GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2020 – 2021 & 2021 – 2022

Sustainability study

AUDIT REPORT

Studied for

Pune District Education Association's

Seth Govind Raghunath

Sable College of Pharmacy

Saswad, Tal- Purandar, Dist-Pune,

Pincode 41230, Maharashtra, India

Studied in the capacity of

Accredited Green Building Professional

with the Indian Green Building Council

Studied by

Greenvio Solutions

Website https://thegreenviosolutions.co.in/

Issued on **03 February 2023** and Valid till **February 2024**

Background reference image Sasin Tipchai on unsplash

Disclaimer

The Audit Team has prepared this report for the **Pune District Education Association's Seth Govind Raghunath Sable College of Pharmacy** located at *Saswad, Tal- Purandar, Dist-Pune, Pincode 41230, Maharashtra, India* based on input data submitted by the Institute and analyzed by the team to the best of their abilities.

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

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

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

The Study is conducted incapacity of an Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

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Acknowledgment

The Audit Assessment Team thanks the **Pune District Education Association's Seth Govind Raghunath Sable College of Pharmacy, Maharashtra, India** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. Shri Ajitdada Pawar**, President; **Hon. Rajendra Ghadage**, Vice-President; **Hon. Adv Sandeep Kadam**, Hon. Secretary; **Hon. Mohanrao B. Deshmukh**, Treasurer; **Hon. L. M.Pawar**, Asst. Secretary; **Hon. Aatmaram M. Jadhav**, Dy. Asst. Secretary (Admin) and everyone from the Management.

Our heartfelt thanks to the Chairperson of the entire process **Dr.Rajashree Chavan**, Principal, for the valuable input.

We are also thankful to **Institute's Taskforce** who have been instrumental in the data collection – **Dr. Smita Pawar**, Vice-Principal; **Mrs. Vidya Maske**, Office Superintendent; **Mrs. Jayashri Jagtap**, IQAC Coordintaor and Academic Incharge; **Mr. Ganesh Nigade**, Internal Exam. Inchrge and Equipment Incharge; **Mrs. Manjusha Baravkar**, Assistant Professor.

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Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About the Management

The aim of PDEA is educating even in the rural families of Pune District and to create the bright future generation. Founder member Shri. Baburaoji Gholap started P.D.E.A. on 7th September 1941.

Shri. Baburaoji Gholap was strongly supported by Mr. Annasaheb Awate, Mr. Shankarrao Ursal, Mr. Mamasaheb Mohol, Mr. Mamasaheb Pimple in this Good venture project.

Hon. Shri. Ajit Pawar-Guardian Minister of Pune and present President, P.D.E.A. & Dy. Chief Minister of Maharashtra, Finance, Planning & Energy and nephew of Union Agriculture Minister Hon. Shri. Sharad Pawar.

As of today. P.D.E.A. is running Marathi, English Medium Schools, Nurseries-12, Primary-12 & Secondary Schools-55, Higher Secondary Schools-27, Junior Colleges-04, Vocational Colleges-25, Senior Colleges-09 (Arts, Commerce and Science Colleges).

1.2 About the Institute

The College is offering Degree (B. Pharm) and Post graduate (M. Pharm in Pharmaceutics, Pharmaceutical Chemistry and Pharmacology). The College is also an approved research centre for Ph. D. in Pharmaceutical Sciences under University of Pune. The College has built a magnificent infrastructure to provide basic requirements viz. spacious laboratories, class rooms, library, computer room etc. and other amenities. The College also provides hostel facility to its girl students.

The College is led towards excellence by its enthusiastic, highly qualified, knowledgeable staff. The College always emphasizes on overall personality development of its students conducting various student centred activities and providing them opportunities in different spheres. The College conducts various activities for welfare of the students.

The College has Training and Placement cell (TPC) in order to provide various job opportunities to its graduate and post graduate students. TPC publishes a placement

brochure 'Horizon' which acts a bridge between prospective employers and the students.

