RANI BIRLA GIRLS' COLLEGE

38, Shakespeare Sarani, Kolkata- 700017

DVV CLARIFICATIONS

Criterion Name: **Institutional Values and Best Practices**

Index No: 7.1.3

Subtitle: The Institutional Environment and Energy Initiatives:

AUDIT REPORTS

GREEN AUDIT REPORT

Link as hosted on the official website of the college:

https://www.rbgc.ac.in/Audit-Reports/Green_Audit_Report_2022-23.pdf

RANI BIRLA GIRLS' COLLEGE

Affiliated to

University of Calcutta

GREEN AUDIT REPORT
2022-23

Audited by:

Dr. Pranabes Sanyal (IFS Rtd.)

Ex Chief Environment Officer,
Govt. of West Bengal.
Visiting Faculty, School of Oceanographic Studies,
Jadavpur University, Kolkata 32

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CERTIFICATE

TO WHOM IT MAY CONCERN

This is to certify that Rani Birla Girls' College, 38, Shakespeare Sarani, Kolkata- 700017, has collected data and credentials as per requirement of Green Audit of the campus and submitted all relevant information to the Auditor. The green infrastructure of the college and, activities and measures adopted by the institution along with data submitted have been scrutinized, verified, and audited, and was found to be satisfactory with several scope of improvement, listed in the recommendations.

The efforts taken by the IQAC along with the faculty members and students of the Department of Geography of Rani Birla Girls' College, towards environment and sustainability is highly appreciated and commendable.

10/5/23

Dr. Pranabes Sanyal (IFS, Rtd.)

Ex Chief Environment Officer,
Govt. of West Bengal.
Visiting Faculty, School of Oceanographic Studies,
Jadavpur University, Kolkata 32

ACKNOWLEDGEMENT

I, **Dr. Pranabes Sanyal,** would like to thank the management of Rani Birla Girls' College for assigning this important work of Green Audit. I appreciate the co-operation to the teams for completion of assessment.

I am thankful to the IQAC team and other staff members who were actively involved while collecting the data and conducting field measurements, especially the Department of Geography.

Last but not the least, we would like to thank **Dr. Srabanti Bhattacharya (Principal),** Rani Birla Girls' College for giving us an opportunity to evaluate the environmental performance of the campus.

DISCLAIMER

I, **Dr. Pranabes Sanyal,** have prepared this report for Rani Birla Girls' College based on input data submitted by the representatives of college.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further advised that the conclusions are based on the best estimates available, and that the auditor makes no express or implied representations, warranties, or undertakings. The auditor also disclaims all liability for any direct or indirect losses resulting from the use of the data, statements, or forecasts in this report.

I agree to maintain the confidentiality of all information pertaining to your organization and not share it with any other parties, unless it is in the public domain, required by law, or required by relevant accreditation organizations. I will only obtain confidential information when it is necessary.

10/5/23

Signature

AUDITOR

Visiting faculty
School of Oceanographic Studies
Jadavpur University, Kolkata-32

CONCEPT AND CONTEXT

Since the academic year 2019–20, all higher education institutions are required by the National Assessment and Accreditation Council, New Delhi (NAAC) to submit an annual Green, Environment, and Energy Audit Report. Green Audit falls under the purview of Criteria 7 of the National Assessment and Accreditation Council (NAAC), an autonomous body which accredited institutes of higher education. Furthermore, ensuring that higher education institutions take steps to reduce their carbon footprint and therefore help to mitigate global warming. The management of the college chose to have a qualified external professional auditor undertake an external environment assessment study in light of the NAAC circular about green auditing. Examining environmental behaviors that affect the atmosphere either directly or indirectly both inside and outside of the College campus is the goal of the green audit. The term "green audit" refers to the methodical identification, measurement, documentation, reporting, and analysis of college environment components. It was started with the goal of examining the actions taken by the institutions whose operations could endanger the environment's and the people's health. The green audit can provide guidance on how to enhance the environment's structure and incorporate various elements that can safeguard the environment. This audit focuses on the institution's implementation of the Green Campus, Waste Management, Energy Management, and Carbon Footprint, among other things. Below is a discussion of the principles, organization, goals, analysis tools, methodology, and audit objectives.

INTRODUCTION

Educational institutions are becoming more environmentally conscious these days, and as a result, fresh ideas are being presented to make them eco-friendly and sustainable. Many educational institutions use a variety of approaches to address their environmental challenges in order to protect the environment within the building. These approaches include encouraging energy conservation, recycling garbage, reducing water use, water harvesting, and many more.

The institution's operations may have a negative influence on the environment. A green audit is an official assessment of the environmental impact of a college. The purpose of the Green Audit is to assess the real-world situation on the campus of the organization. A college can utilize a green audit to find out where and how they are using the most water, energy, or other resources. From there, the institution can decide how to make adjustments and save money. In order to improve waste minimization plans or for recycling projects, it can also be used to ascertain the type and volume of garbage.

The implementation of mitigation measures and green auditing benefits all institutions, students, and the environment. Additionally, it can raise knowledge of health issues and advance environmental awareness as well as values and ideas. It gives employees and students a greater awareness of the institution's green impact. Green auditing maintains cost savings by utilizing less resources. It provides a chance for educators and learners to grow in taking responsibility for their own personal and social responsibilities. Primary data gathering, a site visit with the college team, and an evaluation of the policies, programs, papers, and records are all part of the audit process.

OVERVIEW OF THE COLLEGE

RANI BIRLA GIRLS' COLLEGE, Kolkata was established in July 1961 as an undergraduate arts college affiliated to the University of Calcutta by the Hindustan Charity Trust in the memory of Rani Jogeshwari Devi Birla to serve as a women's educational institution and to impart a comprehensive learning programme to its students within an enlightened, liberal and progressive milieu. Undergoing a remarkable transformation, this college departed from its initial apparatus of governance (by a private Trust) to function as an aided institution under the Government of West Bengal.

The institution holds the distinction of being the bearer of a teaching and learning legacy of more than six decades and has been relentless in its pursuit of excellence. This college has maintained good academic performance with consistency. Co-curricular training and value-orientation have been equally prioritized within the institutional agenda. The college is very conveniently located on Shakespeare Sarani and is easily accessible from both the A.J.C. Bose Road and Jawaharlal Nehru Road intersections of Shakespeare Sarani.

Figure 1: Front view of the College from Main Road side

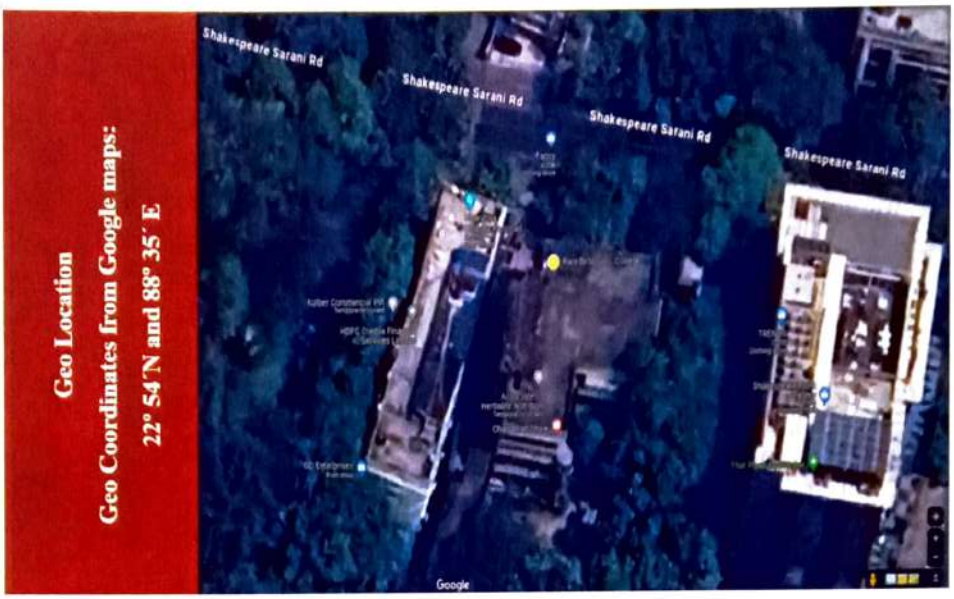
Figure 2: View of the College from inside the campus

VISION

The college was established with an inspirational vision to serve as an ideal seat of learning aimed at promoting higher education and holistic development of young women learners of diverse social and economic background within a liberal, progressive and enlightened milieu.

