building Professional

Studied by

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Valid till 31 May 2024

Background reference image Sasin Tipchai on unsplash

Disclaimer

The Audit Team has prepared this report for the **Acharya Prafulla Chandra Roy Government College** located at *Himachal Vihar, Matigara, Siliguri - 734 010, District Darjeeling (West Bengal), India* based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and College. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who is as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

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Acknowledgement

The Audit Assessment Team thanks the **Acharya Prafulla Chandra Roy Government College, West Bengal** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are extended are due to **everyone from the Governing body.**

Our heartfelt thanks are extended to the Chairperson of the entire process **Dr. Mayukh Sarker** (Officer-in-Charge) for the valuable inputs.

We are also thankful to College's Task force the faculty members who have played a major role in data collection – **Ms.Mandira Ghissing** (Assistant Professor) *(Special mention for the excellent coordination)*; **Smt. Smriti Singh** (Assistant Professor) and **Dr. Kartick Chandra Dey** (Associate Professor and Coordinator, IQAC).

We highly appreciate the assistance of the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

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1. Introduction

1.1 About the Institution

A.P.C. Roy Govt. College was established on 21st July 2010 to cater to the educational needs of this region. This is the second Govt. College of its kind in Darjeeling district and third in North Bengal.

The College is named after the legendary personality in the field of science Acharya Prafulla Chandra Roy who is hailed as the father of Indian Chemistry, a visionary and a great educationist.

It is hoped in all sincerity that this nascent institution will go a long way in carrying forward the noble vision of this great soul.

1.2 About the statements of the Institute

1.2.1 Vision

The College proposes

- *To fulfil the educational aspirations of the region of North Bengal, this is in many ways cut off from the mainstreams of learning.*
- *A large segment of the population of North Bengal is economically backward and some of the people of the region are well below poverty line with the unfortunate result that quality education is denied to them.*
- *To recognise the innate potential of students and to enrich these abilities to enable them to meet any challenges in their chosen field.*
- *To make quality higher education affordable to the less privileged sections of the society with further hope that this college does not become merely a training centre to train students to answer a few selected questions but an institution with a vision committed to the all-round development of the students so that they emerge as good and successful human beings.*

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1.2.2 Mission

The College adheres and focuses towards:

- *To promote capacity-building and all-inclusive development through a quality teaching-learning process.*
- *Holistic education is one that stresses the importance of knowledge of a specific subject with equal amount of emphasis upon the instilling of moral values.*
- *To promote equity by empowering and encouraging women students, students from disadvantaged groups and differently abled students.*
- *To bestow students with human values and social responsibilities this would allow them to become honest and responsible citizens of the country and would be able to meet all kinds of challenges in the future.*

1.2.3 Aim

The College has formulated the following aim to achieve its mission:

Holistic learning - The institution promotes capacity-building and all-inclusive development through a quality teaching-learning process.

1.2.4 Motto

The College channelizes its efforts towards the motto of:

"Culture of knowledge and acquisition of power."

1.2.5 Objectives

The objective of the College is:

- *To fulfil the educational aspirations of the economically backward students of this particular region, which is in many ways cut off from the mainstreams of learning and to acknowledge the innate potential of students*
- *To enrich these abilities to enable them to meet any challenges in their chosen field.*

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1.3 About the Institute building

The magnificent college building is situated at Himachal Vihar, the foothills of the district offering an unobstructed view of the hills, away from the noise of the city and yet not too far, in an environment that is serene and highly conductive to teaching and learning.

The College building is constructed by **S.J.D.A. (Siliguri Jalpaiguri Development Authority)** funded by the Govt. of West Bengal.

The spacious class rooms are highly lighted and well-furnished and so are the sufficiently equipped laboratories.

Library is the heart of every educational institution. The College library though in its formative stage has adequate number of books to meet the academic needs of teachers as well as students.

