



Miranda House
UNIVERSITY OF DELHI



GREEN AUDIT REPORT

2022-2023

PREPARED BY
EHS ALLIANCE SERVICES



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CERTIFICATE



AUDIT CERTIFICATE

PRESENTED TO

MIRANDA HOUSE

GC Narang Road, University Enclave, New Delhi, 110007

Has been assessed by EHS Alliance Services for the comprehensive study of environmental impacts on institutional working framework to fulfill the requirement of

GREEN AUDIT

ACADEMIC YEAR 2022-23

The green initiatives carried out by the institution have been verified on the report submitted and was found to be satisfactory.

The efforts taken by the management and the faculty towards environment and sustainability are appreciated and noteworthy.

AUDITOR SIGNATURE



03.10.2023

DATE OF AUDIT

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ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Miranda House for assigning this important work of Green Audit. We appreciate the co-operation to the teams for completion of assessment.

First of all, we would like to thank **Prof. Bijayalaxmi Nanda - Principal** for giving us an opportunity to evaluate the environmental performance of the campus.

We are also thankful to **Dr. Saloni Bahri - Audit Coordinator and Convenor, IQAC**, for her continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

<i>Prof. Monika Tomar</i>	<i>Ex-Officio Member, IQAC</i>
<i>Prof. Rekha Kumari</i>	<i>Convenor, MH Vatavaran</i>
<i>Dr. Deepali</i>	<i>Convenor, Garden Committee</i>





DISCLAIMER

EHS Alliance Services Audit Team has prepared this report for Miranda House based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

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 informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express 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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A handwritten signature in blue ink, appearing to read 'J. Day'.

Signature

LEAD AUDITOR

CONCEPT AND CONTEXT

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2019–20 onwards that all Higher Educational Institutions should submit an annual Green, Environment and Energy Audit Report. Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

In view of the NAAC circular regarding green auditing, the College management decided to conduct an external environment assessment study by a competent external professional auditor. The green audit aims to examine environmental practices within and outside the college campus, which impact directly or indirectly on the atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of college environment. It was initiated with the intention of reviewing the efforts within the institutions whose exercises can cause risk to the health of inhabitants and the environment.

Through the green audit, a direction as how to improve the structure of environment and inclusion of several factors that can protect the environment can be commenced. This audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution, Energy Management & Carbon Footprint etc. being implemented by the institution. The concepts, structure, objectives, methodology, tools of analysis, and objectives of the audit as below:





INTRODUCTION

Now a days, the educational institutions are becoming more thoughtful towards the environmental aspects and as a result new and innovative concepts are being introduced to make them sustainable and eco-friendly. To preserve the environment within the institution, a number of viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the saving the energy, waste recycle, water consumption reduction, water harvesting and many more...

The activities carried out by the institution can also create adverse environmental impacts. Green audit is defined as an official inspection of the effects a college has on the environment. Green Audit is conducted to evaluate the actual scenario at the institution campus. Green audit can be a useful tool for a university /college to determine how and where they are using the most of the energy or water or resources; the institution can then decide how to implement changes and make savings. It can also be used to determine the nature and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

Green auditing and the application of mitigation measures is a win-win situation for all the institutions, the learners and the mother earth. It can also result in health awareness and can promote the environmental awareness, values and beliefs. It provides a better understanding to staff and students about the Green impact on institution. Green auditing also upholds financial savings through reduction of resource usage. It gives an opportunity to the students and teachers for the development of ownership of the personal and social responsibility. The audit process involves primary data collection, site walk through with the team of university /college including the assessment of policies, activities, documents and records.





OVERVIEW OF THE COLLEGE

Miranda House, college for women, located in the University of Delhi campus, is a premier women's institution. It was established in 1948 by the then Vice Chancellor, Sir Maurice Gwyer. Lady Edwina Mountbatten laid its foundation stone on March 7 in the same year. Originally designed by renowned architect Walter George, Miranda House is built in warm red brick with cool and spacious corridors. The College shares an architectural affinity with other colonial educational institutions of the country. In the past six decades, as the College has grown, several other buildings have been added in consonance with its original design. Special efforts are on to preserve the heritage of its pristine architectural glory.



Miranda House offers liberal education in social sciences, humanities and basic sciences to more than 3500 students. The faculty, renowned for its meritorious basis profile and versatile talent, is dedicated to the cause of liberal education. Through their three years at Miranda, our students develop a sense of social responsibility, intellectual rigour, and practical knowledge. They learn communication, analytical and problem-solving skills, and a demonstrated ability to apply their education to our complex and diverse world. The College has always maintained high academic standards. More significantly, it has provided students an enabling and creative environment to freely develop and express views that help them respond to changes in society.