The Alumni association of the College provides the much sought after communication channel between ex-students and present students for sharing of experiences and knowledge. The College is poised to grow higher towards its goal of ensuring quality education and research along with commitment to social responsibility. **The College received the 'Best College Award by Savitribai Phule Pune University, Pune' in 2016.**

1.3 Mission Statement of the Institute

1.3.1 Vision

The College proposes *"Contributing significantly towards academics and research in the field of Pharmaceutical Sciences by providing state-of-the-art infrastructure and facilities.*

1.23.2 Mission

The College adheres and focuses on *"Empowering students through quality education and inculcation of human values to become responsible pharmacists and excellent human beings."*

1.3.3 Aim

The College has channelizes its efforts "*The institution is committed to its motto of excellence , connected in health education and approach towards higher education through expansion, excellence and equity for achieving rapid and complete growth in pharmacy profession."*

1.3.4 Objective

It is the objective of the College

- *To peruse Excellence in pharmaceutical Education.*
- *To contribute significantly towards quality research in the field of pharmacy.*

- *To make pharmaceutical education more relevant with contemporary needs in order to keep pace with the knowledge and information explosion.*
- *To enhance the students employability skills.*
- *To develop a professionally competent ethically sound and skilled pharmacist.*

1.4 Assessment of the Institute

1.4.1 Affiliations

The College has all its courses approved and affiliated to the **Savitribai Phule Pune University,** formerly the University of Poona, is a collegiate public state university located in the city of Pune, India.

1.4.2 Approvals

- Approved **by All India Council for Technical Education (AICTE), New Delhi.**
- Approved by **Pharmacy council of India (PCI), New Delhi**.
- Approved by **Directorate of Technical Education, Maharashtra.**

1.4.3 Certification

The institute has received the following Certifications

- NIRF – The College is ranked usually above 100 in the NIRF India Rankings.
- AISHE – The code is C-41540.

1.4.4 Accreditation

National Assessment & Accreditation Council (NAAC) - The College received a CGPA of 3.03 with an 'A Grade' in its first cycle of Accreditation in February 2022. The College shall enter its second cycle of NAAC in 2027.

1.4.5 Recognitions

The college has achieved the following recognition from **University Grant Commission (UGC) under section 2 (f) of the UGC Act, 1956 by University Grants Commission, New Delhi.**

2. Institution overview

2.1 Populace analysis for the Academic year 2021-22

2.1.1 Students data

The student data (shared by the Institute) shows there were **a total of 265 Boys and 259 Girl students thus a total of 523 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	06	03	**09**
Teaching Staff	08	16	**24**
Non-Teaching Staff	14	03	**17**
Total Staff Members	**28**	**22**	**50**

Table 1: Staff data of the Institution for 2021-22

The staff data shows the premises had a total of **50** Staff Members.

2.2 Populace analysis for the Academic year 2020-21

2.2.1 Students data

The student data (shared by the Institute) shows there were **a total of 223 Boys and 224 Girl students thus a total of 447 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	05	03	**08**
Teaching Staff	08	16	**24**
Non-Teaching Staff	13	01	**14**
Total Staff Members	**26**	**20**	**46**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **46** Staff Members.

2.3 Total Institute Area & Institute Building Spread Area

The **total site area is 4 acres** and the **total Built-up area of the Institute is 73,566 sq. ft.** for **a total of 573 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in 1993.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 9:00 am to 5:00 pm.

3. Green Building Study as a Research based technical audit

3.1 About the Green Building Study Audit

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

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- Waste Audit - Current waste produced, its segregation, and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

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

3.4 Activities undertaken for the Green Building Study Audit

- Allotment and Initiation by the Institute
- of data collection initiated
- Site visit at the Institute
- Submission of the files

4. Green Practices Audit

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

4.1 Green practices

We observed the following points during the Site investigation and data verification of the premises; these are common for all the Buildings in the premises.

- **Social awareness** - *The College has taken up awareness drives on various social issues for rural upliftment and regeneration in the college and surrounding villages.*
- **Cleanliness Campaign -** *The Swachha Bharat Abhiyan is carried out on college premises as well as off-premises.*
- **Fresh environment** – *The College provides an eco-friendly ambience with fresh air and soothing environment which helps to maintain a physical and mental balance. This kind of a space it a must for an educational specially technical institute which is inviting and gives the stakeholders an opportunity to explore indoor and outdoor learning to a great extent.*
- **Team work** – *The best quality of the College which sets it apart from other institutes is its coordinating and cooperative staff members, as for a building the foundation plays the most important role for its future similarly for an educational institute its staff members do.*
- **Waste Management** - *Vermin compost facility is available in the College. Most of the bio-degradable waste is recycled in 'Vermi-composting Unit'.*
- **Silent and peaceful atmosphere –** *The College is located amidst residential areas which are well designed thus these help to maintain the pollution under control and provide a healthy ambience.*