1.4 Assessment of the Institute

1.4.1 Affiliations

The Institute is affiliated to **University of North Bengal,** a public state collegiate major research university in North Bengal region of West Bengal, which is located in Raja Rammohanpur, Siliguri, Darjeeling district, in the Indian state of West Bengal

1.4.2 Certification

The College has received AISHE – The All India Survey of Higher Education code is C - 45353.

1.4.3 Recognitions

The College has upgraded in the teaching level – Under graduate to Post graduate in the **section 2(f)** (Order No.8-454/2011 (CPP-I/C) dated 12/08/2011) **and section 12 (B)** (Order No. 8- 386/2015 (CPP-I/C) dated 05/07/2016) **of the University Grants Council Act, 1956** Govt. of India, New Delhi.

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2. Overview

2.1 Summarised Populace analysis for 2022-2023

2.1.1 Students data

The data (shared by the Institute) shows there were a total of **339 male and 450 female students.**

2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	27	14	41
2	Non-Teaching staff	08	03	11
Total Staff Members		**35**	**17**	**52**

Table 1: Staff data of the Institution for 2022-2023

The staff data shows the College premises had a total of **52 Staff Members.**

2.2 Summarised Populace analysis for 2021-2022

2.2.1 Students data

The data (shared by the Institute) shows there were a total of **344 male and 434 female students.**

2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	25	16	41
2	Non-Teaching staff	08	03	11
Total Staff Members		**33**	**19**	**52**

Table 2: Staff data of the Institution for 2021-2022

The staff data shows the College premises had a total of **52 Staff Members.**

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2.3 Total College Area & College Building Spread Area

The **site area is 2.1 acres** and the **Built-up area is 86,111.28 sq. ft.** for an approximately **841 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in **2010**.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc.

The Institute is located prettyclose to nature and hence has a very fresh environment which is absolutely pollution free and healthy.

The Building is a Reinforced Cement Concrete (RCC) framework building.

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3. Research

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- Investigation
- Technical discussion with team
- Observations
- Inferences

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Discussion with the Institute
- Allotment and Initiation by the Institute
- Data collection
- Submission of the files

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4. Observation

Survey Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in College, following is the result received.

4.1 Participation

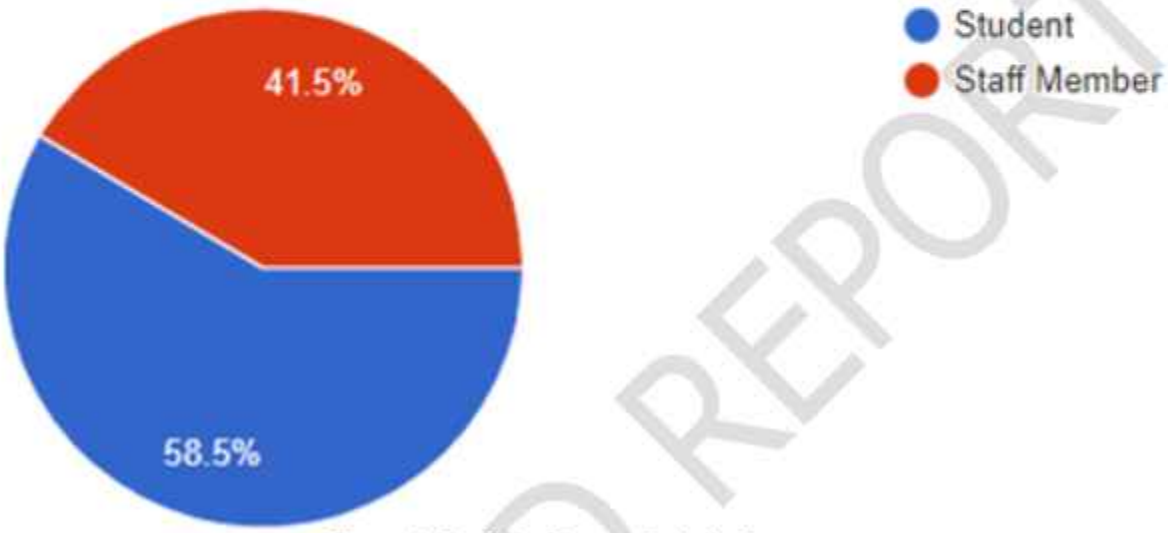

Figure 1: Participation analysis in the survey

A total of **94 responses** were received out of which 59% were students.