The College has always maintained high academic standards. More significantly, it has provided students an enabling and creative environment to freely develop and express views that help them respond to changes in society. Being on the University campus, its proximity to other colleges facilitates the participation of Miranda students in several inter-college events, both academic and cultural. Those who will make the College hostel their home for the next three years have the privilege of residing in one of the most beautiful residential buildings on the University campus. The institution's philosophy is guided by a pedagogy that encourages the students to explore new domains, to critically examine the world around them and to question stereotypes.

The Legacy... traditions and institutional values

MH has a rich legacy. Established at dawn of independence it provided a unique opportunity to young women for quality higher education. They set for themselves high goals and ideals. They worked for a new society in which women would enjoy equal opportunity with men in professional and public fields. In this, they were abetted by the founding faculty who were independent minded, and belonged to the select group of highly educated women in independent India with a deep concern for quality of education they imparted. They were also charged with a spirit of adventure, steeped in idealism, and committed to women empowerment and the task of building a nation. Proud of their mission as early pioneers, they worked with single-minded devotion in setting the Miranda traditions. These attributes of total dedication have contributed in a large measure to the position of distinction occupied by the college. Over near seven decades of its existence, the college has grown from strength to strength, continuing to provide an atmosphere of high academic excellence and rich cultural activities to its students. The college has established a niche for itself amongst the globally recognized premiere institutions of higher learning.

Being a college established and maintained by the University, Miranda House has a special place among the women's colleges of the University of Delhi. Its location in the heart of the University Campus, and its close interaction with the various Departments of the University and other campus colleges gives it a unique advantage. Although a women's college, it is not a cloister. It welcomes interaction with other colleges and educational organizations across the country, actively engaging both men and women in all its extramural activities, competing with the best on equal terms.

The extremely distinguished list of alumnae imparts a sense of confidence and immense pride in students. They view themselves as torchbearers of great traditions. All this propels them to often explore uncharted territory, think unfettered, and bend traditions in a bid to create a better world, especially for women.



MISSION

The stated mission of the college is to provide

- a stimulating active learning environment attracting young women with exceptional desire to make a difference to the world
- highest quality liberal arts and basic science education through distinctive academic programmes that instill rigour in the pursuit of knowledge
- culturally sensitive inclusive environment upholding core values of respect for diversity
- enriching co-curricular activities linking education to the world of work and communities
- dedicated and responsive faculty of scholars to assist each student fulfill aspirations and reach milestones
- competencies for new domains of knowledge and the future of work in a globally connected world
- early mentoring for leadership instilling capacity to explore new ideas, take intellectual risk, and usher paradigm change



VISION

The Upanishadic maxim in the college logo “Swadhyayann pramaditavyam” enshrines Miranda House’s understanding of what education must accomplish and steers students towards introspection and self-learning.

Miranda House envisions a world where women have their rightful place and are given due recognition as leaders to reach top positions in all sectors of human endeavour. To give shape to this vision, Miranda House continually reaffirms and embraces its responsibility to build on its historic legacy of leadership in the education of women. It remains strongly committed to addressing issues of gender in all their complexity and preparing young women to:

lead professionally successful lives enriched by the love of learning
build personally fulfilling lives radiating integrity and strength of character
sustain purposeful engagement with the world with an open mind and balanced perspective
develop an understanding of their duty to nation and nation-building
meet with confidence the challenges they will encounter in their lives
flourish in a different cultural milieu in an increasingly interconnected world
uphold the core institutional values of respect for diversity, inclusiveness, and humanism
to emerge as leaders charged with new ideas and the capacity to make a difference.

Facilities in the campus

Amenities at Miranda provide far more than academic and administrative facilities on campus. It is dedicated to providing students with an exceptional infrastructure for learning as well as facilities for simplifying the procurement of fundamental skills. To accomplish this goal, Miranda House offers the following:

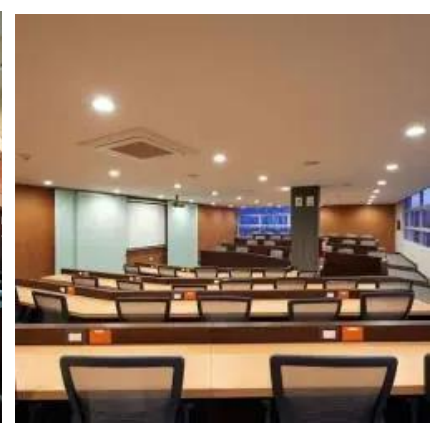
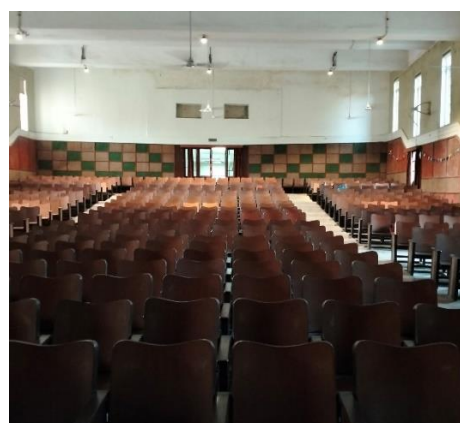
LIBRARY: The Miranda House Library was established on 7th March 1948 and the first book was accessioned on 22nd July 1948. The foundation stone of the present building was laid by Smt. Indira Gandhi, then Prime Minister of India on 7th March 1973. The Miranda House Library preserves and provides access to a rich and enduring source of knowledge to inform, inspire and engage its users in their intellectual and creative endeavors by the well-known motto "Right Document to the Right Reader at the Right Time". It takes pride in fulfilling this inherent mission to the hilt. MH has common Digital Resource Centres with a cluster of 80 computers on LAN.

SMART CLASSROOMS: The total of 110 formal lecture spaces provide comfortable seating for 2200 students in regular classes with the potential for easily accommodating another 10% at any time. Nearly all lecture venues have

- Neatly arranged custom designed, comfortable desks and benches with shelves for bags; teacher table and chair.
- The new Academic Block has added 9 ICT-enabled laboratories, 6 classrooms and a mini auditorium with a seating capacity of 170 equipped with an AV system. It has
- placement centre rooms.
- MH has common Digital Resource Centres with a cluster of 80 computers on LAN
- Green Ceramic Board for use with dust-free chalk or White Board for use with marker pens.
- Roof mounted Projector, and a pull-down white display screen for multimedia projection.
- Custom-designed Lecterns facility to link laptop to multimedia projector.
- Extra power outlets on front wall for flexible usage of the room.
- Air-conditioning was considered essential.



AUDITORIUM: Miranda House has an Auditorium with seating capacity of 450 in the Main Hall. As one of the oldest constructions in the college, it is part of the college building that was designed by Walter George. The architecture is unique. The Miranda House Auditorium and its stage bring alive nostalgic memories and are of historic importance.





SEMINAR HALL: The Seminar Hall has a seating capacity of 125. It has a high-quality sound system, wall-mounted speakers, conference table mikes, roving mikes, lapel microphone, provision for recording; Roof-mounted high luminosity projection system.

MH hosts several cultural events in its outdoor spaces like the open-air theatre, 2 arcades, cafeteria lawns, front lawns, sports ground, hostel lawns, etc. The bank foyer is periodically used for exhibitions and help desks for events. The Heritage Hall and the Student Activity Center are exquisite learning studios used extensively for organizing indoor music concerts, dance, theatre, workshops, exhibitions of photographs, paintings, art installations, prestigious public lectures, and panel discussions. They are innovatively used for baithak-style gatherings.

SPORTS FACILITY: Miranda House has a Sports Ground. Facilities exist for a wide range of indoor as well as outdoor sports. The college has 14 Sport Teams and competitively participates in Archery, Athletics, Ball Badminton, Basketball, Chess, Cross-country, Netball, Power Lifting, Table Tennis, Taekwondo, Tennis, Weight Lifting, Volleyball and Yoga.

MH hosts several cultural events in its outdoor spaces like the open-air theatre, 2 arcades, cafeteria lawns, front lawns, sports ground, hostel lawns, etc. The bank foyer is periodically used for exhibitions and help desks for events.

FITNESS CENTRE: MH has an active Physical Education Department that inspires the college community to work on a fitness regime and organizes several intra-college sports events, morning sessions on aerobics, yoga, recreational games, an annual sports festival, and freshers' cross-country race. The college has an air-conditioned multigym with free weight and cardio training equipment like treadmills, cross-training gears, and bicycles. It also has 2 open gyms. MH has a large sports ground comprising a competitive netball area of 30.5m x 15.25m, a badminton court of 13.4m x 6.1m, and an archery area of 10m x 25m. The sports ground also hosts all athletics sports like field events and flat races. 7.MH is the only college that has an Outdoor Bounce Back Shock Proof Surface Basketball Court with a dimension of 26m x 14m. It has a tennis court with a synthetic surface with a dimension of 23.77m x 10.97m, husky mats with 25mm thickness for taekwondo and martial arts competition with an arena of 10m x 10m. MH provides facilities for chess as well. The college offers a One one-month certificate Course titled Foundations of Yogasana to motivate students to pursue Yoga daily for the manifestation of physical, mental, emotional, and spiritual wellness.