- **Universal design** – *The College premises has special provisions such as ramps, toilets for the specially abled.*

- **Signages on the plants mentioning scientific names -** *The practice of having the names of each plant and tree is executed by the College and is very beneficial.*

- **Hygiene committee -** *The College has a hygiene committee which undertakes multiple programs and necessary actions towards the maintenance of cleanliness in the premises.*

- **Documentation of all the events –** *The best part about the College is the prompt and professional response, this was observed not only in the way the Team responded throughout the project but also through the documented data submitted be it the cleanliness report or the eco club activities report; each of these were documented and presented in a sophisticated manner which is highly appreciating.*

4.2 Community Development

The College has undertaken certain social initiatives for multiple areas through the NSS Currently it has dedicated 'Outreach committee' which undertakes certain activities.

4.3 Eco-friendly initiatives undertaken

The Institution has undertaken the following initiatives through **excellent efforts** towards save environment measures.

Physical Events		
Sr.No	Events Name	Date
Academic Year 2020-21		
1	Tree plantation on the occsion of Birthday Celebration of Padmvibhushan Hon. Shri. Sharadchandraji Pawar Saheb, Ex-Agriculure Minister, Govt. of India	12/12/2020
Academic Year 2021-22		
1	Virtual and Physical Tree Plantation on occasion of Birthday ceremony of Hon. AjitdadaPawar, Deputy Chief Minister and President, PDEA	22/7/2021

2	On the occasion of Swachhata Pakhwada Swacchata abhiyan at Sangmeshwar mandir and college campus and distribution of pamphlets regarding how to use mask and Sanitizer	09/08/2021-11/08/2021
3	Swachhata Pakhawada: Cleanliness drive at medicinal garden, College campus	15/12/2021
4	NSS Residential camp: Cleanliness drive at Veer, Tal- Purandar, Dist- Pune	21/12/2021-27/12/2021
Virtual Events		
Academic Year 2020-21		
1	Tree plantation on occasion of Birthday ceremony of Hon. AjitdadaPawar, Deputy Chief Minister and President, PDEA	22/07/2020
Academic Year 2021-22		
1	Virtual and Physical Tree Plantation on occasion of Birthday ceremony of Hon. AjitdadaPawar, Deputy Chief Minister and President, PDEA	22/7/2021

Table 3: Details of the events in the premises

4.4 Survey Results

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

4.4.1 Participation

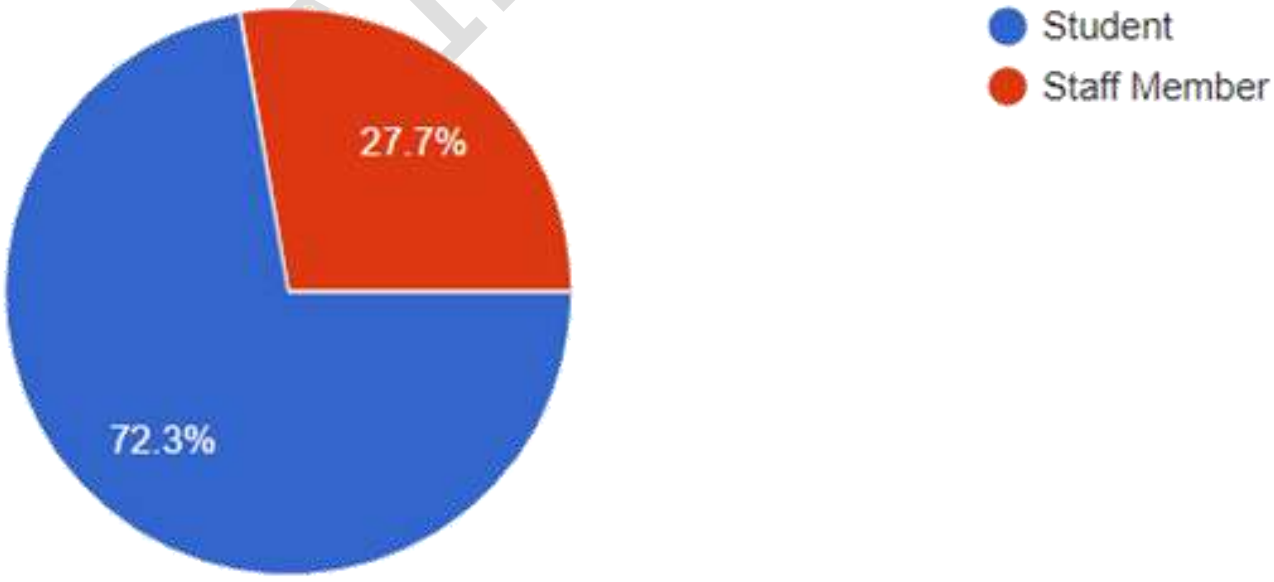

Figure 1: Participation analysis in the survey

A total of **155 responses** were received out of which 72% were students.