Note: The Participants were asked to review the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

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4.2 About the Green awareness practices adopted by Institute

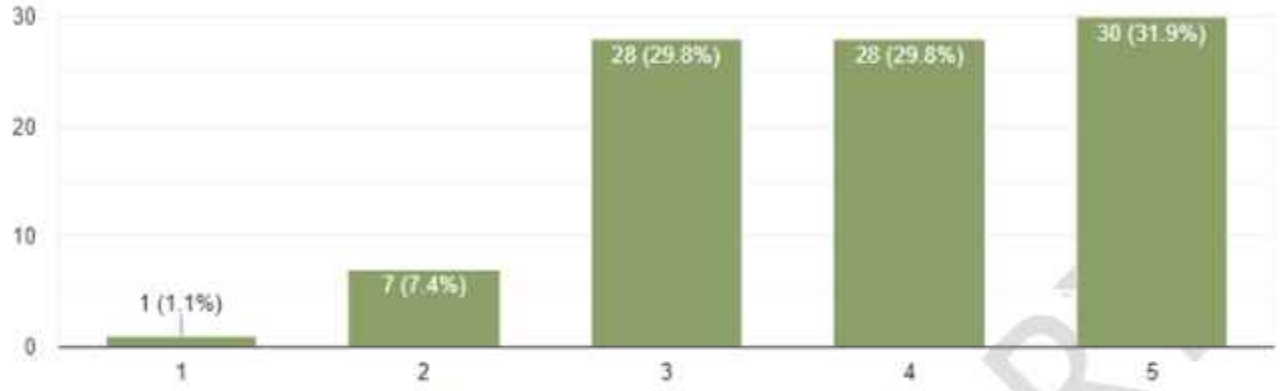

Figure 2: Green awareness practices in the Institute

Observation: The students and staff *almost 32% of the respondents* found practices to be Excellent (Rating of 5); whereas *almost 30% of the respondents* found practices to be Very Good (Rating of 4); and *30% of the respondents* found practices to be Good (Rating of 3).

Inference: Though the majority responses are for 'Excellent – Rating 5' is less than 50% thus this shows that the said section requires improvement.