MISSION

As a premier and reputed institution committed to the goal of women's empowerment through higher education, the institutional mission is oriented to motivating learners to achieve distinction in academic, administrative and cultural spheres and to venture into self- employment or entrepreneurship.

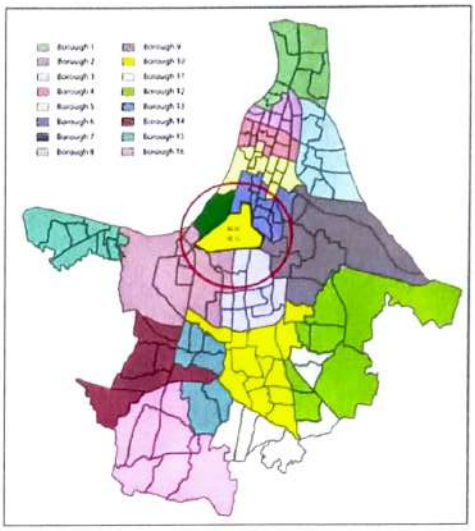


INFRASTRUCTURE OF THE COLLEGE:

GEOGRAPHICAL LOCATION:

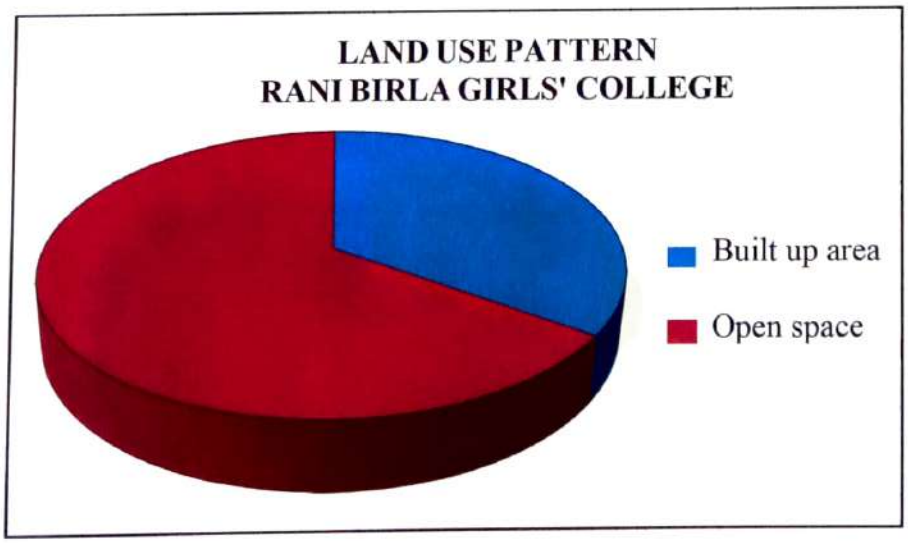
Located within the University of Calcutta, Rani Birla College was founded in 1961 with the goal of providing advanced arts education. It is situated in a rented building in Shakespeare Sarani, Kolkata, at 22° 54′N and 88° 35′ E, at the center of West Bengal's capital. The college occupies a rented space measuring 1 Bigha 4 Katha and 2 Chatak, or roughly 32,535 square feet. 11,330 square feet, or 35% of the total area, are built up. The premise has a playground of 8020 sq. ft area. The College admits students from all social milieus and empowers them through intensive mentoring and counselling to face the challenges of life and become responsible and sensitized citizens of the country. Rani Birla Girls' College provides a caring and nurturing environment where students come into their own, blossoming into confident young women ready to face the world. The college accepts students from all socioeconomic backgrounds and apart from academic training the college through rigorous mentoring and counselling, equips them to meet life's obstacles and develop into responsible, aware citizens of the nation. Students of Rani Birla Girls' College thrive in a supportive and nurturing atmosphere where they develop into self-assured, world-ready young ladies.

COLLEGE LOCATION MAP

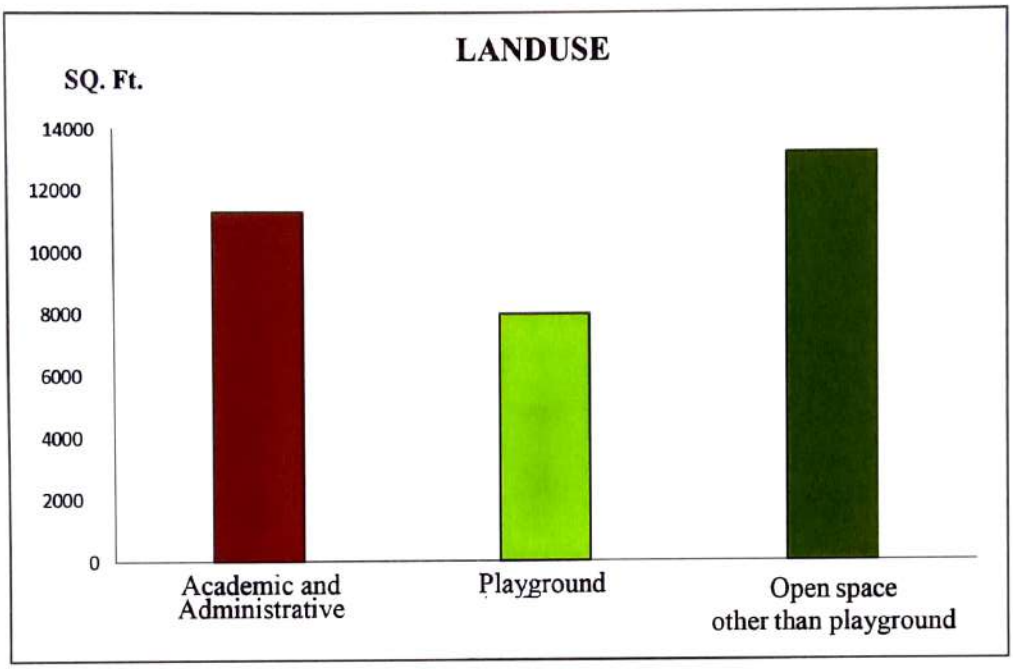


Building Name	Building Square Footage (m^2)	Age of Building (years)	Purpose of building	Number of Floors	Daily Operational Hours	Days of Use per Week	Average number of occupants
Main Building (Total Campus)	11,330 sq. ft	Nearly 80 years	Academic	3	8	6	700
Anex-I Building		Nearly 80 years	Academic	2	8	6	120
Anex-II Building		Nearly 80 years	Academic	2	8	6	50

LANDUSE	AREA IN SQ. FT
BUILT UP AREA	11330 sq. ft.
OPEN SPACE	21205 sq. ft.
TOTAL AREA	32535 sq. ft.