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

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

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

4.4.2 Rate the Green awareness practices in College

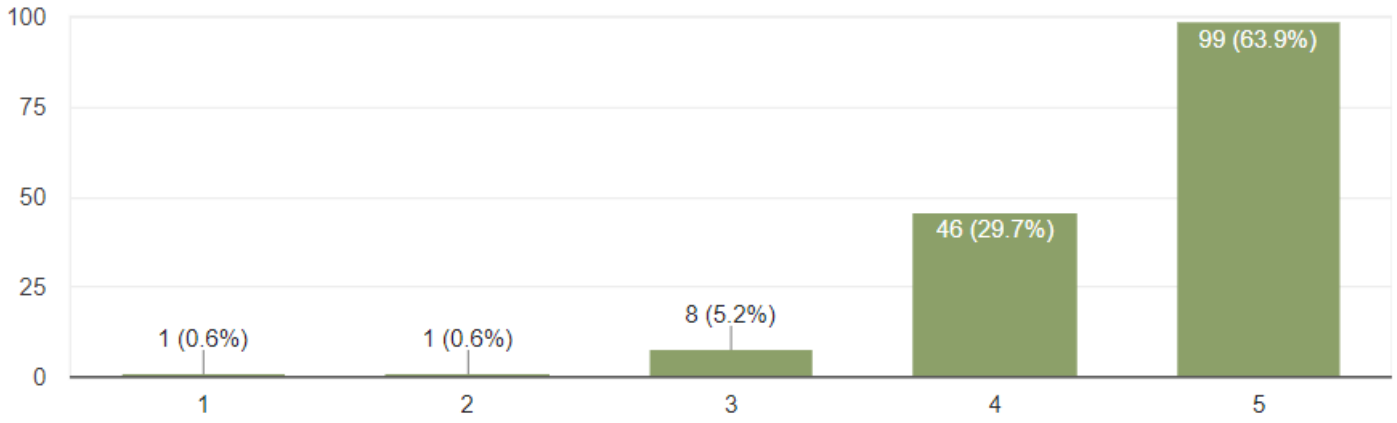

Figure 2: Green awareness practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 64%** followed by **30% for rating 4 (Very good).**

4.4.3 Does your College conduct environment awareness programs/ webinars/ plantations/ cleanliness or similar programs?

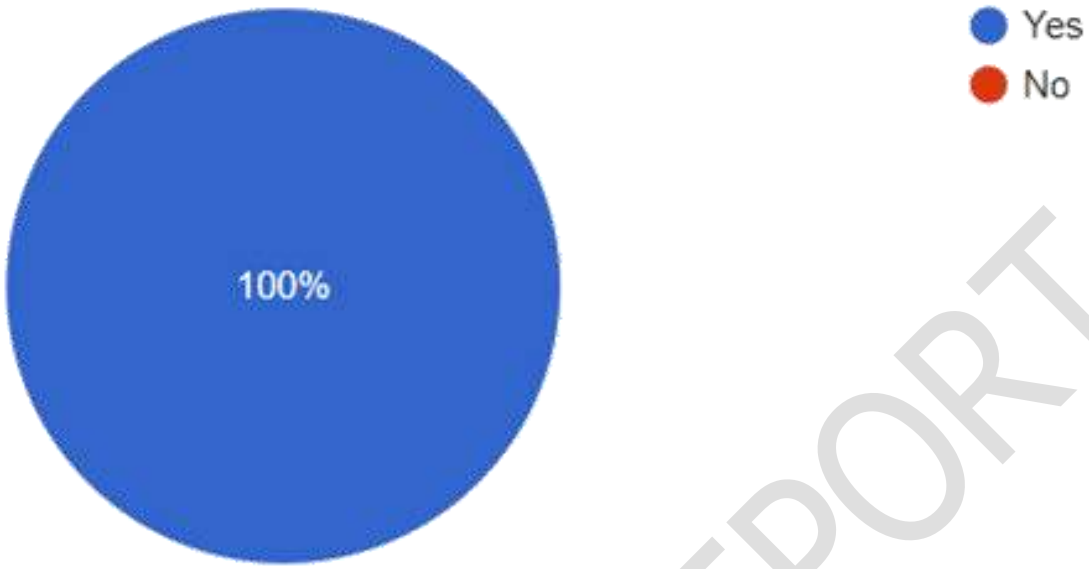

Figure 3: Confirmation of the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **100%** of responses confirmed activities are conducted which is very excellent.