4.3 About the Water management practices adopted by Institute

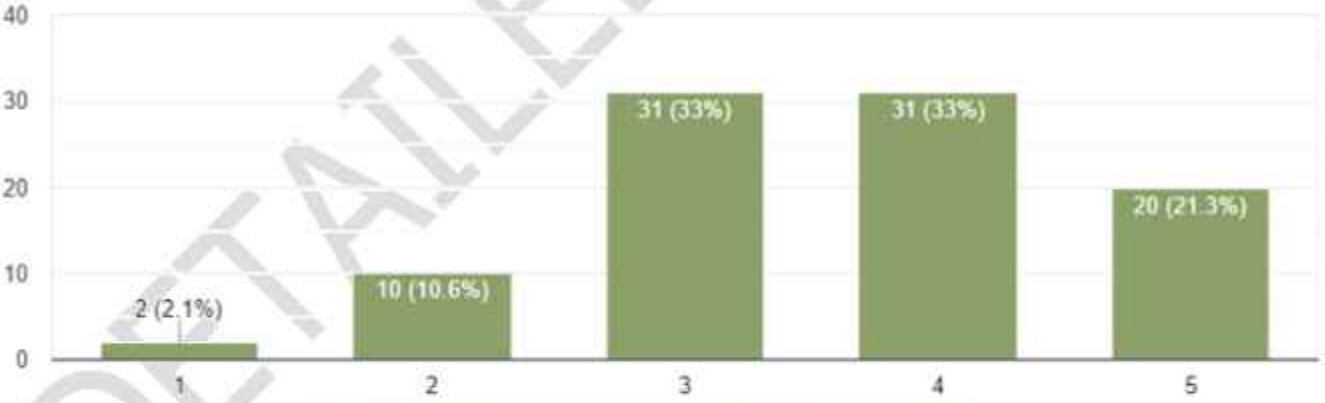

Figure 3: Water management practices in the Institute

Observation: The students and staff *almost 21% of the respondents* found practices to be Excellent (Rating of 5); whereas *almost 33% of the respondents* found practices to be Very Good (Rating of 4); and *33% of the respondents* found practices to be Good (Rating of 3).

Inference: Though the majority responses are for 'Excellent – Rating 5' is less than 50% thus this shows that the said section requires improvement.

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4.4 About the Waste management practices adopted by Institute

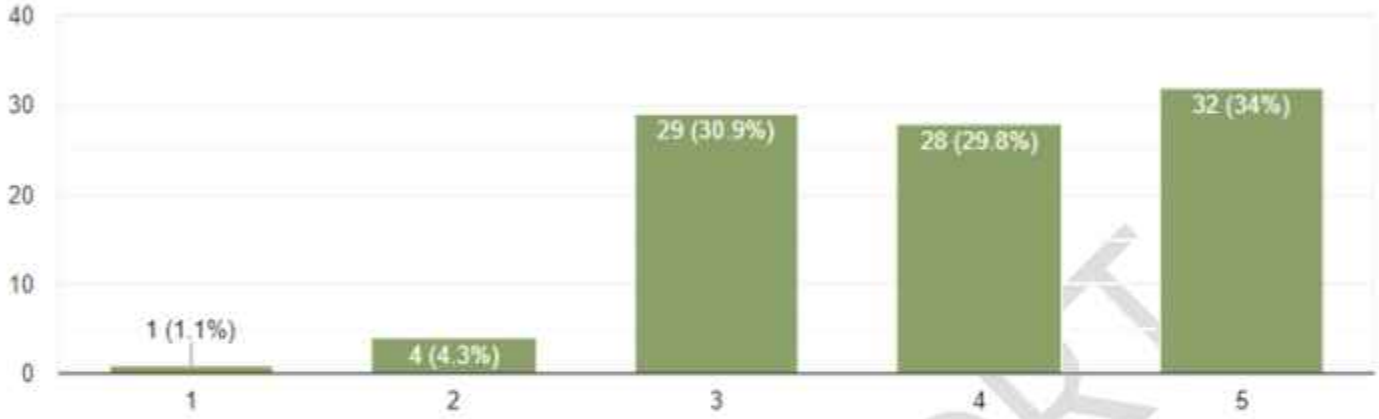

Figure 4: Waste management practices in the Institute

Observation: The students and staff *almost 34% of the respondents* found practices to be Excellent (Rating of 5); whereas *almost 30% of the respondents* found practices to be Very Good (Rating of 4); and *31% of the respondents* found practices to be Good (Rating of 3).

Inference: Though the majority responses are for 'Excellent – Rating 5' is less than 50% thus this shows that the said section requires improvement.