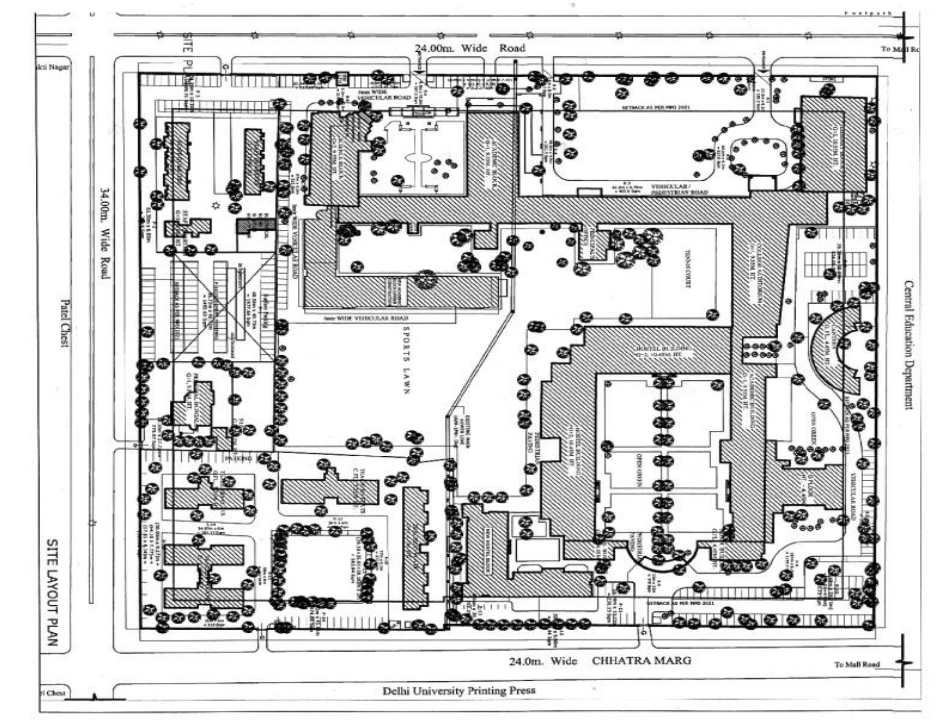


CAFETERIA: The cafeteria has been aesthetically renovated and is furnished with custom-designed furniture. It includes a well-ventilated open kitchen for the preparation of certain food items, with chimney hoods above burner stoves. Utmost hygiene is maintained at the food counters, dedicated storage spaces for grocery, cookware crockery and cutlery and dishwashing area. An additional large room adjoining the main hostel kitchen and opening into the cafeteria complex is used for preparation work and most of the heavy-duty cooking. Water supply for cooking and drinking purposes is from the Hostel Reverse Osmosis Water Purification Plant.

HOSTEL: The hostel designed by the renowned architect Walter George, with the foundation stone laid by Lady Edwina Mountbatten, lends to the college a historical charm and a sense of legacy. It is laid out in an aesthetically designed quadrangle enclosing well-kept gardens paced out by a majestic bottle palm-lined pathway. The long corridors, the dining hall with a high arched ceiling, and stonework balconies add to its charm.



Geo Location
Geo Coordinates from
Google maps:
28.6925615, 77.2102979





AUDIT PARTICIPANTS

On behalf of Miranda House

Name	Designation
Prof. Bijayalaxmi Nanda	Principal
Dr. Saloni Bahri	Convenor, IQAC
Prof. Monika Tomar	Ex-Officio Member, IQAC
Prof. Rekha Kumari	Convenor, MH Vatavaran
Dr. Deepali	Convenor, Garden Committee
Dr. Pushpa Singh	Member, IQAC
Dr. Hena Oak	Member, IQAC
Dr. Simran Jit	Member, IQAC
Dr. Neeru Yadav	Member, IQAC
Dr. Sujata Sengupta	Member, IQAC
Ms. Manavi	Member, IQAC
Mr. Vir Singh	Section Officer, Admin.
Mr. Joyti Prakash	Admin.
Mr. Sudhir Aggarwal	Section Officer, Accounts
Mr. Shiv Kumar	Site Engineer