LANDUSE (SPECIFIED)	AREA IN SQ. FT
Academic and Administrative (sq. ft.)	11330
Playground (sq. ft.)	8020
Open space other than playground (sq. ft.)	13185



WEATHER DATA OF KOLKATA AND RANI BIRLA GIRLS' COLLEGE:

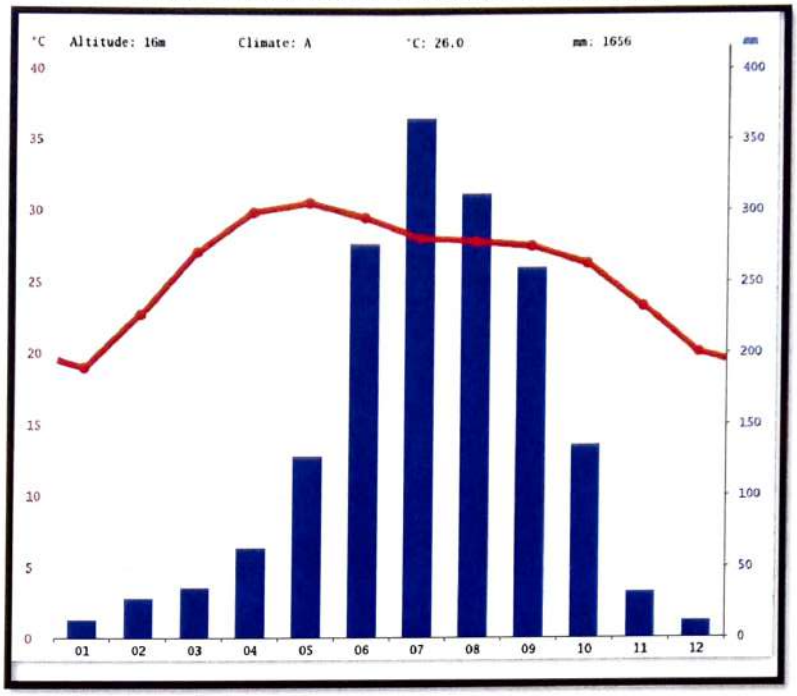
Kolkata, the capital of West Bengal, has a tropical wet-and-dry climate (Köppen climatic classification Aw), which is shared by Rani Birla Girls' College in Kolkata. Although monthly average temperatures vary from 15 °C to 30 °C (59 °F to 86 °F), the annual mean temperature is 26.8 °C (80 °F). Summertime highs in the low 30s are hot and muggy. In May and June, maximum temperatures often get close to 40 °C (104 °F) during dry spells. With seasonal lows between December and January of 9 to 11 degrees Celsius (48.2 to 51.8 degrees Fahrenheit), winter lasts for around two and a half months on average. 5 °C (41 °F) was the lowest recorded temperature, and 43.9 °C (111 °F) was the highest.

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUT	SEPT	OCT	NOV	DEC
Avg. Temperature °C (°F)	19 °C (66.2) °F	22.7 °C (72.9) °F	27.1 °C (80.8) °F	29.9 °C (85.8) °F	30.6 °C (87) °F	29.5 °C (85.2) °F	28.1 °C (82.6) °F	27.9 °C (82.2) °F	27.6 °C (81.6) °F	26.3 °C (79.4) °F	23.3 °C (74) °F	20.1 °C (68.1) °F
Min. Temperature °C (°F)	12.9 °C (55.3) °F	16.5 °C (61.7) °F	21.4 °C (70.5) °F	25.5 °C (77.8) °F	26.9 °C (80.5) °F	27 °C (80.5) °F	26.1 °C (78.9) °F	25.8 °C (78.4) °F	25.3 °C (77.5) °F	23 °C (73.4) °F	18.4 °C (65.1) °F	14.5 °C (58.1) °F
Max. Temperature °C (°F)	25.3 °C (77.5) °F	29 °C (84.1) °F	33.3 °C (91.9) °F	35.7 °C (96.2) °F	35.4 °C (95.7) °F	33.1 °C (91.6) °F	31.1 °C (87.9) °F	31 °C (87.7) °F	30.8 °C (87.5) °F	30.2 °C (86.3) °F	28.5 °C (83.3) °F	25.9 °C (78.6) °F
Precipitation / Rainfall mm (in)	12 (0)	27 (1)	35 (1)	63 (2)	127 (5)	277 (10)	365 (14)	312 (12)	260 (10)	135 (5)	32 (1)	11 (0)
Humidity (%)	64%	61%	59%	67%	73%	81%	85%	86%	87%	82%	70%	65%
Rainy days (d)	1	2	3	6	9	16	21	21	18	10	2	1
avg. Sun hours (hours)	9.1	9.3	9.7	9.7	8.9	8.7	8.2	7.8	7.8	8.3	8.9	8.8

Data: 1991 - 2023 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2023: avg. Sun hours.

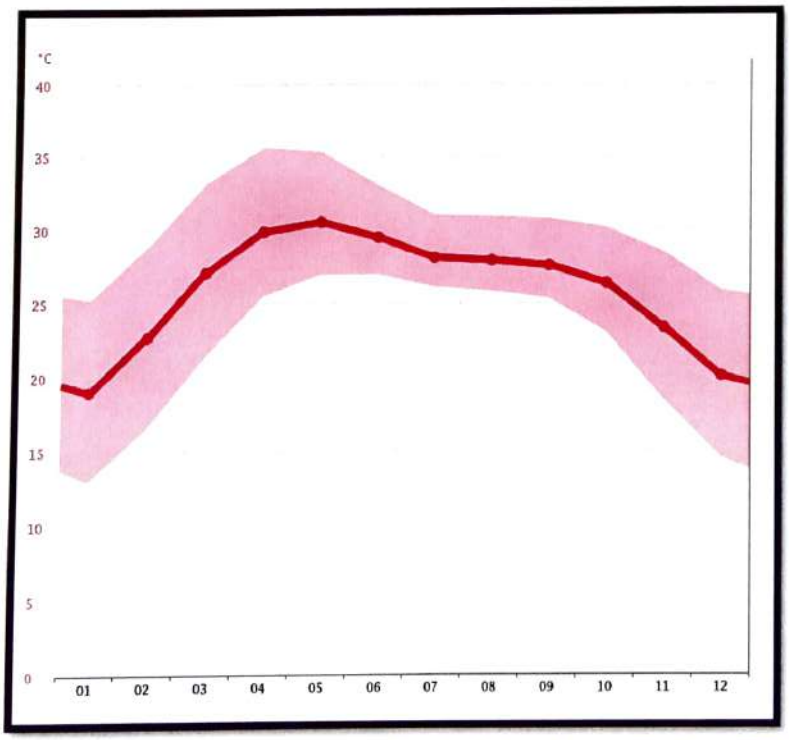
Source: https://en.climate-data.org/asia/india/west-bengal/kolkata-2826

RAINFALL-TEMPERATURE GRAPH OF KOLKATA



Data source: https://en.climate-data.org/asia/india/west-bengal/kolkata-2826

AVERAGE TEMPERATURE BY MONTH IN KOLKATA



Data source: https://en.climate-data.org/asia/india/west-bengal/kolkata-2826

INTERNAL QUALITY ASSESSMENT CELL (IQAC)

In order to advance long-term quality standards, recognized institutions must establish Internal Quality Assurance Cells (IQAC's). The INTERNAL QUALITY ASSESSMENT CELL (IQAC), a crucial part of the college's administration, enhances the campus's quality culture. IQAC"s adventure began on December 18, 2009. The IQAC works to ensure that all participants maintain high standards so they can assume leadership roles in the demanding future environment. It works in tandem with non-teaching personnel, teachers, administrators, and students to ensure quality maintenance and coordination.

The IQAC team evaluates the adequacy of the facilities provided to stakeholders. Any new ideas for improving postsecondary education research and instruction standards are warmly welcomed by the IQAC team. Every academic session, IQAC follows a predetermined plan of activity.

PLAN OF ACTION:

A Green Campus is a place where environmentally friendly practices and education combine to promote sustainable and eco-friendly practices in the campus. The green campus concept offers an institution the opportunity to take the lead in redefining its environmental culture and developing new paradigms by creating sustainable solutions to environmental, social, and economic needs of the mankind. Keeping these facts in mind, the college's IQAC ensures to implement the Green Audit idea on campus as a regular activity, with the following goals in mind:

- To create and announce the college's green policy.
- To increase the stakeholders' knowledge and sensitivity of the various environmental issues and dangers that the college and its surroundings face.
- To establish a set of "green standards" that the college will always strive to meet.
- To have a professional third-party auditor provide expert advice on how to promote environmentally friendly operations.

EXECUTIVE SUMMARY

To discover and ascertain whether an institution's actions are ecologically sound and sustainable, green auditing is a crucial first step. We have always been honest and productive consumers of the environment. However, excessive use of resources such as petrol, electricity, and water has become ingrained in everyone over time, particularly in urban and semi-urban areas.