4.4.4 Do you participate is such events?

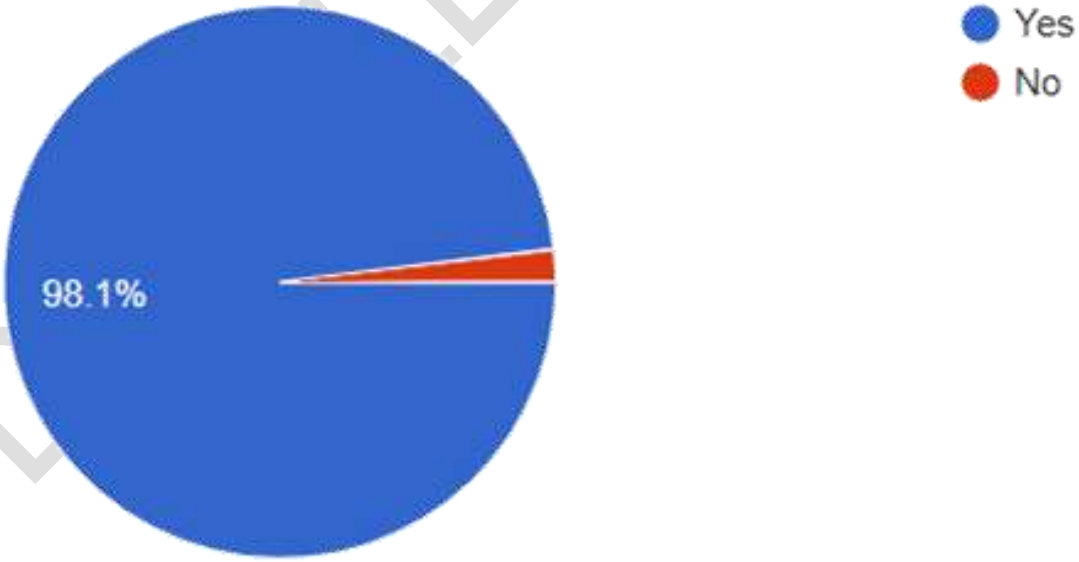

Figure 4: Participation in the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **almost 98%** of the responses confirmed their participation, **this is an excellent response.**

4.5 Recommendations related to section 'Green practices audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

- **Tree adoption scheme -** The college can adopt the One Faculty – One tree adoption scheme which is one of its kind practice, this can be very beneficial, especially during the summer season.

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

5. Waste Audit

Waste is an inevitable part of our lives. Over the years as the awareness about waste management techniques has given a rise to rethink how the waste can be avoided form being sent to the landfills. The audit provides an approximation of the types of waste generated, location of waste collections, disposal techniques used, waste segregation methodologies adopted, waste management strategies that are and implemented in addition to the newer ways the can be adopted aiming to make the premise clean and sustainable. Here sustainable refers to a broader aspect to analyse whether the current techniques are having positive or negative effect on the stakeholders of the premises.

5.1 Waste produced

5.1.1 Types and disposal of waste in Premises

S. No.	Type of waste	Source and quantity	Current Disposal method	Can be treated/ recycled?	Methodology
1	Solid waste	Toilets–Biodegradable waste	Handed to local municipality	Yes	TREATED – Biogas plant can be proposed
2	Paper waste	Newspaper and other paper	Given to vendor	Yes	TREATED – Adopt a Paper recycling unit
3	E-waste	Computers - Non-biodegradable waste as per the annual year usage	Given to vendor	Yes	CONTINUE - with the current practice
4	Dry waste in form of leaves	Open space & plantations, papers - Non biodegradable waste	Vermi-composting is undertaken	Yes	CONTINUE - with the current practice
5	Liquid waste	Toilets, washbasins – Around 100 – 120 litres per week during general times and 50 litres at present	Led in to storm water drain	Yes	TREATED – A water treatment plant can be proposed
6	Organic regular waste	Dust, dirt usually dry waste from Canteen and all sources – approx. 10 to 15 kg	Vermi-composting is undertaken	Yes	CONTINUE - with the current practice

Table 4: Summary of the types of waste produced in the premises

5.1.2 Bins summary

There are 83 Dustbins in the indoors and 4 in outdoors with volume of 7 litres (small), 15 litres (medium) and 30 litres (large); these are made up of plastic material.