On behalf of EHS Alliance Services

Name	Position	Qualifications
Dr. Uday Pratap	Lead Auditor	<i>Ph.D., PDIS, QCI – WASH, Lead Auditor ISO 14001:2015</i>
Ms. Pooja Kaushik	Co-Auditor	<i>M.Sc., Field Expert, QCI – WASH, PGCCC</i>



EXECUTIVE SUMMARY

Green auditing is an essential step to identify and determine whether the institutional practices are sustainable and ecological. Traditionally, we were upright and efficient users of natural resources. But over the period, excessive usage of resources like water, electricity, petrol, etc. has become habitual for everyone especially, in urban and semi-urban areas. It is the right time to check if we (our process) are consuming more than the required resources? Whether we are using resources sensibly?

Green audit standardizes all such practices and provides an efficient way to use natural resources. In a time of climate change and resource exhaustion, it is necessary to re-check the processes and convert them in to green and sustainable. Green audit provides an approach for the same. It also increases overall awareness among the folks working in the institution towards the eco-friendly environment.

This is the third attempt to conduct a green audit of this campus for fulfilment of NAAC criteria. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil, water usage, vegetation, waste management practices and carbon footprint of the campus. Initially, a questionnaire was shared to know about the existing resources of the campus and the resource consumption patterns of the students and staff in the campus.

GREEN AUDIT - ANALYSIS

1.1 GENERAL INFORMATION

1. Does any Green Audit conducted earlier?

Yes, this is the third external audit organized by the College

2. What is the total strength (people count) of the Institute?

Students

Male: 0 Female: 5628 Total: 5628

Teachers (including guest faculty)

Male: 19 Female: 181 Total: 200

Non-Teaching Staff

Male: 66 Female: 11 Total: 77

Total Strength

Male: 85 Female: 5820 Total: 5905



3. What is the total number of working days of your campus in a year?

There are one hundred and eighty working days in a year.

4. Where is the campus located?

The campus is located at GC Narang Road, New Delhi, Delhi 110007

5. Which of the following are available in your institute?

<i>Garden area</i>	<i>Available</i>
<i>Playground</i>	<i>Available</i>
<i>Kitchen</i>	<i>Available</i>
<i>Toilets</i>	<i>Available</i>
<i>Garbage Or Waste Store Yard</i>	<i>Available</i>
<i>Laboratory</i>	<i>Available</i>
<i>Canteen</i>	<i>Available</i>
<i>Hostel Facility</i>	<i>Available</i>
<i>Guest House</i>	<i>Available</i>

6. Which of the following are found near your institute?

<i>Municipal dump yard</i>	<i>Not in the vicinity of the institute</i>
<i>Garbage heap</i>	<i>No Garbage heaps</i>
<i>Public convenience</i>	<i>Public convenience is available</i>
<i>Sewer line</i>	<i>Approximately 2.0 KM sewer line within campus</i>
<i>Stagnant water</i>	<i>No stagnant water</i>
<i>Open drainage</i>	<i>No</i>
<i>Industry – (Mention the type)</i>	<i>No</i>
<i>Bus / Railway Station</i>	<i>Metro/Bus connectivity</i>
<i>Market / Shopping complex</i>	<i>Available</i>

1.2 WASTE MINIMIZATION AND RECYCLING

1. Does your institute generate any waste? If so, what are they?

Yes, Solid waste, Canteen waste, paper, plastic, horticulture, laboratory waste, e-waste, etc.

2. What is the approximate amount of waste generated per day? (in Kg approx.)

*Biodegradable waste - 80 Kg
Non-biodegradable waste -16 Kg
Hazardous Waste - 2 Kg
Others < 2 Kg*

3. How is the waste managed in the institute? By Composting, Recycling, Reusing, Others (specify)

- *Food waste and horticulture waste is collected into pits for composting*
- *A plant for recycling paper has been established on campus.*



- On campus, single-use plastic is prohibited.
- After collecting the BMW separately, the Municipal Corporation takes care of the solid garbage.
- Paper with printing on one side is reused for internal correspondence.
- The process of Anaerobic Composting is used to manage biodegradable trash.
- Grey water from college waste is recycled using the hydroponics method.
- Rainwater harvesting pits are there in campus for groundwater recharge
- E-waste collection and management through recycled – authorized vendor

4. Do you use recycled paper in the institute?

Yes, there is a fully functional paper recycling plant on the campus. Products made from recycled paper at the recycling unit are available for purchase at the MH EcoSouvenir Shop located in the college near Gate No. 3.