4.5 About the Hygiene practices adopted by Institute

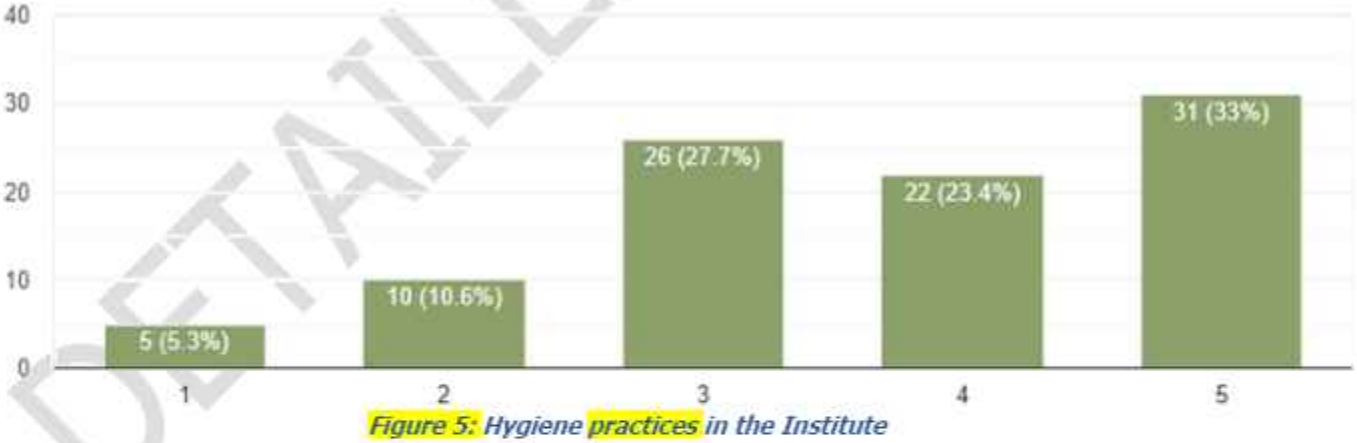

Figure 5: Hygiene practices in the Institute

Observation: The students and staff *almost 33% of the respondents* found practices to be Excellent (Rating of 5); whereas *almost 23% of the respondents* found practices to be Very Good (Rating of 4); and *28% of the respondents* found practices to be Good (Rating of 3).

Inference: Though the majority responses are for 'Excellent – Rating 5' is less than 50% thus this shows that the said section requires improvement.

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5. Documentation

5.1 Green Practices Audit

The increasing global warming and climate change have made us realise that apart from the enormous strategies the individual small efforts need to be taken by individuals and Educational Institutes as the younger generations are the future of the world and once they are taught about these practices only then can we assume a better future.

5.1.1 Green practices

We observed the following points during the process.

- **Fresh environment** – *The College provides an eco-friendly ambience with fresh air and soothing environment which helps to maintain a physical and mental balance. This kind of a space it a must for an educational specially technical institute which is inviting and gives the stakeholders an opportunity to explore indoor and outdoor learning to a great extent.*

- **Team work** – *The best quality of the College which sets it apart is its coordinating, cooperative staff members; for a building the foundation plays the most important role for its future similarly for an educational institute its staff members do.*

5.1.2 Community development

The College conducts environmental initiatives documented as follows:

S. No.	Event	Particulars	Date
1	Awareness Program on **'Save the Local Streams'**	It was organised by the Department of Bengali, APCR Govt College to sensitise the people about the importance of local water bodies and why they should not be polluted. During this rally the students themselves cleaned the logged areas of streams nearby the locality. The whole event really evoked an unprecedented response among local people to start practising a lifestyle which does not contribute to water pollution for upcoming generations.	10.06.2022

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2	Awareness Program on **'Harmful Effects of Using Cell Phone'**	This programme was organised by the Dept of Physics, APCR Govt College in order to raise awareness in the local community regarding the physical, mental and environmental ill-effects of excessive cell phone use. The students went to a shopping mall complex adjacent to the college with festoons bearing warning signs of smartphone and internet overuse, its side effects, and self-help tips. The chosen place appeared to be a practical one as it is found to be always crowded with people engaged with their mobile phones at all time.	19.05.2022
3	**Swachh Bharat Abhiyan**	A one day cleanliness drive was conducted by the NSS Unit of APCR Government College to draw the attention of the general public to the callous attitude of people towards the important issue of public sanitation. The area chosen for the cleanliness drive was the Himachal Vihar Social Welfare Association compound which is adjacent to the college and the programme began with oath-taking ceremony of student volunteers in the presence of the Programme Officer, Dr. Tabesum Begam.	03.02.2023.
4	**Campus Cleaning Programme**	A one day cleanliness drive within the campus was organised by the department of Sociology, APCR Government College on 06.04.2023 in order to reiterate their commitment towards the creation and promotion of a clean and green Campus. The programme witnessed enthusiastic participation from a large number of students under the able supervision of the Departmental teachers, Prof. Kritisudha Baraily and Prof. Rajdeep Sunar.	06.04.2023