All these procedures are standardized by green audit, which also offers an effective method of using natural resources. It is vital to reevaluate the procedures and transform them into green and sustainable ones in the face of resource depletion and climate change. A method for it is provided by green audit. Additionally, it raises general understanding of environmental sustainability among those employed by the organization.

The primary focus of this audit was on greening indicators, such as the campus's carbon footprint, waste management procedures, soil and water quality, vegetation, and power and fossil fuel consumption. The Internal Quality Assessment Cell (IQAC) of Rani Birla Girl's College in Kolkata, West Bengal, on behalf of the Principal, requested that the auditor perform a Green Audit of the campus in compliance with the Green Campus Evaluation Plan.

On 8th December 2022, the auditor paid a visit to the college campus and carried out a field survey. The Principal's information and baseline data were examined and recorded as the study's backdrop. The team gathered field data on the campus's floristic variety in addition to other elements as required by the Green Audit. Physical inspection revealed that, while being a degree-granting institution, this college primarily focuses on providing high-quality education in the Arts and Geography streams. The college does not now have the necessary facilities for a science stream. Nevertheless, despite having very little funding, the college's administration, and Internal Quality Assessment Cell (IQAC) have organized and maintained several environmentally friendly activities on campus.

During the campus visit, it was also noted that certain departments have excellent instrumentation and development. Notably, the geography department offers excellent infrastructure for funded projects and is well-stocked with tools and maps. In the little space that it has, the library section is kept in good condition. The LED bulbs were found to be in use, which is a fantastic move to save electricity. In addition, work was underway to prepare the soil for the medicinal plant garden development on the vacant property, and the college

administration stated that the garden will be developed soon, if there are enough funds. Additionally, it has been noted that, should funding be available, the institution may be encouraged to offer biological science courses. This will enable it to better maintain its medicinal plant garden and employ environmentally and eco-friendly practices.

The audit's goal was to confirm that campus procedures adhered to the environmental policy the university had embraced. The development and completion of a questionnaire, a campus tour, an examination and assessment of the documentation, key person interviews, data analysis, measurements, and suggestions were all part of the approach. It focuses on several aspects of a "Green Campus," such as waste management, biodiversity mapping, energy efficiency, and plantation management. Considering this, the audit's specific goals were to assess the colleges' compliance with relevant laws, rules, and standards, as well as the suitability of the environmental sustainability management control structure. It can have a significant effect on the environment, learning college operating costs, and student health.

The primary conclusions of this college's current green audit indicate that, for the most part, all departments and students understand the significance and necessity of doing green, eco-friendly actions and conserving the environment. Additionally, it was noted that the school adheres to several green initiatives, including upkeep of a garden, tree planting, water conservation, good waste management, etc. Nevertheless, a thorough examination revealed that many of the institution's methods are still in their infancy and require more development because the college has very few resources, including land, staff, facilities, etc.

The care of the college's environmentally friendly buildings and campus, as well as the high standards in the curricular and extracurricular areas, demonstrate the commitment of the College Authority, especially the Principal, the Internal Quality Assessment Cell (IQAC), and the Department of Geography, despite the institution's limited funding. Through the introduction of good changes to the socioeconomic and educational condition of the state and the country, it gives an ideal vision of education and is responsive to the problems of a growing India in a globalized world.

GREEN AUDIT – ANALYSIS

1.1. FINDINGS ON FLORAL DIVERSITY OF THE CAMPUS

The goal of the Rani Birla Girls' College is to provide to its student wholistic education in a liberal, progressive, and enlightened setting. The institution is housed at Shakespeare Sarani, which is ideally located and easily accessible from the intersection of Jawaharlal Nehru Road and A.J.C. Bose Road.

The significant findings from the current visit to this college campus show that a considerable diversity of flora is supported despite the institution's tiny size. On campus, there are 42 taxa of plants, including trees, herbs, and shrubs (Table 1). The vast majority of plants are native to the area. Many plant species are important commercially and have therapeutic advantages.

The committee also observed that there are currently very few name plates for the plants that are present in the gardens on the temporary sheets. The team recommends that plant name plates include the scientific name, local name (if available), family, and any known medicinal benefits in an effort to increase awareness among students and teachers. Furthermore, it will be very beneficial to conserve and catalogue the campus's biodiversity given its significance. It was also observed that a number of common animals and birds depend on the campus's greenery as a critical habitat. Therefore, proper, and sustainable management is required to maintain the campus's cleanliness and greenery.

Table 1. List of the Plant taxa recorded in the college campus

Sl. No.	Family	Scientific Name	Bengali Name	Common Name
1	Acanthaceae	Justicia adhatoda L.	বাসক	Vasaka/Malabar Nut
2	Acanthaceae	Andrographis paniculata (Burm.f.) Wall. ex Nees	কালমেঘ	Green Chiretta
3	Anacardiaceae	Mangifera indica L.	আম	Mango
4	Apocynaceae	Plumeria pudica Jacq.	কাঠচম্পা	Bridal Bouquet
5	Apocynaceae	Alstonia scholaris (L.) R.Br.	ছাতিম	Blackboard Tree
6	Araceae	Dieffenbachia seguine (Jacq.) Schott		Dumbcane
7	Araceae	Epipremnum aureum (Linden & André) G.S.Bunting		Money Plant
8	Arecaceae	Livistona chinensis (Jacq.) R.Br. ex Mart.	সুবাবুল	Chinese Fan Palm/ fountain palm
9	Arecaceae	Cocos nucifera L.	নারকেল	Coconut
10	Arecaceae	Caryota mitis Lour.		Fishtail Palm
11	Arecaceae	Areca catechu L.	সুপারি	Betel-nut Palm
12	Arecaceae	Chrysalidocarpus lutescens H.Wendl.		Palm
13	Asparagaceae	Cordyline fruticosa (L.) A.Chev.		Cordyline Plant
14	Asteraceae	Tagetes erecta L.	ফরাস গাঁদা	French marigold
15	Asteraceae	Tridax procumbens L.	ত্রিধারা	Coat Buttons
16	Asteraceae	Cyanthillium cinereum (L.) H.Rob.		
17	Cyperaceae	Cyperus rotundus L.		
18	Euphorbiaceae	Codiaeum variegatum (L.) Rumph. ex A.Juss.		Croton
19	Euphorbiaceae	Euphorbia tithymaloides L.	রাং চিতা	Redbird Flower
20	Euphorbiaceae	Euphorbia hirta L.	বারখেরিনি	Dove Milk
21	Euphorbiaceae	Phyllanthus niruri L.		
22	Euphorbiaceae	Euphorbia milii Des Moul.	কাঁটা মুকুট	Crown-of-thorns

23	**Euphorbiaceae**	Acalypha indica L.	মুক্তা ঝুরি	Indian Copperleaf
24	**Fabaceae**	Tamarindus indica L.	তেঁতুল	Tamarind
25	**Fabaceae**	Grona triflora (L.) H.Ohashi & K.Ohashi		
26	**Lecythidaceae**	Couroupita guianensis Aubl.	নাগচম্পা /কামানগগালা	Cannon Ball tree
27	**Malvaceae**	Hibiscus rosa-sinensis L.	জবা	Chinese Hibiscus
28	**Meliaceae**	Azadirachta indica A.Juss.	নিম	Neeon Tree
29	**Moraceae**	Ficus benghalensis L.	বট	Banyan tree
30	**Moraceae**	Artocarpus heterophyllus Lam.	কাঠাঁল	Jackfruit
31	**Myrtaceae**	Syzygium cumini (L.) Skeels	জাম	Java Plum
32	**Nyctaginaceae**	Bougainvillea spectabilis Willd.	বাগান বিলাস	Bougainvillea
33	**Poaceae**	Cynodon dactylon (L.) Pers.	দূর্বা	Scutch grass
34	**Poaceae**	Digitaria ciliaris (Retz.) Koeler		Southern Crabgrass
35	**Rubiaceae**	Neolamarckia cadamba (Roxb.)	কদম্ব	Kadamba
36	**Rubiaceae**	Ixora pavetta Andrews	রঙ্গন	
37	**Rubiaceae**	Ixora coccinea L.		
38	**Rubiaceae**	Gardenia jasminoides J.Ellis		
39	**Solanaceae**	Solanum nigrum L.		Grasses
40	**Verbenaceae**	Duranta erecta L.	কাটা মমগেন্দি	pigeon berry
41	**Verbenaceae**	Clerodendrum infortunatum L.	ভাংট , ঘঘংটু	

1.2. QUALITY ASSESSMENT OF SOIL AT RANI BIRLA GIRLS' COLLEGE:

Soil sample collection by the students for soil testing (13th December):

SOIL PROPERTIES	VALUE	REMARKS
pH	8.5	Strongly Alkaline
Nitrate Nitrogen	18 Lbs/acre	Medium
Ammoniacal Nitrogen	13 Lbs/acre	Low
Potassium	250 to 350 lbs/acre	High
Phosphate	Less than 20 lbs/acre	Very Low
Organic matter	Below 0.5%	Very Low
Salinity	0.1 PPT	Very Low

Source- Lab Report, Department of Geography, Rani Birla Girls' College

RECOMMENDATIONS

SUGGESTIONS AND RECOMMENDATIONS

Based on observations and resource availability, the auditor makes the following recommendations during a green audit to the college authority, asking for their thoughtful consideration.

