

Sarada Vilas Teachers College
K.M. Puram, Mysore-04

7.1.6 QNM DE

**1. Geotagged photographs
related to Green Practices
adopted**



7-16

Estd.1963

Sarada Vilas Educational Institutions (R.)
ಶಾರದಾ ವಿಲಾಸ ಶಿಕ್ಷಣ ಮಹಾವಿದ್ಯಾಲಯ, ಮೈಸೂರು-04
SARADA VILAS TEACHERS COLLEGE



Sarada Vilas Road, K.M Puram, Mysuru-570004, Karnataka
Affiliated to University of Mysore, Mysuru, Karnataka State, Grant in Aid College
NAAC Accredited in 2016, "B" Grade, CGPA-2.73/4

Email ID: svtemysore@gmail.com
Website: www.svtemysore.org

Office No: 0821-2332137
Mob No : 7019807294

1. Encouraging use of bicycles / E-vehicles: Some students use bicycles for commutation. Using of bicycles is always encouraged but most of the students commute using public transport. Girls and boys who stay in Paying Guest Homes or private hostels or BCM hostels are by and large from other places do not have bicycles.

Bicycles Stand



Sreedha.K.S
Principal
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K.M. Puram, Mysore-570 004



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2. Create Pedestrian - Friendly roads in the campus: College is having its own premises in 10 acres of campus area where other sister institutions are also located. The campus opens with a pair of gates into parking areas for both two and four wheeled vehicles. From the main entrance there is lush green path way that leads to the college. Again there is a big gate which opens into college garden corridor with a ramp slope for physically challenged student- teachers. The college has a long and wide corridor for easy movement of students. The college is connected with administrative block, Cycle and Two-wheelers stand and four wheelers parking lot with pedestrian friendly foot path roads.



Keela.K.S
Principal
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3. Develop plastic-free campus: The whole college campus is made strictly plastic-free. Every day any plastic materials like pens, refills, carry-bags, covers, wrappers, sketch pens, empty water bottles or any such materials are removed and collected in Plastic Collection boxes which are exclusively kept for the said purpose. There are two boxes kept for the purpose, one for waste plastic materials and the other for refills. Once a month the collected plastic waste is handed over to the authorities of Mysore City Corporation (MCC) for further recycling processes.



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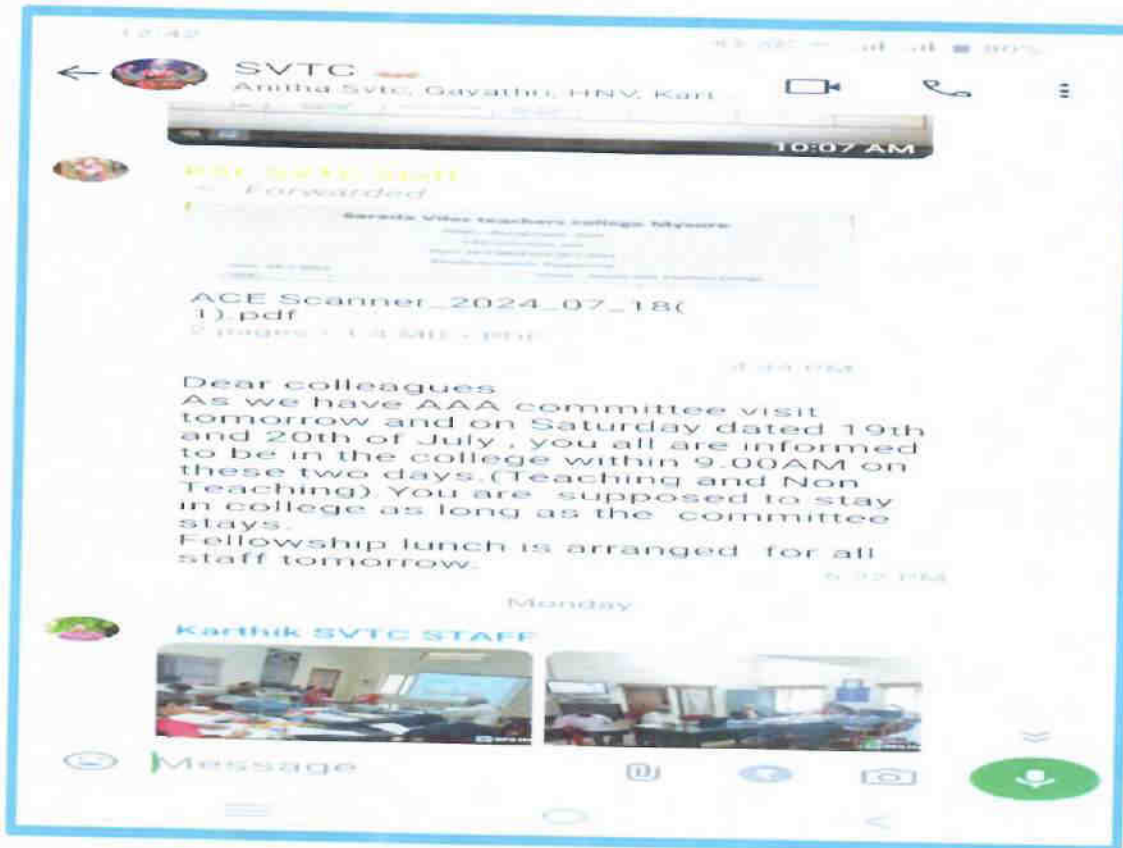


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4. Move towards paperless office: College has developed policies and adapted various measures regarding making communication paper less. Waste paper or one sided papers are being used for photocopying and writing purposes especially for internal communication. Fresh paper sheets are used only for developing official letters for external communication with the departments of Education. Assignments and tutorial topics are written by students using both sides of paper. Most of the communication among different administrative levels and between students and teachers for academics are done through on-line modes. Paper is used only when hard copies of the documents are necessary in extreme cases.



Leda.K.S
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5. Green landscaping with trees and plants: Entire campus area of Sarada Vilas Educational Institutions and college premises are full of lush green grass, plants and trees. More than 35 to 40% area of our college campus is covered by green top. Our college has a beautifully maintained garden with more than 300 potted plants and 15 -20 small and rare trees. Most of them bear flowers and fruits. We have fruit bearing trees like Papaya, Passion fruit, Mango, Plantain, etc. We have even Green Corridor where potted plants are preserved and maintained through Green Corridor Project – VIPINUM.



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Green Corridor Project – VIPINUM

SARADA VILAS TEACHERS COLLEGE, MYSORE
GREEN CLUB
GREEN CORRIDOR PROJECT
VIPINUM-2023

INAUGURATION

Date: 16.10.2023 / Time: 3-4 PM / College Garden Area

The college has a new project called, **GREEN CORRIDOR PROJECT: VIPINUM-2023**. It's the brainchild of the Staff-coordinator **Dr. HN Vishwanath**, Asst. Professor. In this project each student donates a potted plant to the college on his/her birthday and takes care of it during his/her stay for two years in the college. At the end of the IV semester the best three well maintained plants are selected and the concerned students will be rewarded during the valedictory ceremony. The same potted plants will be adapted by new students and this continues.

The scheme was planned by the staff coordinator in the presence of all II semester students in the open class. Every individual student accepted to pay some amount to buy the new pots, plants and soil. Students were explained the whole scheme and asked to name the project which was called **VIPINUM-2023**. The whole group of students was called **GREEN ARMY** and the Executive committee was formed which is called **GREEN BRIGADIERS**. About 100 new plants were planted in new pots and about 113 plants were re-potted. Altogether about 230-235 plants were potted and arranged orderly in the I and II floor corridors.

The inauguration of the Project was done by **Dr. RAJENDRA, AkshayaAharaJolige** of Mysore which is an NGO that serves the community by distributing the left out good quality food collected from places where functions are held. Dr. H N Vishwanath who is the staff coordinator gave a bird view of the whole scheme. Sri Srikanth, Administrative Officer was invited as the Guest. Dr. Shanmukha was invited to express his opinions. The program was chaired by the Principal Dr. K S Leela. Two compendia of manuscript articles by Biology method students namely, **PARNA** and **ILA** were released during the program.