5. How would you spread the message of recycling to others in the community?

Following are the ways through which the college is spreading awareness about recycling

- Waste plastic collection drives
- Installation of Dustbins for waste plastic collection, e-waste collection and recycling
- Tie-ups with authorized e-waste collection agency
- Awareness among the Students by Webinars, seminars, Sign Boards, Posters, etc.

6. Can you achieve zero garbage in your institute? If yes, how?

Not yet achieved. Possible through waste management policy and planning.

1. Minimization of waste production
2. Awareness workshops & training for students and faculty on Waste management

1.3 GREENING THE CAMPUS

1. Is there a garden in your institute?

Yes, about 398279 Sq ft areas are developed as Gardens.

2. Do students spend time in the garden?

Yes, students spend around 2-4 Hours during winter.

3. Total number of Plants in Campus?

<i>Plant type with approx. count</i>	
Full-grown Trees	872
Small Trees	1541
Hedge Plants	15218
Grass Cover sqm	398279 Sq ft

4. Is the College campus having a Horticulture Department? (If yes, give details)

Yes, Total 9 staff (maali) were deployed in the horticulture department



5. How many Tree Plantation Drives are organized by campus per annum?

13 Plantation Drives are Organized by the campus in the last year
The survival rate is more than 70%.
Vatavaran - 4 (#35)
Chemistry – 1 (#20)
Garden Committee – 6 (plants planted: #96)

6. Is there any Plant Distribution Program for Students and Community?

Yes, Plantation distribution drives are conducted in nearby Villages under Unnat Bharat. Moreover, the college has a practice where all guests are given a planter as a gift rather than a bouquet of flowers.

8. Is there any Plant Ownership Program?

MH Vatavaran is continuously encouraging the students to adopt a tree in their neighborhood

1.4 WATER AND WASTEWATER MANAGEMENT

1. List uses of water in your institute

Basic use of water in campus:
Drinking – 141.91 KL/month
Gardening – 186.24 Kl/month
Kitchen and Toilets – 1121.36 KL/month
Others – 205.66 KL/month
Hostel – 972 KL/Month
Total = 2627.16 KL/Month

2. How does your institute store water? Are there any water-saving techniques followed in your institute?

Total available water storage of the college is 192500 liters

Sl. No	Storage Type	Capacity	Quantity	Total (in Ltr)
1	OVER HEAD TANK	500	75	37500
2	OVER HEAD TANK	1000	19	19000
3	OVER HEAD TANK	2000	3	6000



4	OVER HEAD TANK	3000	1	3000
5	UNDERGROUND TANK (Fire tank)	5000	3	15000
6	UNDERGROUND TANK	34000	3	102000
7	UNDER GROUND HEAD TANK	10000	1	10000
	TOTAL STORAGE CAPACITY			192500

Saving Techniques

- Avoid overflow of water-controlled valves are provided in water supply system.
- Close supervision for water supply system.
- Push taps are installed for water conservation
- Water Conservation awareness for new students
- Sprinklers usage for gardening and grass cover

3. Locate the point of entry of water and point of exit of wastewater in your institute.

Entry - Water comes from Municipal corporation (Delhi Jal Board)

Exit- From Canteen, Toilets, Hostel, bathrooms and Labs through covered drainage which is connected to municipal sewage

4. Write down ways that could reduce the amount of water used in your institute

Basic ways:

- Close the taps after usage
- Water Conservation awareness for new students
- Maintenance and monitoring of valves in supply system to avoid overflow, leakage and spillage
- Push tap are installed to save water
- Water recycling and use of sprinklers for gardening

1.5 ANIMAL WELFARE

1. List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.)

3 Cats, 20+ butterfly species, 100+ Squirrels and 18+ Bird species and dragonflies are found in campus

2. Does your institute have a Biodiversity Program or a KARUNA CLUB?

Yes, Miranda House’s MH Vatavaran actively organizes awareness through various campaigns and activities including seminars, poster competition, etc. Aavya, The Animal Welfare Club led by students of Miranda House organizes several compassion drives, first aid guidelines and animal rescue programs throughout the year. The Department of Zoology and CESDM, Miranda House, regularly organizes natures walks and Campus Bird Count events



with eminent bird watcher during the academic session. Floral biodiversity of the campus is mapped and QR code stickers are affixed to the trees and relevant information is available with a click. The college has developed a Nakshatra Vanam where trees associated with the 27 constellations or nakshatras have been planted. These trees are of medicinal, social, aesthetic, or economic value. It was inaugurated by Prof. Leena Gahane, Deputy Adviser, NAAC on 23 September 2022.