1. To raise awareness among students and teachers, all plants on campus must be properly identified with name plates that provide the plant's botanical name, family, local name, and any economic or medical significance.
2. By adding native medicinal (herbal) and commercially significant species, a tiny medicinal plant garden may be established on campus. (A proposed list is provided in table 2).
3. To raise general awareness among students about biodiversity conservation, campus events such as debates on environmental awareness, and green skill development may be arranged on a regular basis.
4. Increasing the variety of containers available can help the college's waste management efforts. Laboratory and non-biodegradable trash can be disposed of by working with a licensed, experienced company.
5. The biodegradable wastes can be turned into vermicompost or bio-compost, which can be utilised again for gardening to promote self-sustainability.
6. If available, energy-saving lightbulbs and electric appliances should be used to lower energy usage.
7. To preserve and enhance the campus's environmental health as well as that of its students and professors, the campus should undergo periodic assessment and green auditing.
8. Education-related graffiti featuring phrases and slogans from notable individuals, especially female scientists, might be strategically positioned to motivate students.
9. College campuses can install rainwater collection systems.

Table 2. Suggested Medicinal Plants for plantation in the College Garden.

Sl.No.	Name of the medicinal plants	Uses
1	Rauvolfia serpentina (L.) Benth. Ex Kurz	Hypertension, high blood pressure.
2	Justicia adhatoda L.	Bronchial disease, cough,
3	Holarrhena pubescens Wall. ex G. Don	Dysentery, Diarrhea, Fever, Diabetes, Malaria.
4	Vitex negundo L.	Skin disease, Eczema, Ringworm, Liver disorder, Spleen enlargement.
5	Saraca asoca (Roxb.) Willd.	Dysmenorrhea, Depression, Leucorrhea
6	*Lawsonia inermis* L.	Skin disease, Anti-hemorrhagic, Leprosy
7	*Nyctanthes arbor-tristis* L.	Sciatica, Arthritis, Fever, Dry cough, Ringworm,
8	*Catharanthus roseus* (L.) G.Don	Diabetes, Malaria, Leukemia
9	*Aloe vera* (L.) Burm.f.	Antioxidants.
10	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson	Fever, Jaundice, Chronic Diarrhea, Cancer, Dysentery, Bone Fracture, Pain, Asthma, Skin Disease, Poisonous Insect & Snake Bite, Eye Disorders.
11	*Phyllanthus emblica* L.	Source of Vitamin C, Improves Immunity and nourishes eyes, hair and skin.
12	*Ocimum tenuiflorum* L.	Useful in Cough, Asthma and Fever, Anti-Oxidant
13	*Centella asiatica* (L.) Urb.	Diarrhea, Dysentery, Healing Property
14	*Oxalis corniculata* L.	Use for treatment of Influenza, Fever, Urinary Tract Infections, Enteritis, Diarrhea, Traumatic Injuries and Sprains.
15	*Eclipta prostrata* (L.) L.	Ayurvedic medicine, the leaf extract is considered a powerful liver tonic, rejuvenate, and especially good

CONCLUSION

Significant team discussions and meetings with important staff members on a range of environmental-related topics are part of this audit. The Rani Birla Girls' College nature club encourages resource protection with all, 40% of a college campus is covered with green space and 60% is used for landscaping. The College considers the environmental impact of most of its operations and makes a concerted effort to act in an environmentally friendly manner. Despite its generally good performance, the College can still strive to enhance its procedures and become a more sustainable organization by following the recommendations in this study.

It's crucial to start a few things, such drip irrigation and inspecting the tap flow. We also strongly suggest placing water balance reports and water meters for each building or block.

REFERENCES

- Relevant Indian Standard Code practices
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Water [Prevention & Control of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- Energy Conservation Act 2010.
- E-waste management rules 2016
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)

ANNEXURE – PHOTOGRAPHS OF ENVIRONMENT CONSCIOUSNESS

Spacious and well equipped computer lab

Classrooms as per NBC guidelines with more than 40% window ratio

Color-coded Dustbins

Lush Green Campus

Gardening inside the College Campus

Installed Stop-watch in Water tank to prevent water wastage

Gardening inside the College Campus

Well-maintained College Campus

Poster making activities

Cleanliness drive

Cleanliness drive outside campus

********** END OF THE REPORT **********

ENERGY AUDIT REPORT

Link as hosted on the official website of the college:

https://www.rbgc.ac.in/Audit-Reports/Energy_Audit_2022-23.pdf

RANI BIRLA GIRLS' COLLEGE

Affiliated to The University of Calcutta

38, SHAKESPEARE SARANI
KOLKATA: 700017

ENERGY AUDIT REPORT

PERIOD OF ASSESSMENT

APRIL 2022 – MARCH 2023

12/06/23

Debiprasad Maiti
MBA (Power), B.Tech (Elec), Assistant Engineer
West Bengal Medical Services Corporation Ltd.
(wholly owned by Govt. of W.B.)

Audited By:
Debiprasad **Maiti**
B.Tech(Elec) Assistant Engineer
West Bengal Medical Services Corporation Ltd.

Acknowledgement

The Auditors places on record its sincere thanks to the management of Rani Birla Girls' College, University of Calcutta for their interest and cooperation for conduction detailed Energy Audit. The interactions and deliberations with Rani Birla Girls' College, Shakespeare Sarani (Kolkata), team were exemplary and the whole exercise was thoroughly a rewarding experience.

We thank the team members involved for providing all necessary coordination and information. The study team acknowledges the vital support and contributions of Dr. Srabanti Bhattacharya, Principal, Rani Birla Girls' College, University of Calcutta. e-mail: rbgcprincipal@gmail.com

Our sincere gratitude goes to Ms. Sushmita Das, IQAC Coordinator, Rani Birla Girls' College.

We thank Dr. Keya Dutta, Assistant Professor in History for coordinating the process of Energy Audit.

We also thank Department of Geography, Rani Birla Girls' College, especially Dr. Chalantika Laha Salui, Assistant Professor for their all support and cooperation for making this report successfully.

Table of Content

SECTION-1

INTRODUCTION

1.1 Background

Availability and utilization of energy drives the growth of economy and advancement of any country and thus, the demand of energy is increasing day by day. The worldwide mounting energy crisis with galloping cost hike, concern for environmental protection and open market competitive economy possesses serious challenge to Indian College to survive and grow.

One of the easier available options for survival is 'Energy Conservation' thereby saving environment and cost reduction through strategic energy management. It also gives a positive orientation to energy cost reduction, preventive maintenance and quality control programs. This is the translation of conservation ideas into reality by blending techno-economically feasible solutions within a specified time frame.

Energy conservation is a worldwide objective. The energy policy of the Government of India calls for conservation of energy. With the enactment of Energy Conservation Act-2001 amongst others has emphasized upon the power of the appropriate Govt. to enforce efficient use of energy and its conservation.