Leela.K.S
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Sarada Vilas educational institutions (R), Mysore
Sarada Vilas Teachers College, Mysore.

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GREEN CLUB

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THE GREEN CORRIDOR PROJECT

Abhipreetya Vaatika

VIPINAM-2023 **16.10.2023**

Leela K.S
Principal
Sarada Vilas Teachers College,
K.M. Puram, Mysore-570 004



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IQAC initiative

The Green Club

Abhipreetyavatika

GREEN CORRIDOR

VIPINAM-2023

Inauguration

Chief Guest

Dr. H R RAJENDRA

Akshaya Ahara Foundation. (R) Mysore.

Guests

Sri CHANDRASHEKHAR N

Hon. Secretary

Sarada Vilas Educational Institutions, Mysore

SRI SRIKANTH

Administrative Officer

Sarada Vilas Educational Institutions, Mysore

Presence

Dr. SHANMUKHA

Academic Advisor

Sarada Vilas Teachers College, Mysore

President

DR. K S LEELA

Principal

Sarada Vilas Teachers College, Mysore

**16.10.2023/ Monday / 3 PM / College Garden /
Welcome**

Leela K S

Principal

Sarada Vilas Teachers Coll. --
K.M. Puram, Mysore-570 004

Sarada Vilas Teachers College
K.M. Puram, Mysore-04

7.1.6 QNM DE
5. Green Audit Report

Sustainability energy and environment
Report Of
SARADA VILAS TEACHERS COLLEGE



Month & Year – JULY 2024

Conducted By



RACHANA ENER CARE

Energy management Co

No555/1,13th cross,TK lay out , Beside BSNL RTTC

Saraswati puram (p)Mysuru- 570009 - Ph-9449837309

www.rachanaenercare.com, Mail;rachanaenercare@gmail.com

Title of project:

Green audit report
Sustainability energy and environment of
Sarada vilas teachers college-Mysore, Karnataka, India

Work order No:

P.O. NO. 156/2024-25 DATE 12-06-2024

Scope & Objective:

To conduct green auditing at the Sarada vilas teachers college, Mysuru based on the following activities; Water management, Water conservation, energy conservation, green cover, Pollution control & sustainable practices

Period of study:

June 2024 to July 2024

Report submitted on:

July 2024

Study Conducted By;

Rachana Ener Care

Contact person:

Sri. Anil kumar Nadiger
Director & Energy specialist
9449837309

Contact details:

Contact Address: Rachana ener care ,No 555/I, 13th cross , TK lay out 3rd stage, Beside RTTC,
Saraswatipuram Post Mysore-570009 (ph 0821-2543334) (R.O.-Bangalore)
Email; rachanaenercare@ gmail.com, web www.rachanaenercare.com

Acknowledgement

We appreciate the initiation taken by Sarada vilas teachers college for taking interest to have energy environment & green audit. These will not only benefits institution, but society at large.

We are thankful for Sarada vilas for giving this opportunity to us. This is a great opportunity for us to serve in our passionate area of energy & environment.

We are thankful to all the staff of Sarada vilas teachers college who have supported us in data collections taking measurements during the course of audit

Sustainability in Energy & Environment is every one's need & its conservation is every one's responsibility. But practicing is a challenge. We are sure that Sarada vilas will go ahead in this regard.

Thanking you.....

For **RACHANA ENER CARE**



ANIL KUMAR NADIGER BE(E & E)M.I.E

(DIRECTOR & ENERGY SPECIALIST)

RACHANA ENERCARE

INDEX

No.	Chapter	Page no.
	Title of Project and Work order details	A-2
	Acknowledgement	A-3
	Index	A-4
	Green audit flow chart	A-6
	Scope of work	A-7
	Introduction of Organization	A-8
	Certificates	A-9
	Abbreviations & Glossary	A-10
	Standards	A-12
EXECUTIVE SUMMARY		
		B-1
1	Energy Audit	B-2
2	Environment Audit	B-8
3	Green Audit	B-12
ENERGY AUDIT		
		C-1
1	Energy sources	C-2
2	Electrical bill analysis	C-3
3	Renewable energy utilization	C-6
4	Energy share	C-7
5	Lighting system	C-8
6	Fans	C-10

7	Computers	C-12
8	UPS systems	C-13
9	Pumping system	C-16

Environment Audit D-1

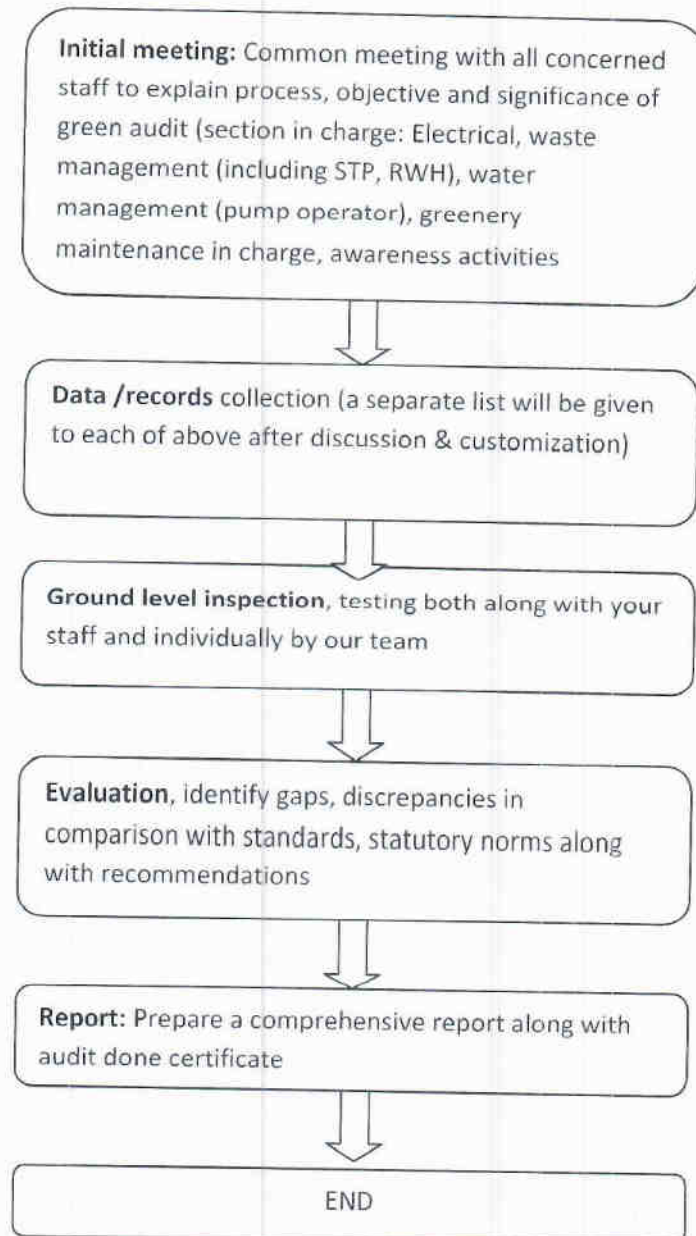
1	Water usage & Conservation measures	D-2
2	Waste generation	D-3
3	Pollution control	D-6

Green Audit E-1

1	Green coverage	E-2
2	Type of vegetation	E-3
3	Fauna	E-4

Photo Gallery F-1

Green audit flow chart



Scope & Objective

Objective; the intention of the green audits is to upgrade the environmental condition inside and around the institution. It is performed by considering environmental parameters like water and wastewater accounting, energy conservation, waste management, air, noise monitoring, etc. for making the institution eco-friendlier.

The main objective of energy audit is to identify the end use of energy in the campus and identify Energy Conservation opportunities; and as a feasibility study leading to implementation of an energy management program

The scope covers the study of Electrical system comprising the energy sources, loading practices, power management. The study will cover an analysis of the demand side management, efficiency evaluation.