1.6 CARBON FOOTPRINT - EMISSION & ABSORPTION

1. Electricity used per year - CO₂ emission from electricity

$(\text{electricity used per year in kWh}/1000) \times 0.84$
 $= 832534 / 1000 \times 0.84$
 $= 699.33 \text{ tons}$

2. LPG/PNG used per year - CO₂ emission from LPG/PNG

$(\text{LPG/PNG used per year in KG}) \times 2.99$
 $= 600 \times 2.99$
 $= 1.61 \text{ tons}$

3. Diesel used per year CO₂ emission from HDS (Diesel)

$(\text{Diesel used per year in litres}) \times 2.68$
 $= 300 \times 2.68$
 $= 0.90 \text{ tons}$

4. Transportation per year (car) CO₂ emission from transportation (Bus and Car)

There are no college-owned vehicles

Total CO₂ emission per year is 701.83 tons

After considering the carbon absorption capacity of the campus and solar energy export, the total carbon emission is 660.34 tons



CARBON ABSORPTION BY FLORA IN THE INSTITUTION

There are 872 full-grown trees and 1541 semi-grown trees of different species, on the campus spread over 398279 sq ft.

Carbon absorption capacity of one full-grown tree 22 kg CO₂ Therefore Carbon absorption capacity of 80 full-grown trees $872 \times 22 \text{ kg CO}_2 = 19.19 \text{ tons of CO}_2$.

The carbon absorption capacity of 1541 semi-grown trees is 30% of that of full-grown trees. Hence the carbon absorption $1541 \times 6.8 \text{ kg of CO}_2 = 10.48 \text{ tons of CO}_2$

There are approximately Hedge Plants 15218 of various species being raised in the gardens and grown in the areas where no buildings are built Carbon absorption of bush plants varies widely with their species. Certain bushes absorb very high level of CO₂ whereas some others absorb very low levels of CO₂ In the absence of a detailed scientific study, 200g of CO₂, absorption is taken per bush (in consultation with Environmental Science specialists). Based on this, the total carbon absorption of bushes is $15218 \times 200 \text{ g} = 3.04 \text{ tons of CO}_2$

The lawns on the campus have buffalo grass, Mexican grass, and indigenous grass species and cover a total area of 398279 sq. ft. Carbon absorption capacity of a 10 sq. ft. area of lawn is 1 g per day Therefore, carbon absorption by lawn area $398279 \times 365 \times 0.1 \text{ g CO}_2 = 14.54 \text{ tons CO}_2$ per year.

The total of carbon absorption capacity of the campus is 47.25 tons.

GREEN INITIATIVES BY CAMPUS

➤ Solid Waste Management

- Collect paper waste produced on campus and recycle in paper plant
- College does compost for horticulture waste
- Reduce the use of paper by supporting the digitization of attendance and internal assessment records.
- Reduce the requirement of printed books by updating the e-books and e-journals collection of the college library.
- Take initiatives to spread awareness amongst students about food wastage and ways of minimizing it
- The habit of reusing and recycling non-biodegradable products
- Organizing workshops for students on solid waste management.
- There is a ban on single-use plastic and plastic crockery in the campus.

➤ Liquid Waste Management

- Maintain leakproof water fixtures.
- Minimize the use of water by constructing more Indian-style toilets instead of Western-style toilets.
- Continued employment of a caretaker to take immediate steps to stop any water leakage through taps, pipes, tanks, toilet flush etc.