This study has mapped power system parameters at the source, Distribution Panels and various equipment's. It has also mapped illumination level at various activity areas in the RANI BIRLA GIRLS COLLEGE, where the team was permitted to enter for the study. The study could identify concerned problem areas, barriers towards maintaining right use of available facilities and come out with cost effective solutions. It also recommends cost effective and fast pay back solutions for performance improvement of all the systems.

1.2 Objective of the Study

The objective of the study is to assess overall efficiency of the various systems and defined pacific energy consumption of the public building and make recommendations about potential energy saving opportunities, based on the observation of energy audit.

- Electrical Structural details
- Use & occupancy of the building.

➢ Energy supply features

➢ Details of systems/equipment's/appliance etc.

➢ Quality of power

1.3 Methodology for Energy Audit

Detail energy audit consists of evaluation of the present trend of energy consumption. Energy Audit activities, in general, include.

➢ The activity starts with collection of basic information and general overview of the - RANI BIRLA GIRLS COLLEGE -Based on the dissections with Dr. Srabanti Bhattacharya, Principal, RANI BIRLA GIRLS COLLEGE, University of Calcutta.

➢ RANI BIRLA GIRLS COLLEGE was requested to provide the electricity bills for last 1 year

➢ Identification of energy streams.

➢ Quantification of energy streams into discrete functions (system/ equipment's/ appliances etc.)

➢ Identification of energy and cost savings opportunities.

➢ Establish measurement and verification protocol i.e., objective measurement through meters by identifying measurement points.

➢ Required data collection, field measurements and analysis of data, etc.

The Deliverables are a report consisting of following:

a) The main energy-consuming equipment's performance and the suggested energy-saving solutions.

b) The financial computation of the associated investment and the rate of return.

c) Assess the building's use and occupancy as well as the state of the structure and the equipment that supports its systems.

1.4 About Rani Birla Girls College, University of Calcutta

Rani Birla Girls' College was established in July 1961 as an undergraduate arts college affiliated to the University of Calcutta by the Hindusthan Charity Trust in the memory of Rani Jogeshwari Devi Birla to serve as a women's educational institution and to impart a comprehensive learning programme to its students within an enlightened, liberal and

progressive milieu. Undergoing a remarkable transformation, this college departed from its initial apparatus of governance (by a private Trust) to function as an aided institution under the Government of West Bengal.

The institution holds the distinction of being the bearer of a teaching and learning legacy of more than six decades and has been relentless in its pursuit of excellence. This college has maintained good academic performance with consistency. Co-curricular training and value-orientation have been equally prioritized within the institutional agenda. The college is very conveniently located on Shakespeare Sarani and is easily accessible from both the A.J.C. Bose Road and Jawaharlal Nehru Road intersections of Shakespeare Sarani. It is adjacent to Bharatiya Bhasha Parishad and Macpherson Square.

1.5. Status of the college building

Rani Birla College comes under the University of Calcutta and it is established in the year 1961, imparting higher education in the field of Arts. It is located in a rented building in the heart of the capital of West Bengal and in prime location i.e. Shakespeare Sarani, Kolkata. The college is running in the rented property with an area of 1 Bigha 4 Katha and 2 Chatak (nearly 32,535 sq. ft). out of the total area, 11,330 sq. ft is built-up. The premise has a playground of 8020 sq. ft area. The College admits students from all social milieus and empowers them through intensive mentoring and counselling to face the challenges of life and become responsible and sensitized citizens of the country. RBGC provides a caring and nurturing

environment where students come into their own, blossoming into confident young women ready to face the world.

Building Name	Building Square Footage (m^2)	Age of Building (years)	Purpose of Building	Number of Floors	Daily Operational Hours	Days of Use per Week	Average number of occupants
Main Building (Total Campus)	11,330 sq. ft	Nearly 80 years	Academic and Administrative	3	8	6	700
Anex-I Building		Nearly 80 years	Academic and Administrative	2	8	6	120
Anex-II Building		Nearly 80 years	Academic	2	8	6	50

SECTION-2

Electrical Supply & Billings

2.1. Energy Sources

Electricity is the major energy sources of the college. Electricity is supplied by CESC, Kolkata. Diesel oil is being used in the DG sets for in-house generation of electricity during power cut.

2.2. Energy Consumption

For the Unit / college, the applicable CESC electrical tariff is in two parts i.e. a fixed cost (Demand Charges) and unit (kWh) rate. The average monthly unit consumption of the college is 1560.71 kVAh and the average monthly electricity bill amount is around Rs. 15,233/- (April 2022 to March 2023).

2.3. DG Sets

There is a DG set available in the college of capacity 63 kVA for in house generation of electricity. This control panel model of DG has rated voltage of 415v and rated current of 86.8 A. The DG is with rated frequency of 50 Hz. As the power supply is very good in the area so the running hour of DG set is very less. It is advisable to put an energy meter on each DG set then it would be easy to conduct the efficiency of DG set. This way, the operator could also note down the unit generation and oil consumed. The operator may record the operating parameters of the sets in the following manner in future.

The mechanical details like temperature, lube oil etc. should be in addition to the above. From the above data, the management may calculate the offices generated by the DG set in an hour and total diesel consumption. The offices generated per litre of diesel consumed can hence be calculated on an hourly basis. Thereafter, the monthly figures can be calculated in the similar fashion. It may be noted that the efficiency of the DG set depends largely on the operating load factor. The maximum efficiency of the DG set is available at about 80-85% load factor.

Annual average Electricity consumption as per electric bill			Diesel consumption (lit)	Diesel consumption Amount (Rs)	AMC (Rs)	Other Maintenance cost (Rs)
Duration	Electricity (kVA)	Electricity Cost (Rs)				
April 2022 to March 2023	1560.71	15233/-	20 lit	1854/-	10,620/-	3,000/-

2.4. Air Conditioning

There are three window ACs. One in the Office and two in the ground floor of the main building. Two split Acs are installed in the 2nd Floor. Each one is with 1 ton capacity.

2.5. Computer

There are all together 54 computers used in various departments as well as in college administration. In the main building, in ground floor, Principal's office and Geography Department have 11 desktop computers. Office in the ground floor of Anex-I building has 6 computers. In the first floor of main building, Library has 6 desktop computers, other departments like B.FAD and Zonal have 12 desktop computers. In the second floor, Journalism department has 9 desktop computers. In Anex-2 building, there are 10 desktop computers under C.M.E.V.

2.6. CCTV Cameras

24 hours CCTV surveillance is available in the whole campus of the college. All together 11 active CCTV cameras and 2 surveillance screens are there. CCTV cameras are installed in the entrance of college. Other places like entrance of office, Principal's office and stairs, lobbies, library are under CCTV surveillance.

SECTION-3

Lights, Fans, Air-condition

3.1 LIGHTING

Building Name	Floor	Light source	Light number	Type of light (Normal / CFL)	Wattage	Number of days institution open	Number of hours lights are left on each day
Main Building	Ground Floor	Tube light	32	CFL-21 Normal-11	40 watt each	6 days / week	8 hrs
	1st Floor	Tube light	49	CFL-43 Normal-06	40 watt each	6 days / week	8 hrs
	2nd Floor	Tube light	19	CFL-13 Normal-06	40 watt each	6 days / week	8 hrs
Annex Building	Anex-1	Tube light	18	CFL-11 Normal-07	40 watt each	6 days / week	8 hrs
	Anex-2	Tube light	8	CFL-04 Normal-04	40 watt each	6 days / week	8 hrs

3.2. FAN

Saving on Replacement of Ceiling Fan with Energy Efficient fans	
Total no. of fan nos.	
Ground Floor	23
1st Floor	28
2nd Floor	22
Anex-1	14
Anex-2	09
running hours per day	8 hrs

3.3. AIR CONDITIONING LOAD

In the Unit/ college, there are 3 window AC of 1 ton capacity in ground floor and office. Two 2 star rated Split AC in the second floor. Air-conditioners to maintain comfort temperature in the Auditorium/ office etc. Package units are installed mainly for the Auditorium. Due to the study being done in winters, the Energy efficiency assessment could not be done for the ACs. It is recommended that whenever new split/ window ACs are being installed, it should be 5 stars rated. Filters of package units were also checked during study which was found very clean. Energy Consumption in star rated split office is given above for information.