- Study present energy consumption scenario & analyse energy sources
- Record power, load ,voltage variation from grid
- Study major energy consuming loads
- Identify present energy conservation measures taken by institute
- Identify options to save energy & evaluate

Benefits of energy conservation

- Reduces dependency on fossil fuels
- Reduces global warming
- Reduces import cost
- Promotes economic growth
- Harmonises with sustainable goals

India has set a target to reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade, achieve 50 percent cumulative electric power installed by 2030 from renewable, and achieve net-zero carbon emissions by 2070.

INTRODUCTION OF ORGANISATIONS

This study has been done to promote best practices in sustainability and set role model for others. Hence this effort is made with interest and involvement of Sharada vilas teachers college, Rachana Ener Care and NIE CREST. Brief introduction of three organisations is given below.

About Rachana Ener Care

Rachana Ener care headed by Mr.Anil kumar Nadiger, is team of experience and qualified engineers, BEE certified energy manager and auditors. Its team members have under gone many trainings and certification programs. Such as ECBC, ASHRAE standards, Green buildings ,etc conducted by NPC- National Productivity Council, KREDL – Karnataka Renewable Energy development ltd, ISHRAE – Indian Society for Heating Refrigeration & Air conditioning engineers, SEEM – Society for energy engineers & managers, etc It has conducted many audits to reputed clients like South Western Railways, Karnataka Urban water supply & drainage board, Central work shop, Police training centre, Teresian college, NIE, Institution of engineers India & many more. They also conduct training & workshops.

We are backed by consultancy support of NIE CREST, headed by sri Sham sunder for green technologies such as bio gas, composters, rain water harvesting, sustainable energy etc.

ABOUT NIE CREST

NIE-Centre for Renewable Energy and Sustainable Technologies (NIE-CREST) is a renowned Green technology promoting centre at the premises of The National Institute of Engineering (NIE), Mysore. The centre promotes eco- friendly energy systems, Renewable energy and sustainable technologies. The Centre itself has successfully implemented numerous projects on eco friendly and - renewable energy systems and sustainable technologies at International & National Level. NIE -CREST provides technology for, Design & Implementation of Renewable Energy Systems, Design & project execution of Solar, Biomass & Other RE Devices, Design & Implementation of Sustainable Technologies, Design & implementation of Technologies for Green Building, Design and implementation Of Rainwater Harvesting Systems and many more.



Ref no: RECM/EA/ 3913/1

Date 23-07-2024

ENERGY, ENVIRONMENT & GREEN AUDIT CERTIFICATE

This is to certify that, All India Institute of Speech and Hearing, An autonomous institute under ministry of health and family welfare, Govt. Of India, Mysore -570006 (Karnataka India) has been audited for energy, environment & green conservation systems & practices.

Energy, environment & green audit covered the entire Sarada Vilas Teacher's College for energy consumption pattern, measures taken to conserve energy and carbon savings. Along with waste management, water management and greenery (flora & fauna)

Audit report has been prepared based on study, site visit & data collected measurements and verification done during the course of audit. Energy audit is related to connection having RR NO HT 436 Contract demand 50 KVA solar SPVRT 40kwp at Sarada Vilas teacher's College for period 2023-24

Audit has been conducted by our team of qualified and certified engineers in accordance with standards & guidelines set by, BEE- Bureau of energy efficiency - Dept of energy, ECBC – Energy Conservation Building Code, PCB- Pollution control board guidelines, ISHRAE, ASHRAE and other standards. Environment & green audit has been done in consultation with NIE CREST for best international standard practices and technologies.

Audit also considered guidelines of NAAC National Accreditation Council under institutional values related to energy, environment & green.


-ANIL KUMAR NADIGER, BE (E&E), MIE
Director & Energy Specialist

RACHANA ENER CARE
<Engineers for Energy & Environment>
BEE (Dept of energy) certified energy managers & auditors

Abbreviations & Glossary

AC – Alternating Current

AH- Ampere Hour (Used to define capacity of battery)

DC- Direct Current

BD – Billing Demand

BEE- Bureau of energy efficiency

BLDC – Brush less Direct Current

CD- Contract Demand

CFM – Cubic Feet per Minute

CHESCOM – Chamundeswari electricity Company

DG – Diesel Generator

DISCOMS- Distribution Company (electricity)

ECBC- Energy conservation building code

EER – Energy Efficiency Ratio

Efficacy – capacity to deliver desired out put

ENCON- Energy conservation

ESCOM – Electricity Company

HP - Horse power (1hp = 0.745 kw)

HT – High Tension (High voltage 11,000 Volts)

KWH – Kilo watt hour generally used as ‘Units’

LED – Light Emitting Diode

LPH – Liter per hour (related to flow)

Lumens- Unit to measure total output light

LUX – Illumination level in unit area

Mains- Electricity supply point

MD- Maximum Demand

PCB – Pollution Control Board

PF – Power factor

Refrigerant- Chemical used in refrigerator

RO – Reverse Osmosis

SHCG – Solar Heat Gain Coefficient

SMF – Sealed Maintenance Free

Star label – Indication of energy efficiency of any equipment

TDS- Total dissolved salts

UPS – Uninterrupted Power Supply

VA – Volts and amps multiple

Standards

Standards and guide lines set by following professional bodies, societies and government bodies were followed in this report.

BEE – Bureau of energy efficiency

Nodal agency under department of energy, government of India

NPC – National productivity council

Star label standards – beestarlabel.com

ECBC – Energy Conservation Building Code

ISHRAE- Indian Society of Heating Refrigerating & air conditioning Engineers

ASHRAE- American Society of Heating Refrigerating & air conditioning Engineers

PCB – Pollution Control Board

SEEM – Society of Energy Engineers & Managers

UNSDG- United Nation Sustainable Development Goals - <https://sdgs.un.org/goals>

KREDL-Karnataka State Renewable energy development ltd

SDA - State designated agency under BEE

NBC - National Building Code

CPWD general specifications for electrical works 2023

IGBC - Indian Green Building Council

CEA -Central Electricity Authority

INSTRUMENTS USED

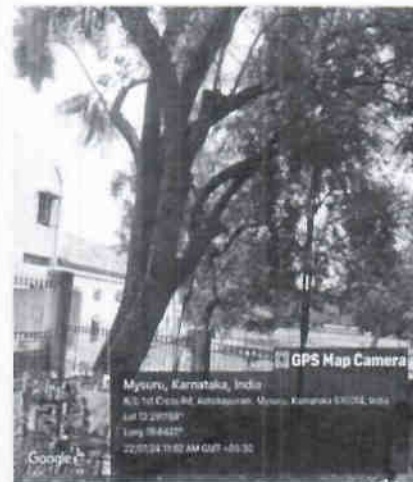
- Power analyzer
- Power parameter data logger
- Multi meter
- Clamp meter
- TDS meter
- Lux Meter

EXECUTIVE SUMMARY

Green Audit:

Green coverage

The campus is celebrated for its rich and varied landscape, characterized by a harmonious blend of institutional buildings, recreational areas, essential utilities, and expansive green spaces adorned with a diverse array of trees, ornamental plants, and gardens. These verdant areas constitute a significant portion, encompassing approximately 15-20% of the campus, and play a pivotal role in creating an inviting and sustainable environment. Around the B.Ed College, an impressive assortment of twenty distinct tree species thrives, including Papaya, Banana, Mango, Croton, Jungle Geranium, Coconut, Mahogany, Pongamia Oil, and Sandalwood, among others. Each tree is thoughtfully identified with a name board that showcases both its scientific classification and common name, fostering greater awareness and admiration for the natural beauty and ecological richness of the campus. This commitment to green coverage not only enhances the aesthetic appeal of the campus but also contributes to its biodiversity, providing a tranquil and inspiring setting for students, faculty, and visitors alike to appreciate and connect with nature.