Table 3: Details of the events undertaken by the Institute

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5.2 Waste Audit

Waste is an inevitable part of our lives. The audit provides an approximation of the types of waste generated, location of waste collections, disposal techniques used, waste segregation methodologies adopted. The waste management strategies are studied and ways that can be adopted aiming to make the premise clean and sustainable are proposed.

5.2.1 Waste produced

S. No.	Type	Details
1	Solid waste (Toilets)	Solid waste generated from toilets in the campus is disposed through the sewerage system regularly according to the norms of the Municipal Corporation. An incinerator has been installed in the girl's toilet for hygienic disposal of sanitary napkins.
2	Organic waste (Regular)	Organic waste is mostly generated in the College Canteen where the waste is segregated using the three bin system - green for food and yellow and blue for plastic and paper in 121 bins. A plan for setting up a composting unit is in the offing but is yet to be put into practice.
3	Liquid waste (Toilets, wash basins)	Liquid waste from the campuses is in the form of waste water from toilets and washes basins is disposed through the sewage system. No separate liquid waste management system exists.
4	Chemical waste from laboratories	Non-hazardous chemical waste generated in laboratories is disposed normally through the sink and bins.
5	Toxic waste from laboratories	Toxic waste form laboratories, if any, are segregated at source and disposed on a regular basis by transporting such waste safely through the cleaning staff of the Municipal corporation.
6	E-waste	Negligible e-waste generated till date.
7	Plastic waste	Segregated at source through the use of the three bin system and disposed accordingly.
8	Bio-waste (Sanitary)	Incinerator has been installed in the girl's toilet to ensure hygienic disposal of sanitary napkins within the college premises.

Table 4: Details of the waste management practices adopted by the team

5.3 Water Audit

Water is one of the basic needs. Pure drinking water is a resource that needs to be preserved efficiently. A water audit helps to identify the sources of water consumption, and the water requirement by the premises is met by these sources. The effective usage of water without any wastage should be a mandatory practice. Understanding the techniques as per site context to increase water conservation in terms of awareness and practice can be identified and executed as part of this exercise.

5.3.1 Water availability and consumption

5.3.1.1 Source of Primary water supply

The College uses drinking water for daily consumption through the 'OVERHEAD' water tanks available on the terrace in a total of 5 tanks; these are bifurcated and used for primary and secondary purposes.

5.3.1.2 Source of Secondary water supply

The College uses the secondary sources of water supply for general usages such as watering plants, kitchen, toilets, and wash basins connected to the labs and other spaces. **At present, there are no sources such as well/ bore well/ tube well and the existing water tanks are bifurcated for primary and secondary uses.**

5.1.3.3 Source of Tertiary water supply

The tertiary source of water is the additional source of water harvesting. *The project is under process, we have suggested certain typologies and site specifications that can be executed on the campus.*

5.1.3.4 Source of Reusing waste water

The initiative is not under practice at present completely only the chemicals are neutralized before letting it down in the drains. **However, certain measures w.r.t. academics and equipment are practiced in the laboratories include fume motor usage.** *We have suggested to under practices of green chemistry as per discussion to treat the waste water from the laboratories and reuse after filtering for watering the plants and the trees in the premises.*

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5.3.2 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has the following facilities:

Particulars	Nos.
General toilet for students	52
General toilet for staff	28
Special Toilet for handicaps 1.5m x 2.5m	1
Urinals	75
Taps in laboratories	111
Taps in wash basins in toilets	118
Taps in Canteen	2

Table 5: Details of the water usages in the premises

5.4 Health and Hygiene Audit

The hygiene is a part and parcel of our daily life. It is extremely essential to keep the surroundings clean in the same manner as we would want our houses to be.