Star rated window ACs are also available in the market. It also consumes similar power as there in split office. Proper cleaning of ACs is very important for its output performance. At least, once in two months cleaning of ACs filter is recommended during the season.

AC				
Building Name	Floor	No. of AC	Type of AC	Capacity
Main Building	Ground Floor	2	Window	1 ton
	2nd Floor	2	Split **	1 ton
Annex Building	Anex-1	1	Window	1 ton

3.4. COMPUTERS

Building Name	Floor	Type of Computer	Number of Computer	Usage duration / day	Number of days institution open
Main Building	Ground Floor	Desktop	11	8 hrs	6 days / week
	1st Floor	Desktop	18	8 hrs	6 days / week
	2nd Floor	Desktop	9	8 hrs	6 days / week
Annex Building	Anex-1	Desktop	6	8 hrs	6 days / week
	Anex-2	Desktop	10	8 hrs	6 days / week

3.4. CCTV CAMERAS

Building Name	Floor	Number of CCTV camera
Main Building	Ground Floor	4
	1st Floor	4
	2nd Floor	1
	3rd Floor	2

SECTION – 4

Recommendation

Fans

- Employ fan blades designed like aero foil.
- Turn off fans when not in use.

Lighting

- Make use of occupancy sensors to control wastage of electricity.
- Install a greater number of energy-saving substitutes for incandescent lights in place of normal tube lights.
- To permit utilising fewer fixtures, think about reducing them.
- Reassess the type, control, and strategy of outside lighting. Take firm control over it.
- Installation of some solar energy fixtures to reduce energy consumptions.

Buildings

- Take into account new thermal windows, doors, roofing insulation, etc.
- For windows facing the sun, take into account coatings and shades in addition to tinted or reflective glass.

12/06/23
Debiprasad Maiti
MBA (Power), B Tech (Elec) Assistant Engineer
West Bengal Medical Services Corporation Ltd.
(wholly owned by Govt. of W.B.)

Certificates from Recognized Agencies

Rani Birla Girls College, Kolkata formed a waste management committee to act regularly to maintain the green campus of the college. A collaboration was initiated with VITAL WASTE COMPANY and they conducted a Waste Audit for the period of June to August, 2024. College initiated for its E-waste recycling and recycled 495 kgs of paper waste and 209 kgs of metal waste and received certificates from the company for conserving environment.

Certificate from VITAL WASTE for 495 kgs of papers

CERTIFICATE NO.: VW/2023-2024/CER/0007

VITAL WASTE

A RECYCLING AND WASTE MANAGEMENT COMPANY

CERTIFICATE

OF ENVIRONMENTAL EXCELLENCE

IN RECOGNITION OF THE SPIRIT TO CONSERVE THE ENVIRONMENT AND FOR MAINTAINING HIGH STANDARDS OF RECYCLING, WE ARE HAPPY TO CERTIFY

Rani Birla Girls' College

HAS RECYCLED 495 KGS OF PAPERS WHICH NEARLY SAVED 8 TREES

Pranav Goel

PRANAV GOEL
Director Vital Waste
A Brand Of Redivivus Recyclers Pvt. Ltd.

08-01-2024

DATE

www.vitalwaste.com | 033-66064288 |

Certificate from VITAL WASTE for 209 kgs of metals waste

CERTIFICATE No.: VW/2023-2024/CER/0005

VITAL WASTE

A RECYCLING AND WASTE MANAGEMENT COMPANY

CERTIFICATE

OF ENVIRONMENTAL EXCELLENCE

IN RECOGNITION OF THE SPIRIT TO
CONSERVE THE ENVIRONMENT AND FOR
MAINTAINING HIGH STANDARDS OF RECYCLING,
WE ARE HAPPY TO CERTIFY

Rani Birla Girls' College

HAS RECYCLED 209 KGS OF METAL WASTE.

Pranav Goel

PRANAV GOEL
Director Vital Waste
A Brand Of Redivivus Recyclers Pvt. Ltd.

08-01-2024

DATE

www.vitalwaste.com | 033-66064288 |

Certificate from VITAL WASTE for 290 kgs of E-waste

CERTIFICATE NO.: VW/2023-2024/ W... 03

VITAL WASTE

A RECYCLING AND WASTE MANAGEMENT COMPANY

CERTIFICATE

OF E-WASTE RECYCLING

This certificate is proudly presented to

Rani Birla Girls' College

For the ethical collection and channelization for recycling of 290 kgs of E-Waste.

This document certifies that all materials/equipment have been channelized for recycling under standard set down in the E-waste (Management) Rules, 2016 and amendments thereafter

08-01-2024

DATE

CERTIFIED ISO 14001:2015 COMPANY

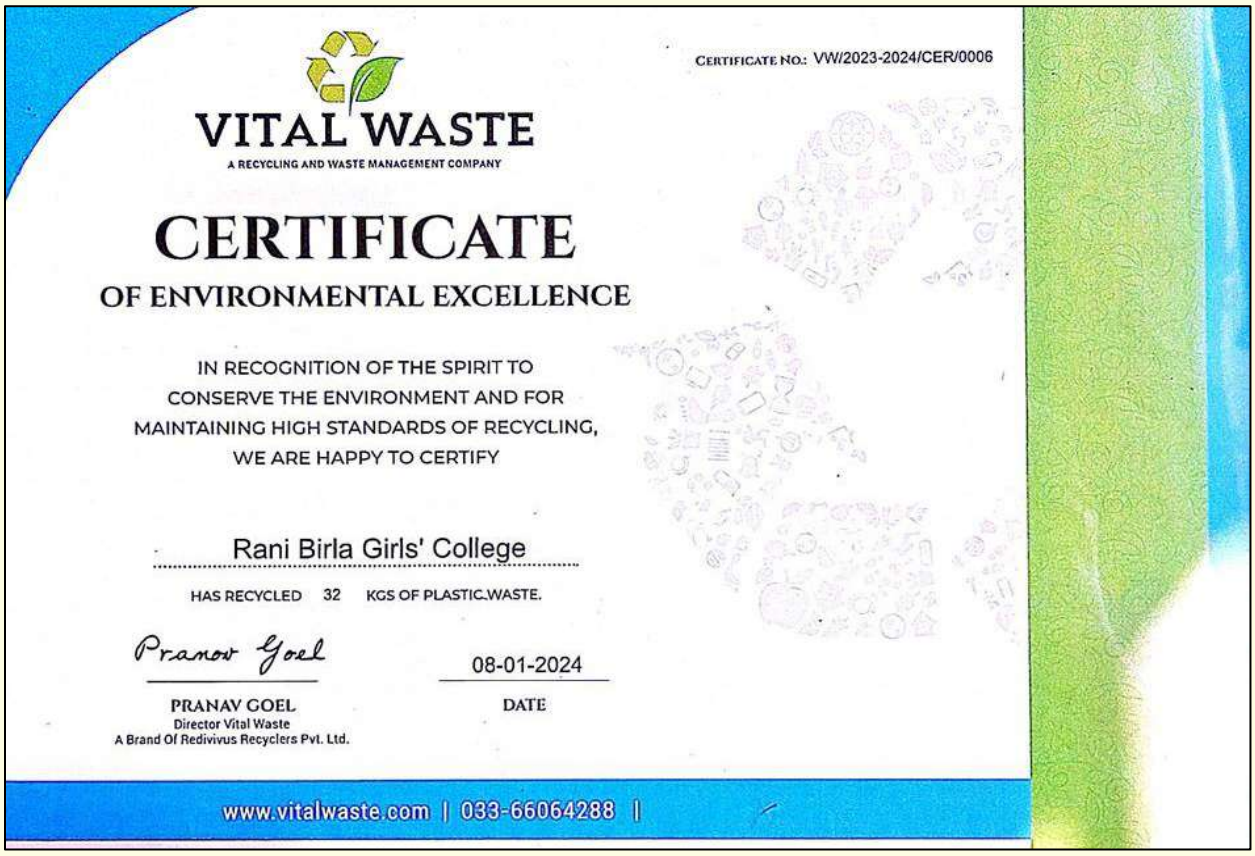
Pranav Goel

CHIEF EXECUTIVE OFFICER

E-WASTE

CPCB REGISTRATION NO.: B-29016(141)/(PRO)/2022/WM-III Division

Certificate from VITAL WASTE for 32 kgs of plastic waste



CERTIFICATE NO.: VW/2023-2024/CER/0006

VITAL WASTE

A RECYCLING AND WASTE MANAGEMENT COMPANY

CERTIFICATE

OF ENVIRONMENTAL EXCELLENCE

IN RECOGNITION OF THE SPIRIT TO
CONSERVE THE ENVIRONMENT AND FOR
MAINTAINING HIGH STANDARDS OF RECYCLING,
WE ARE HAPPY TO CERTIFY

Rani Birla Girls' College

HAS RECYCLED 32 KGS OF PLASTIC WASTE.