Water bodies

The campus currently lacks any water bodies such as ponds, pools, or artificial fountains within its grounds. This absence presents an opportunity to enhance biodiversity and ecological balance by considering the creation of a small pond in the garden area. Introducing such a feature can significantly enrich the campus environment, attracting birds and small creatures that contribute to the ecosystem's vitality. A well-designed pond not only serves as a habitat for wildlife but also adds aesthetic value, creating a serene and natural focal point amidst the built environment. It could become a hub for observing and studying local flora and fauna, offering educational opportunities and fostering a deeper connection with nature for students, faculty, and visitors. Moreover, the presence of a pond can promote relaxation and mindfulness, providing a tranquil space for reflection and recreation within the bustling campus setting. By incorporating sustainable practices in its design and maintenance, such as using native plants and natural filtration methods, the campus can further enhance its commitment to environmental stewardship and create a thriving ecosystem that benefits both humans and wildlife alike.

Awareness Activities

The institution's students have actively engaged in a variety of environmental conservation activities, demonstrating a strong commitment to sustainability. These efforts underscore the institution's ongoing initiative to educate and empower students about the importance of preserving natural resources. Moving forward, it is recommended to expand these awareness activities both within the campus premises and beyond. Placing informative awareness boards at strategic locations can effectively communicate practices such as energy conservation by switching off lights and fans when not in use, minimizing water consumption through responsible usage, and advocating for plastic-free zones to reduce environmental impact. These initiatives not only promote eco-friendly behaviours among the student community but also install a sense of environmental responsibility that extends into their daily lives and future endeavours. By fostering a culture of environmental stewardship through proactive education and practical initiatives, the institution can further enhance its role in creating a sustainable and conscientious campus environment.

End of Executive summary

Green Audit

Green coverage

The campus includes various institutional buildings, a play area, a general utility area, and green spaces. The green areas consist of trees, ornamental plants, and gardens.

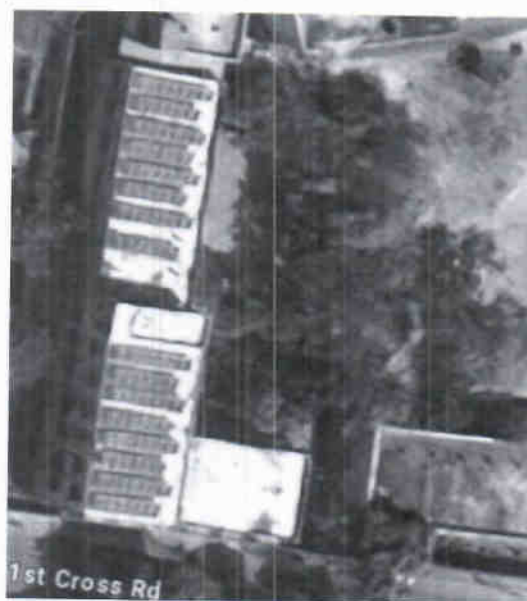
Approximately 15-20% of the campus is covered with greenery.

The B.Ed College is surrounded by twenty different trees, including Papaya plant, Banana plant, Mango tree, croton plants, jungle geranium plants, coconut, mahogany trees, Pongame oil tree and sandalwood trees. It is fixed a name board on each tree displaying its scientific and common names.



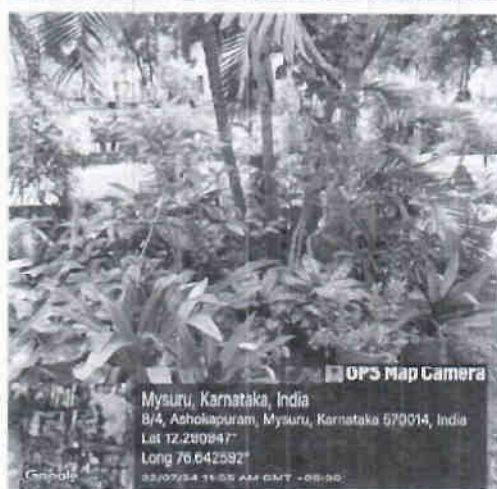
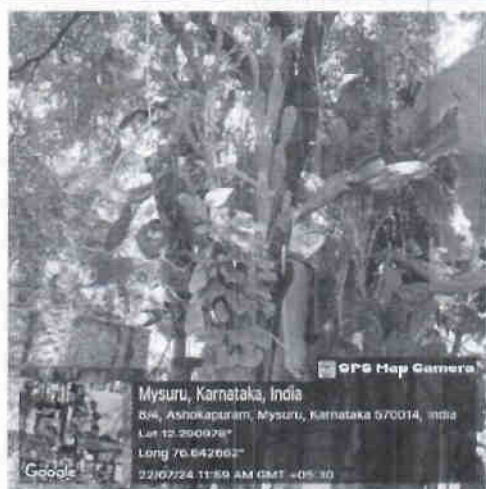
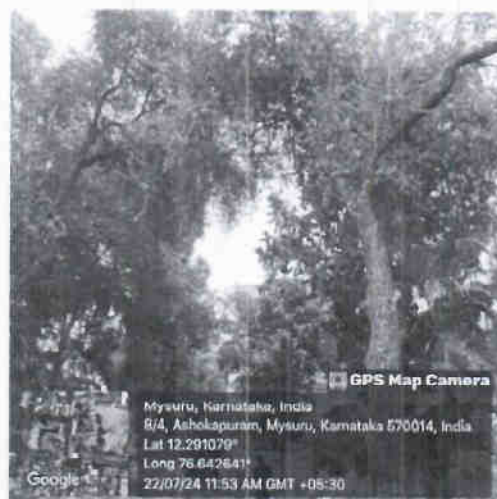
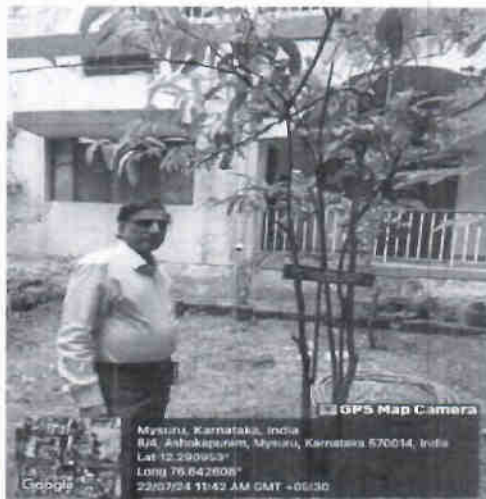
Aerial view of Sarada vilas Education Institution

Aerial view of Sarada vilas Teachers college



Type of vegetation

There are many types of trees and plants are there in the institution



Fauna

The campus boasts a rich diversity of fauna, encompassing a wide array of small mammals, birds, reptiles, amphibians, butterflies, moths, beetles, dragonflies, and various other insects. Among the resident creatures are snakes, squirrels, chameleon and a variety of reptiles, contributing to the ecological balance of the environment. Additionally, the campus serves as a habitat for both resident and migratory birds, including pigeons, mynas, crows, sunbirds, coucals, bee eater and more. This diverse wildlife population not only enhances the natural charm of the campus but also provides opportunities for students, faculty, and visitors to observe and appreciate the beauty and importance of biodiversity firsthand. Efforts to preserve and protect these habitats can further enrich the campus's ecological footprint, fostering a sustainable environment where wildlife and humans coexist harmoniously.

Water Bodies

There are no any water bodies like pond, pool or artificial fountain within the campus.

In order to increase the visit of birds and small creatures, it is recommended to create a small pond in the garden area.

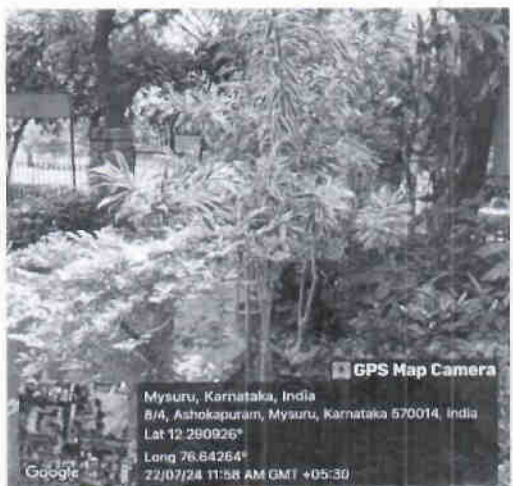
Awareness Activities

The students of the institution have participated in various activities related to environmental conservation. The institution continuously raises awareness among students about conserving natural resources.