- Reuse of wastewater generated by the Reverse Osmosis (RO) system in washrooms.
- **E-waste Management**
 - The college has a separate storeroom for the safe storage of electronic waste. After a certain interval of time college disposes of the E-waste to concerned agencies through the auction process.
- **Rainwater harvesting**
 - College has 3 rainwater harvesting pits for better groundwater recharge. The stored water in this tank can be used for gardening purposes
- **Renewable Energy**
 - The college has installed solar PV (7 KW) on the rooftop of building.
 - College has signed an agreement with third party solar power provider for 1 MW.
 - The College is using solar lights for street lights.
- **Air Pollution Reduction**
 - Personal Vehicles (Students) are not allowed in the campus
- **Green Committee Initiatives**
 - Plantation of three tree species during CESREC Visit on 13 July 2022
 - Plantation of 22 tree species as a part of Kalptaruh project by Brahmakumaris in collaboration with MH-Vatika on 22 July 2022
 - Plantation of 5 Panchwati species during Century Vriksharopan on 10 August 2022
 - Organised a workshop at Department of Botany, Miranda House on Composting Techniques on 20 August 2022
 - Inauguration of Nakshtravanam with the planting 3 Nakshtravanam species by Dr. Leena Gahene, Advisor NAAC on 23 September 2022
 - Plantation of 5 Nakshatravanam species on the occasion of Dr. Amrita Tripathi Sheikh's Retirement Program On 31 October 2022
- **Environment Committee Initiatives** – MH has an environment committee 'MH Vatavaran'. Below are the highlights of their work on environment cautiousness.
 - Miranda House and MH Vatavaran has successfully completed the District Eco-SDG Championship 2023, conducted by APEX SDG and has been awarded "District Eco SDG Champion -2023 with Outstanding Performing Grade "S" for North Campus, Delhi District.
 - Letter Of Association signed between Miranda House, University of Delhi And Bottles for Change Programme, CSR, Bisleri International Pvt Ltd. On 27 September, 2023. Purpose: "To inculcate civic sense among students and educate on responsible disposal of plastics for recycling from the campus thus achieve zero plastic waste to landfill."
 - MH actively participates in Clean India 2.0 and Mission Life activities in various villages, including Dhirpur, Burari, and Azadpur.
 - Cleanliness Drive - Only one earth was organized on 02 June
 - Best out of waste activity was conducted on 15 June
 - NSS at MH actively promotes cleanliness through various initiatives aligned with the Swachh Bharat Abhiyan. Collaborating with Unnat Bharat Abhiyan (UBA) Cell, a cleanliness and plantation drive was organized in Burari Village on July 8, 2022
 - Digital poster-making and Essay Writing Competition was organized on 28 July



- E-Waste awareness webinar was organized on 27 Aug
- An Instagram Story-making event was organized on the topic “World Ozone Day” on 11 Sept.
- On MH Vatavaran Day, a plantation drive was organized (Coconut Plantation) on 15 September
- An awareness program was organized for educate underprivileged children about Eco-friendly Diwali on 15 Oct
- Various activities such as paper weight making, eco pen making and book mark making activities were organized to enhance recycling in October month
- In partnership with UBA cell and National Cadet Corps (NCC), a cleanliness drive was conducted in Dhirpur village on November 7, 2023 as a part of the Orientation Course. A door-to-door awareness campaign took place in Azadpur village on February 24, 2023 under Mission Life, focusing on segregation of waste.
- A joint seminar on personal hygiene was organized with Million Minds on November 24, 2022.
- On Craft Day, MH Vatavaran volunteers created useful materials using recycled paper
- Interactive Session on World Wetlands Day: WWF-India was organized on 2 Feb
- Campus Bird Count in Collaboration with the Department of Zoology was organized on 6 Feb
- A seminar on New Generation Women Healthcare was held in partnership with Queen's Gynaecology

RECOMMENDATIONS

- Environmental parameters shall be included in the purchase policy to achieve a cradle-to-grave approach for sustainability.
- College should start drip irrigation to save water in campus
- The flow rate of taps should be checked, it should not be more than 2.5 liters/minute. Arrange training programs on environmental management systems and nature conservation for schools and local people.
- More Messages should be displayed at various locations to Aware People of Energy Savings
- Water Meters should be installed at every building of the institute for monitoring of water consumption per capita.
- Borewell permission should be taken from an authorized government department
- Car-pooling practices can be adopted by the campus to minimize air pollution. Increase in the display of environment-conscious posters/paintings/slogans for spreading awareness amongst students.
- Green building guidelines for future expansion projects of the campus.



CONCLUSION

This audit involves considerable team discussions and meetings with key staff members on a variety of environmental-related topics. The eco club of Miranda House promotes conservation of resources.

Overall 75% of Miranda House is for landscaping. The college makes a significant effort to act in an environmentally responsible manner and takes into account the environmental effects of the majority of its activities. The recommendations in this report suggest some more ways in which the college can work to improve its practices and develop into a more sustainable institution.

It's important to begin a few things, such as initiating drip irrigation, and increasing plantation drives. Additionally, we strongly advise signing an MOU with third-party authorized vendors for waste management such as plastic, paper, metal, C&D, etc.

REFERENCE

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- Energy Conservation Act 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
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981)
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

ANNEXURE – PHOTOGRAPHS OF ENVIRONMENT CONSCIOUSNESS



Well maintained campus



Well ventilated building



Lush green campus



Sports Ground



Paving stone installed in campus



Color coded dustbins



Ornamental plants in campus



Indoor plants in campus



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



Spacious and well equipped labs



Well equipped labs



Spacious Auditorium



Composting



Paper recycling in action



Tree & Plant profile with QR code



Solar panel

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