Pranav Goel

PRANAV GOEL
Director Vital Waste
A Brand Of Redivivus Recyclers Pvt. Ltd.

08-01-2024

DATE

www.vitalwaste.com | 033-66064288 ||

Report from VITAL WASTE

VITAL WASTE

A RECYCLING AND WASTE MANAGEMENT COMPANY

WASTE AUDIT REPORT

REPORT NUMBER: VW/2023-2024/AR/0004

PREPARED FOR
Rani Birla Girls' College

PERIOD
1/6/2024
TO
1/8/2024

OVERVIEW

Vital Waste has been appointed to conduct waste management of various types of solid wasteat your premises. A Waste Audit Report has been prepared as per the waste collection done.

PURPOSE

The purpose of the audit was to identify, quantify and analyse the composition of the waste stream generated by the collective functional areas within the Premises.

SUMMARY

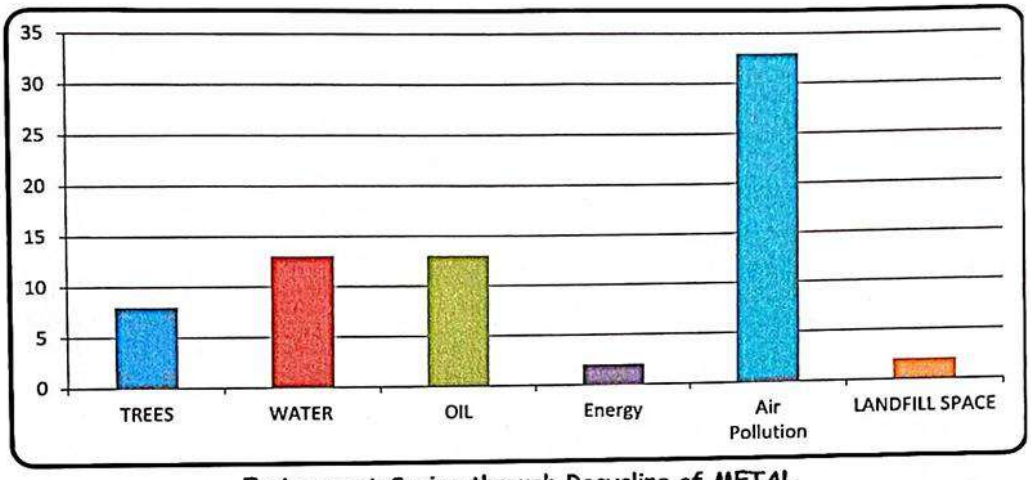
The total amount of solid, non-hazardous waste generated is estimated to be as below:-

1. PAPER	495 KGS
2. METAL	499 KGS
3. PLASTIC	32 KGS

Enclosure - Graphical Representation of Environmental Impact through Recycling.

Environment Saving through Recycling of PAPER

TREES	WATER	OIL	Energy	Air Pollution	LANDFILL SPACE
MATURE TREES	IN '000 LITERS	IN '000 LITERS	(MWH)	(Pounds)	(CUBIC METERS)
8	13	13	2	33	2

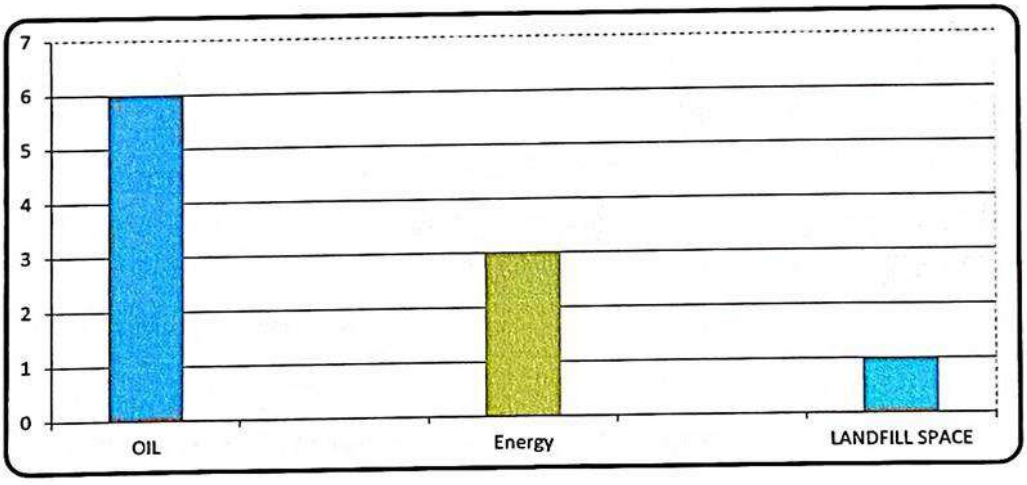


Environment Saving through Recycling of METAL

OIL
IN '0000 LITERS
6

Energy
(MWH)
3

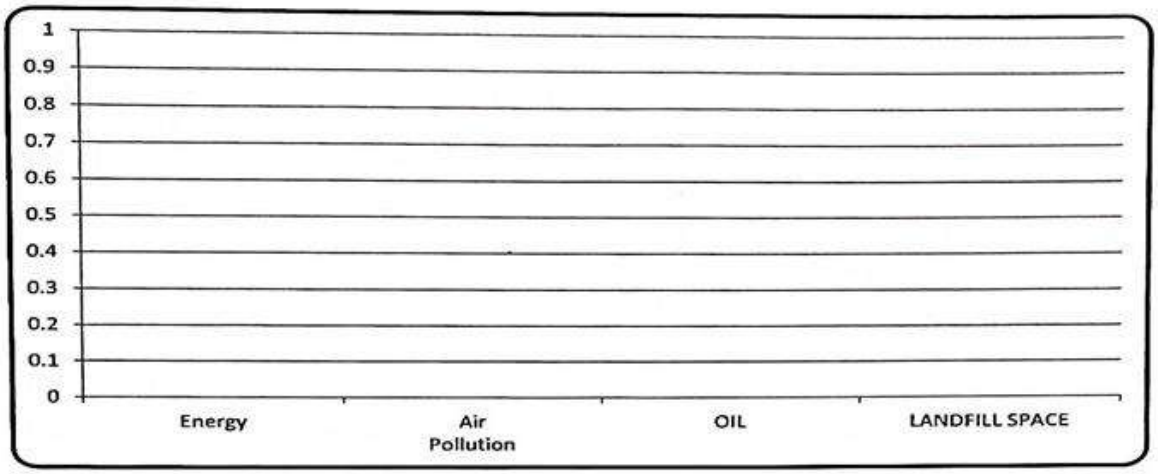
LANDFILL SPACE
(CUBIC METERS)
1



Environment Saving through Recycling of PLASTIC

Energy	Air Pollution	OIL	LANDFILL SPACE

(MWH)	(in '000 Pounds)	IN '00 LITERS	(CUBIC METERS)
0	0	0	0



We thank you for giving us the opportunity to help you Reduce,Reuse and Recycle materials from your existing waste stream and provide you a foundation for a Waste Reduction Work Plan.

*Environmental Saving projections are made in accordance with the collection data available and are indicative figures only

Tree Plantation by NATURE CLUB

**** END OF THE REPORT ****