We recommend increasing such activities both inside and outside the campus. Awareness boards should be placed at strategic locations, promoting actions such as switching off lights and fans, reducing water usage, and establishing plastic-free zones.

End of Green Audit

Photo Gallery



Seela.K.S
Principal
Sarada Vilas Teachers College,
K.M. Puram, Mysore-570 004

Sarada Vilas Teachers College
K.M. Puram, Mysore-04

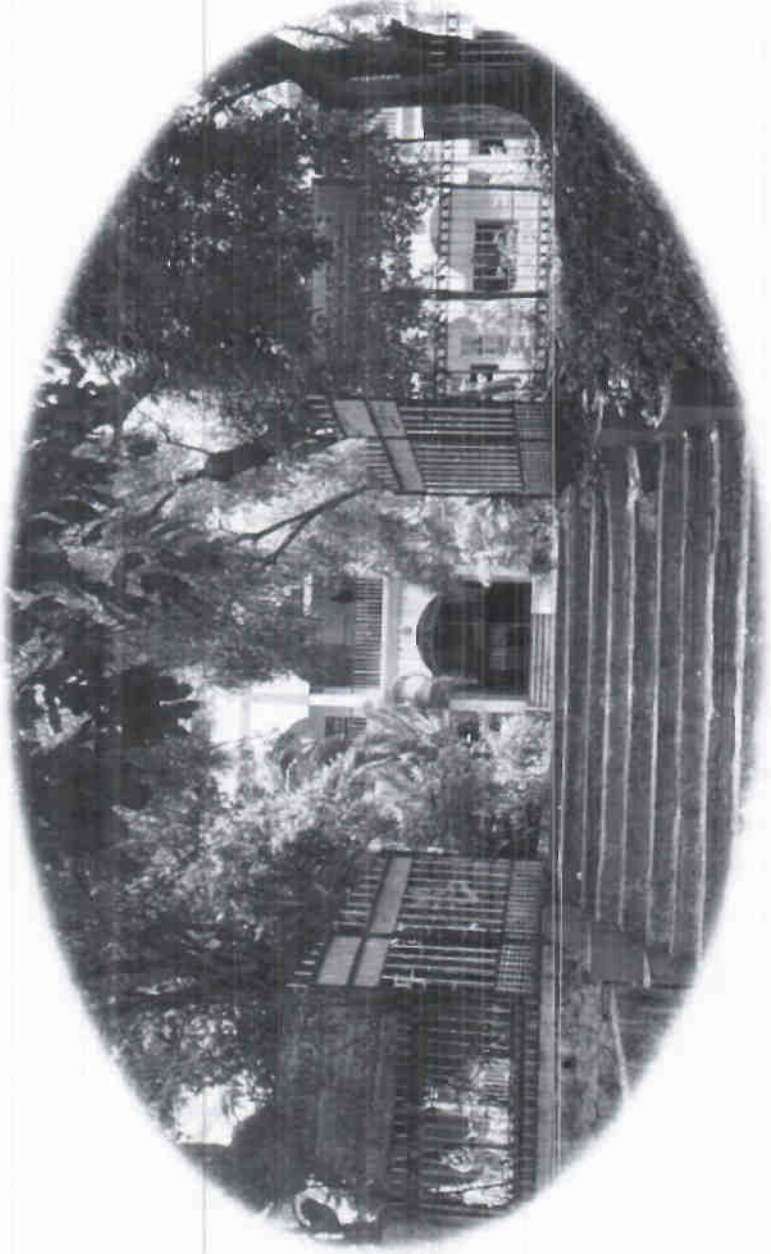
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6. Environment Audit Report

Sustainability energy and environment

Report Of

SARADA VILAS TEACHERS COLLEGE



Month & Year – JULY 2024

Leela.K.K
Principal

Sarada Vilas Teachers College,
K.M. Puram, Mysore-570 004

Conducted By

7.16 (E.A)

Title of project:

Green audit report
Sustainability energy and environment of
Sarada vilas teachers college-Mysore, Karnataka, India

Work order No:

P.O. NO. 156/2024-25 DATE 12-06-2024

Scope & Objective:

To conduct green auditing at the Sarada vilas teachers college, Mysuru based on the following activities; Water management, Water conservation, energy conservation, green cover, Pollution control & sustainable practices

Period of study:

June 2024 to July 2024

Report submitted on:

July 2024

Study Conducted By;

Rachana Ener Care

Contact person:

Sri. Anil kumar Nadiger
Director & Energy specialist

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Acknowledgement

We appreciate the initiation taken by Sarada vilas teachers college for taking interest to have energy environment & green audit. These will not only benefits institution, but society at large.

We are thankful for Sarada vilas for giving this opportunity to us. This is a great opportunity for us to serve in our passionate area of energy & environment.

We are thankful to all the staff of Sarada vilas teachers college who have supported us in data collections taking measurements during the course of audit

Sustainability in Energy & Environment is every one's need & its conservation is every one's responsibility. But practicing is a challenge. We are sure that Sarada vilas will go ahead in this regard.

Thanking you.....

For RACHANA ENER CARE



ANIL KUMAR NADIGER BE(E & E)M.I.E

(DIRECTOR & ENERGY SPECIALIST)

RACHANA ENERCARE

INDEX

No.	Chapter	Page no.
	Title of Project and Work order details	A-2
	Acknowledgement	A-3
	Index	A-4
	Green audit flow chart	A-6
	Scope of work	A-7
	Introduction of Organization	A-8
	Certificates	A-9
	Abbreviations & Glossary	A-10
	Standards	A-12
	EXECUTIVE SUMMARY	B-1
1	Energy Audit	B-2
2	Environment Audit	B-8
3	Green Audit	B-12
	ENERGY AUDIT	C-1
1	Energy sources	C-2
2	Electrical bill analysis	C-3
3	Renewable energy utilization	C-6
4	Energy share	C-7
5	Lighting system	C-8
6	Fans	C-10

- | | | |
|---|----------------|------|
| 7 | Computers | C-12 |
| 8 | UPS systems | C-13 |
| 9 | Pumping system | C-16 |

Environment Audit

- | | | |
|---|-------------------------------------|-----|
| | | D-1 |
| 1 | Water usage & Conservation measures | D-2 |
| 2 | Waste generation | D-3 |
| 3 | Pollution control | D-6 |