Educational Institutes have a bigger role to play in order to affect the young minds in the positive manner through better hygienic practices.

5.4.1 Facilities available

The Institution has washroom facility, hand wash, drinking water and dustbin facilities.

5.4.2 Hygiene aspects

There was no major hygiene issue observed anywhere in the premises.

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6. Suggestions

Section-wise suggestions related to premises

The following suggestions are to be considered as a ***first priority*** for implementation. These **should be executed within the next 1.5 to 2.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

6.1 Green practices Audit

- **Plant as a gift** - As a kind gesture, the guests visiting the premise can be asked to plant a small plant on the premise itself and they can be even given plants/bouquets from the flowers of the plants on the premise as a gift.

- **Environmental awareness** - There can be various artworks on the compound wall giving the message of saving the environment through the joint efforts of the students and staff thereby making the student socially and environmentally responsible citizens.

6.2 Waste Audit

- **Signages** - Messages about avoiding wastage should be placed at appropriate locations.

- **Include better plastic/ E-waste management measures** - The Institute can celebrate one day of every month as a 'Plastic/ E-waste awareness day' The stakeholders (Students and staff members) can be asked to bring plastic/ E-waste which can be further given to an NGO for recycling or better purpose.

- **Organic compost pit maintenance methodology** - The Institute can recheck the current methodology as it can yield better results in terms o quantity if it is well maintained with the following strategies:
  - The sanitary pad incineration dust can be sent to the compost pit
  - There should be a balance of brown and green waste material
  - Shred the materials before adding them to pit
  - Add twigs and stir occasionally
  - Add water in less quantity to avoid the smell
  - Keep ample air circulation to avoid the smell
  - Regular monitoring and maintenance.

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6.3 Water Audit

- **Water flow stopper** - The water flow stopper should be installed to avoid overflow and smart use of the system. Install water-saving showerheads or flow restrictors. No leakage anywhere on-premises. Water lawn only when it needs it.

- **Waterless urinals** - There can be the provision of waterless urinals as a Green Building initiative in the premise, either the existing ones can be replaced with such a facility or new toilets can be constructed in this manner.

- **Rain water bunds** – There should be landscape beautification project undertaken to appropriate channelize the rain water through bunds and similar facilities.

6.4 Health and Hygiene Audit

- **Avoid burning waste** - The waste produced on the premises should not be burned as it is dangerous to the health of students and staff

- **Pest control program** - The Institute should practice pest control programs with appropriate sanitation facilities through an appropriate agency.

- **Signboards** – The Institute should have multiple signboards about 'No smoking' and 'Healthy premises' at every nook and corner of the Institute.

- **Compound wall** – The compound wall should have awareness messages about 'No Smoking' and 'No Tobacco'

- **Sanitary vending and incinerator** - There should be provision for sanitary vending, incinerator machine and incinerator in every ladies common room, and toilet on the premises.

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Investigative parameters – Energy Management – Solar street light and sources of energy consumption



Investigative parameters – Ecological Management – Plantations, covered parking and ramp


Investigative parameters – Water Management – Water sources and proposed rain water harvesting system



Investigative parameters – Waste Management – Sanitary vending machine, dustbins and cleanliness in premises

7. Compilation

The study is based on the data collected, analysed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyse and study the data collected.

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013
- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
- The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- Images on site by Coordinators of the both teams
- Icon images used by https://www.vecteezy.com/free-vector/security-camera-icon and https://www.vecteezy.com/free-vector/electric-car-icon

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