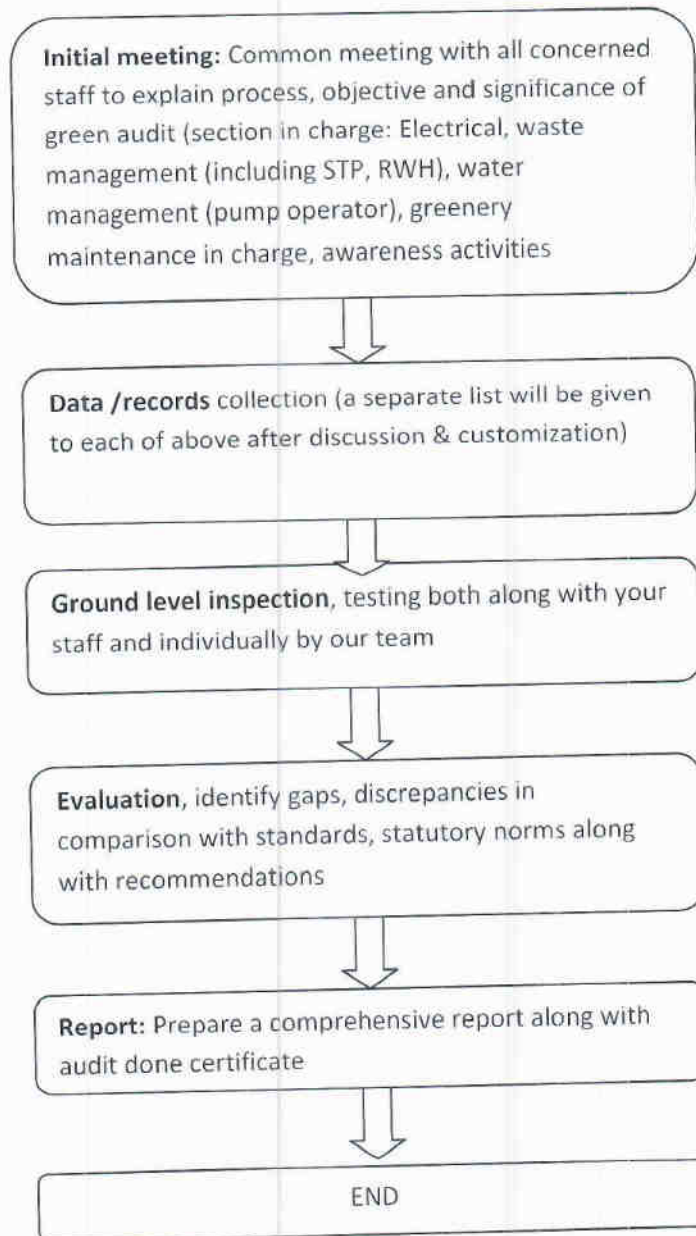
Green Audit

- | | | |
|---|--------------------|-----|
| | | E-1 |
| 1 | Green coverage | E-2 |
| 2 | Type of vegetation | E-3 |
| 3 | Fauna | E-4 |

Photo Gallery

F-1

Green audit flow chart



Scope & Objective

Objective; the intention of the green audits is to upgrade the environmental condition inside and around the institution. It is performed by considering environmental parameters like water and wastewater accounting, energy conservation, waste management, air, noise monitoring, etc. for making the institution eco-friendlier.

The main objective of energy audit is to identify the end use of energy in the campus and identify Energy Conservation opportunities; and as a feasibility study leading to implementation of an energy management program

The scope covers the study of Electrical system comprising the energy sources, loading practices, power management. The study will cover an analysis of the demand side management, efficiency evaluation.

- Study present energy consumption scenario & analyse energy sources
- Record power, load ,voltage variation from grid
- Study major energy consuming loads
- Identify present energy conservation measures taken by institute
- Identify options to save energy & evaluate

Benefits of energy conservation

- Reduces dependency on fossil fuels
- Reduces global warming
- Reduces import cost
- Promotes economic growth
- Harmonises with sustainable goals

India has set a target to reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade, achieve 50 percent cumulative electric power installed by 2030 from renewable, and achieve net-zero carbon emissions by 2070.

INTRODUCTION OF ORGANISATIONS

This study has been done to promote best practices in sustainability and set role model for others. Hence this effort is made with interest and involvement of Sharada vilas teachers college, Rachana Ener Care and NIE CREST. Brief introduction of three organisations is given below.

About Rachana Ener Care

Rachana Ener care headed by Mr. Anil kumar Nadiger, is team of experience and qualified engineers, BEE certified energy manager and auditors. Its team members have under gone many trainings and certification programs. Such as ECBC, ASHRAE standards, Green buildings .etc conducted by NPC- National Productivity Council, KREDL – Karnataka Renewable Energy development ltd, ISHRAE – Indian Society for Heating Refrigeration & Air conditioning engineers, SEEM – Society for energy engineers & managers, etc It has conducted many audits to reputed clients like South Western Railways, Karnataka Urban water supply & drainage board, Central work shop, Police training centre, Teresian college, NIE, Institution of engineers India & many more. They also conduct training & workshops.

We are backed by consultancy support of NIE CREST, headed by sri Sham sunder for green technologies such as bio gas, composters, rain water harvesting, sustainable energy etc.

ABOUT NIE CREST

NIE-Centre for Renewable Energy and Sustainable Technologies (NIE-CREST) is a renowned Green technology promoting centre at the premises of The National Institute of Engineering (NIE), Mysore. The centre promotes eco- friendly energy systems, Renewable energy and sustainable technologies. The Centre itself has successfully implemented numerous projects on eco friendly and - renewable energy systems and sustainable technologies at International & National Level. NIE -CREST provides technology for, Design & Implementation of Renewable Energy Systems, Design & project execution of Solar, Biomass & Other RE Devices, Design & Implementation of Sustainable Technologies, Design & implementation of Technologies for Green Building, Design and implementation Of Rainwater Harvesting Systems and many more.



Ref no: RECM/EA/ 3913/1

Date 23-07-2024

ENERGY, ENVIRONMENT & GREEN AUDIT CERTIFICATE

This is to certify that, All India Institute of Speech and Hearing, An autonomous institute under ministry of health and family welfare, Govt. Of India, Mysore -570006 (Karnataka India) has been audited for energy, environment & green conservation systems & practices.

Energy, environment & green audit covered the entire Sarada Vilas Teacher's College for energy consumption pattern, measures taken to conserve energy and carbon savings. Along with waste management, water management and greenery (flora & fauna)

Audit report has been prepared based on study, site visit & data collected measurements and verification done during the course of audit. Energy audit is related to connection having RR NO HT 436 Contract demand 50 KVA solar SPVRT 40kwp at Sarada Vilas teacher's College for period 2023-24

Audit has been conducted by our team of qualified and certified engineers in accordance with standards & guidelines set by, BEE- Bureau of energy efficiency - Dept of energy, ECBC - Energy Conservation Building Code, PCB- Pollution control board guidelines, ISHRAE, ASHRAE and other standards. Environment & green audit has been done in consultation with NIE CREST for best international standard practices and technologies.

Audit also considered guidelines of NAAC National Accreditation Council under institutional values related to energy, environment & green.


-ANIL KUMAR NADIGER, B.E (E&E) MIE
Director & Energy Specialist
RACHANA ENER CARE
<Engineers for Energy & Environment>
BEE (Dept of energy) certified energy managers & auditors

Abbreviations & Glossary

AC – Alternating Current

AH- Ampere Hour (Used to define capacity of battery)

DC- Direct Current

BD – Billing Demand

BEE- Bureau of energy efficiency

BLDC – Brush less Direct Current

CD- Contract Demand

CFM – Cubic Feet per Minute

CHESCOM – Chamundeswari electricity Company

DG – Diesel Generator

DISCOMS- Distribution Company (electricity)

ECBC- Energy conservation building code

EER – Energy Efficiency Ratio

Efficacy – capacity to deliver desired out put

ENCON- Energy conservation

ESCOM – Electricity Company

HP - Horse power (1hp = 0.745 kw)

HT – High Tension (High voltage 11,000 Volts)

KWH – Kilo watt hour generally used as 'Units'

LED – Light Emitting Diode

LPH – Liter per hour (related to flow)

Lumens- Unit to measure total output light

LUX – Illumination level in unit area

Mains- Electricity supply point

MD- Maximum Demand

PCB – Pollution Control Board

PF – Power factor

Refrigerant- Chemical used in refrigerator

RO – Reverse Osmosis

SHCG – Solar Heat Gain Coefficient

SMF – Scaled Maintenance Free

Star label – Indication of energy efficiency of any equipment

TDS- Total dissolved salts

UPS – Uninterrupted Power Supply

VA – Volts and amps multiple

Standards

Standards and guide lines set by following professional bodies, societies and government bodies were followed in this report.

BEE – Bureau of energy efficiency

Nodal agency under department of energy, government of India

NPC – National productivity council

Star label standards – beestarlabel.com

ECBC – Energy Conservation Building Code

ISHRAE- Indian Society of Heating Refrigerating & air conditioning Engineers

ASHRAE- American Society of Heating Refrigerating & air conditioning Engineers

PCB – Pollution Control Board

SEEM – Society of Energy Engineers & Managers

UNSDG- United Nation Sustainable Development Goals - <https://sdgs.un.org/goals>

KREDL-Karnataka State Renewable energy development ltd

SDA - State designated agency under BEE

NBC - National Building Code

CPWD general specifications for electrical works 2023

IGBC - Indian Green Building Council

CEA -Central Electricity Authority

INSTRUMENTS USED

- Power analyzer
- Power parameter data logger
- Multi meter
- Clamp meter
- TDS meter
- Lux Meter

EXECUTIVE SUMMARY

Environment Audit:

Water Usage & Conservation Measures

Rain water harvesting: Rainwater harvesting technology has been successfully integrated into the institution's sustainability efforts to bolster groundwater resources and establish a reliable backup water supply in emergencies. Covering a 500m² area, the system collects an impressive 3,70,612 liters of rainwater annually. This harvested water plays a crucial role in replenishing groundwater levels directly via percolation pits, thereby reducing dependence on external water sources and contributing to long-term water conservation goals. The initiative underscores the institution's commitment to environmental stewardship and resilience in water management practices.

Recommendation on water conservation

To enhance water conservation efforts, several recommendations are proposed for implementation. Firstly, installing pressure reduction valves for taps can significantly reduce water wastage by regulating and lowering water flow. Secondly, placing awareness boards strategically across the campus will educate and encourage students and staff to adopt water-saving practices in their daily routines. Thirdly, implementing a dual flush tank system in restrooms can effectively reduce water usage by providing options for different water volumes based on need. Lastly, introducing automatic controls for pumps will ensure efficient water distribution and minimize unnecessary water use. These measures collectively aim to promote responsible water management and sustainability within the institution

Waste Management

The institution manages various types of waste with a structured approach aimed at environmental sustainability. Dry waste includes paper, dry leaves, and plastic, while wet waste primarily consists of food scraps. E-waste, generated from computers and old electrical equipment, is handled separately to ensure proper disposal and recycling. Hazardous waste, such as lead and old tubes, undergoes specialized management protocols to minimize environmental impact. Emphasizing waste segregation, the institution focuses on efficiently managing food and leaf waste, with daily food waste, averaging around 1 kg, handed over to external agencies for disposal. Meanwhile, leaf waste undergoes natural decomposition

onsite, supporting organic soil enrichment practices. These efforts reflect the institution's dedication to responsible waste management and conservation practices.

To enhance waste management practices, several recommendations have been proposed. Firstly, establishing vermi-composting and natural composting facilities would enable the institution to effectively process organic waste like food scraps and leaf litter into nutrient-rich compost. This approach not only reduces waste sent to landfills but also improves soil fertility for landscaping and gardening purposes. Secondly, implementing separate wet waste segregation would further minimize environmental impact by ensuring that biodegradable waste is managed separately from other waste streams. This segregation promotes efficient decomposition and reduces methane emissions, contributing to overall environmental sustainability goals. Together, these recommendations aim to enhance waste diversion efforts and foster a greener campus environment.

Dry waste

Dry waste management at the institution encompasses paper waste, dry leaf waste, and plastic waste, the institution produces approximately 1-1.5 kgs of paper waste, 2-3 kgs of dry leaf waste, and 1-1.5 kgs of plastic waste during this period. All dry waste is meticulously collected and transferred to designated facilities operated by the corporation for proper disposal. This systematic approach ensures that these recyclable materials are handled responsibly, contributing to the institution's commitment to effective waste management and environmental sustainability.

E waste

E-waste management at the institution involves handling electronic waste generated from lights, fans, and computers. Recent efforts include the replacement of standard tube lights with energy-efficient LED lights and upgrading old CRT monitors to LCD/LED monitors. Over a span of three to five years, approximately 500 kgs of e-waste accumulates, currently managed through a regular scrap vendor. To enhance sustainability practices, there is a recommendation to replace the remaining tube lights and monitors, reducing overall e-waste production. Compliance with the PCB Environment Act of 1986 mandates that e-waste must be handed over to authorized recyclers, ensuring proper disposal and recycling practices are followed to minimize environmental impact.

Hazardous waste

Hazardous waste management at the institution focuses primarily on lead waste and old tubes generated from various equipment. Currently, the generator produces approximately 150 kg of lead waste annually, stemming from 6 units of 100 Ah batteries, each weighing 25 kg. Additionally, around 60 mg of mercury waste is generated from old tubes. To reduce environmental impact, the institution plans to lower the generator's battery capacity to 60 Ah, potentially cutting down lead waste to 60 kg annually.

Moreover, efforts to replace 48 fluorescent lamps with energy-efficient LED lights have significantly reduced mercury waste generation by 480 mg. Battery disposal follows strict adherence to Pollution Control Board regulations, with old batteries exchanged during new purchases. Notably, the institution found that current batteries exceed required capacity, prompting a recommendation to replace them with 60 Ah batteries in the next cycle. This change is projected to save ₹24,000 across six units while reducing lead waste by 72 kg.

The institution maintains strict practices regarding chemical and biomedical waste, with any sanitary waste generated handled in designated, leak-proof bins lined with plastic bags. These measures ensure compliance with safety and environmental standards, promoting responsible waste management practices across the campus.

Air pollution

The institution effectively controls air pollution by enforcing a ban on vehicular traffic within its premises, thereby significantly reducing emissions. Exhaust pipes from generators are installed in compliance with PCB regulations, ensuring emissions meet prescribed standards. Furthermore, the adoption of solar energy in the 23-24 period has resulted in a substantial decrease of 3624.4 kgs in carbon emissions. Moving forward, recommendations include encouraging staff to use electric vehicles to further mitigate carbon footprints. Regular monitoring of outdoor and indoor air quality by accredited agencies is also advised to uphold air quality standards. Additionally, periodic checks on generator exhaust emissions will ensure continued compliance and contribute to maintaining a clean and healthy environment on campus.

Noise pollution

Noise pollution at the institution primarily originates from generators and limited vehicular activity on campus. Measures such as acoustic enclosures ensure that noise levels from DG sets remain within acceptable limits, minimizing disturbance to the environment and occupants.



- The generator is having acoustic enclosure and its exhaust is provided as per PCB norms
- The DG sets meets PCB II standards as per environmental act 1986

Water pollution

Regarding water pollution, the institution maintains strict practices to prevent the generation of chemical pollutants. Sewage and used water undergo regulated management processes as per PCB regulations, ensuring they are safely directed into the drainage system without causing harm to the environment.

Soil pollution

In terms of soil pollution prevention, the institution adopts practices to prevent the addition of pollutants to the soil. Proper disposal methods for mercury and lead waste are implemented to safeguard soil quality. Additionally, plans are in place to enhance soil fertility through the use of natural fertilizers and the establishment of vermi-composting facilities. These initiatives aim to maintain healthy soil conditions while supporting sustainable agricultural practices on campus.

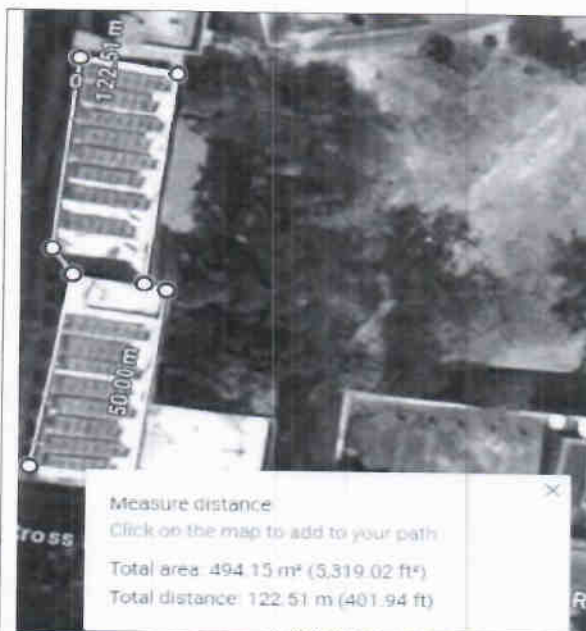
The institution demonstrates proactive measures in environmental sustainability through comprehensive water conservation, efficient waste management, pollution control strategies, and soil preservation efforts. Recommendations aim to further enhance these initiatives, promoting a greener and more sustainable campus environment.

Environment Audit

Water usage & Conservation measures

Rainwater harvesting

Rainwater harvesting technology helps recharge groundwater and provides an alternative water source during emergencies. Water collected through rainwater harvesting can be used for various purposes, including watering plants and flushing toilets. The institution has a 500m² areas that can be utilized for rainwater harvesting technology. It will collect 3,70,612liters of water per year. The collected water will directly go to a percolation pit, enhancing the groundwater level.



Percolation pit for rain water harvesting

The institution does not have any STP

Recommendations

- Pressure reduction valve for taps
- Awareness boards at strategic locations
- Dual flush tank system
- Automatic control for pump

Waste generation

Types of waste generated in the institution are:

Dry waste:

Paper waste

Dry leaves waste

Plastic waste

Wet Waste:

Food waste

E-Waste:

Computers

Old electrical equipments

Hazards waste:

Lead waste

Old tubes

Waste segregation

The institution has adopted following methods in waste segregation and collection

- Dust bins have been kept at strategic location
- Office has been provided with dustbins to collect paper waste
- Blue colour dustbin is kept in corridor to collect paper and plastic waste
- Leaf waste has been collected and dumped at pre defined places for natural decomposting

Wet waste management

Food waste and leaf waste are the primary types of waste generated in the institution. Food waste originates from leftover food (since there is no canteen on the premises), amounting to

approximately 1 kg per day. Currently, food waste is disposed of by handing it over to the corporation. Leaf waste decomposes naturally.

Recommendations:

- Implement vermi-composting and natural composting facilities in the institution. Vermicompost is produced by using earthworms to decompose organic matter, which enhances soil water retention, aeration, texture, and structure.
- It is advisable to segregate wet waste separately to minimize environmental impact.

Dry waste management

Paper waste, dry leaf waste and plastic waste are the different waste generated at the institution. As per analysis, approx. 1-1.5kgs of paper waste, 2-3kgs of dry leaf waste and 1-1.5kgs of plastic waste is generated at the institution. It is observed that all the dry waste is handed over to the corporation.

Hazards waste management

Hazardous waste is generated from lead waste and old tubes. Currently, the generator produces 150 kg of lead waste (i.e., 100 Ah, 6 units x 25 kg each). Additionally, approximately 60 mg of mercury waste is generated from old tubes. If the generator's battery capacity is reduced to 60 Ah, the institution can minimize lead waste to 60 kg.

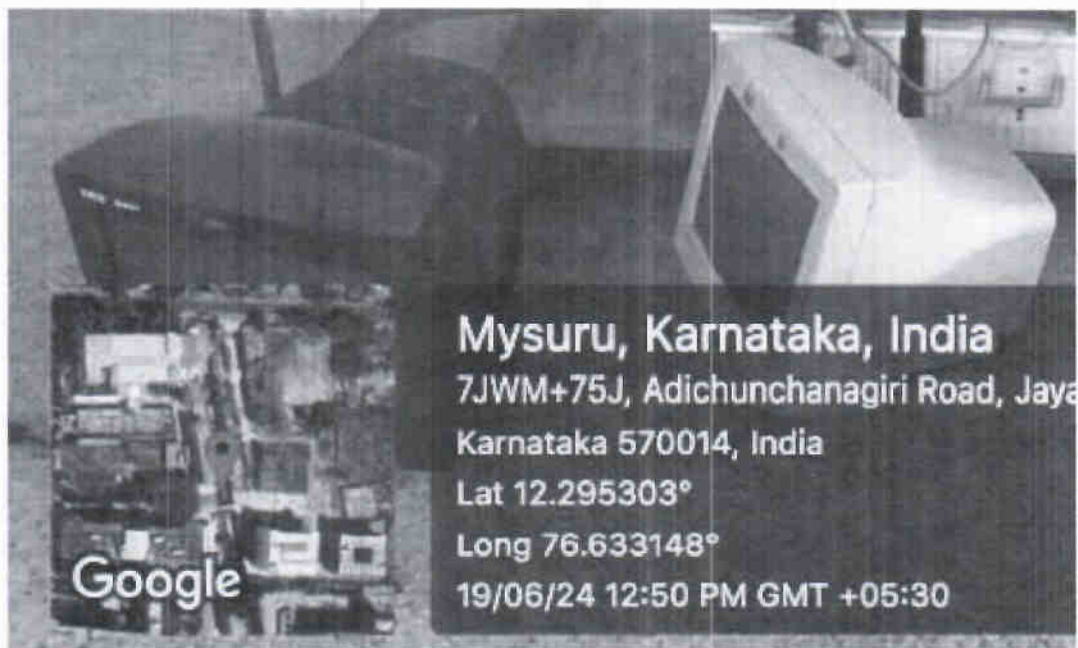
Out of 63 different lights, 48 fluorescent lamps have been replaced with LED lights. This replacement has resulted in a reduction of 480 mg of mercury waste generation. The institution disposes of batteries by exchanging old batteries when purchasing new ones from vendors. It is compliant with the Pollution Control Board's requirements. We have found that the batteries are of greater capacity than required. It is recommended to replace the batteries with 60 Ah capacity for all six units. Additionally, this proposal will lead to a reduction of lead waste by 72 kg for six units.

There is no chemical and bio medical waste in the institution. If there is any sanitary waste is generated it has to take suitable measures like place sanitary waste in designated, labelled bins specifically for this purpose. These bins should be leak-proof and lined with plastic bags.

E-waste management

- E-waste is generated from the use of lights, fans, and computers in the institution.
- The institution has replaced some standard tube lights with LED lights and old CRT monitors with LCD/LED monitors.
- Approximately 500 kgs of e-waste is produced over a period of three to five years.
- Currently, the e-waste is given to a regular scrap vendor.
- We recommend replacing the remaining tube lights and monitors to help reduce e-waste.
- As per PCB(pollution control board) environment act 1986, e-waste has to be handed over to authorised recycler (guidelines enclosed)

Old monitors kept for disposal



Pollution control

Air Pollution:

- Air pollution on campus is minimal due to the prohibition of vehicles.
- Exhaust pipes are installed for the generator as per PCB norms
- The day power cut is less in the institution, so there is less consumption of generator usage
- Campus has a generator of capacity 62.5kva.
- During 23-24 by the use of solar energy the B.Ed college has reduced carbon emission of 3624.4kgs

Recommendation

- Measures to be taken to promote use of E vehicle among the staff. This will reduce scope III carbon emission of the institution
- Periodical testing of outdoor air quality and indoor air quality by testing agencies
- Periodical testing of generator exhaust

Noise Pollution:

- The sources of noise pollution in the campus are generators and vehicular movements
- Usage of DG set is very much limited. During 23-24, the DG sets have run for very less time.
- DG set have acoustic enclosures. Its noise level is within PCB prescribed limited.
- The vehicle movement within the campus is restricted.
- There is no unrelated public vehicle movement within the institution.



Water Pollution:

- There are not any chemical pollutants generated in the institution.
- The sewage water/ used water will directly go into the drainage system according to PCB act

Soil Pollution:

- No pollutants added to soil. Institution has taken care to dispose all pollutants generated in the campus, such as mercury waste of tube lights and lead waste etc
- Institution can improve soil fertility by using natural fertilizer.
- Vermi-compost and natural composting can be installed. Vermi-compost is a type of compost that is produced by using earthworms to decompose organic matter. It is also known as worm castings. Vermi-compost is considered to be one of the highest quality organic fertilizers available. Vermi-compost improves the soil water retention, aeration, texture and structure. Vermi-compost contains all the nutrients necessary for enhancing plant growth and protecting the plant from diseases.

End of Environment Audit