5.2 Waste management

There are an adequate nos. of dustbins in premises. No smell problem or health related issues due to the waste are there. The College should undertake an appropriate waste management program along with Management for all Colleges in premises as currently no emphasis is given to this aspect.

5.3 Survey Results

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

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

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

Rating for the views regarding the Waste management practices adopted in College, following is the result received.

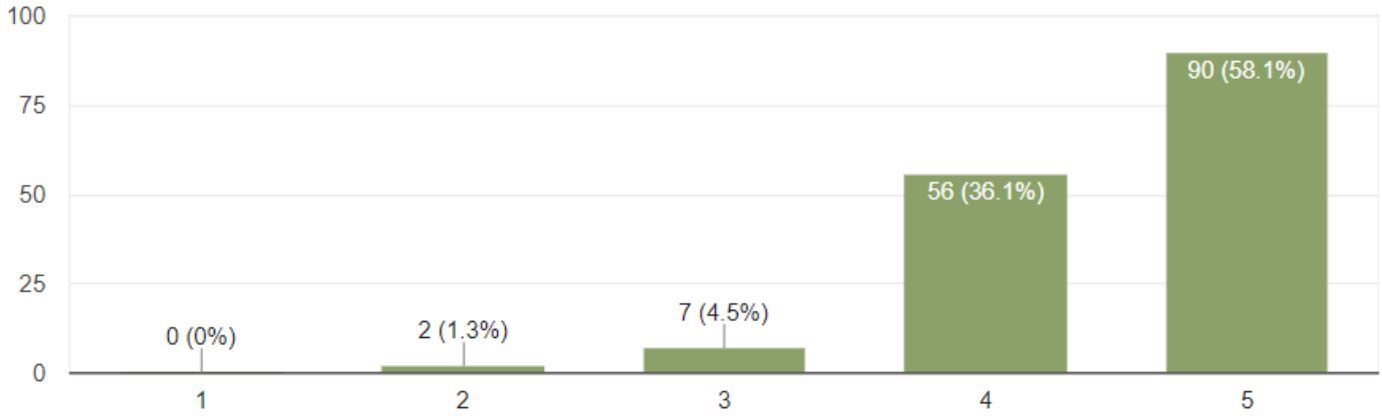

Figure 5: Waste management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 58%** followed by **36% for rating 4 (Very good).**

5.4 Recommendations related to section 'Waste Audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

5.4.1 Specific inferences

The following inferences should be undertaken by the College as per its suitability.

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

- **Plastic management for localities –** The can be frequent cloth/ paper bags distribution in local schools, slums, colleges, medical, police stations.

- **Documentation** – Improve and increase the documentation and visibility/ reflectance of the environment related events on the website, social media handles

6. Water Audit

Water is one of the basic needs. Pure drinking water is a resource which needs to be preserved efficiently. Water audit helps to identify the sources of water consumption, the water requirement by the campus met by these sources.

The points and effective usage of without any wastage. Understanding the techniques which are best suited to the site to increase water conservation in terms of awareness and practice.

6.1 Water availability and consumption

6.1.1 Sources of Primary water supply

The primary water supply refers to the drinking water. The main source of water is the Local Municipality. The water received is stored in water tanks at various locations. These are periodically cleaned and well maintained for hygiene purpose. **At present there are multiple tanks available in the premises for drinking water purpose.**

6.1.2 Sources of Secondary water supply

The secondary source of water is the source of water supply available through wells/ bore wells/ tube wells which is used for wash basin, kitchens, toilet purposes. At present there is 1bore well available on site.

6.1.3 Sources of Tertiary water supply

The tertiary source of water is the additional source of water harvesting. At present there is natural rain water harvesting practiced to increase recharge of groundwater by capturing, by rainwater harvesting from rooftop run-offs; collected water from rooftop was discharge in bore well.

6.2 Water requirement

The main areas of water requirement and type of usage is as follows

- **Drinking water –** Consumption of around 850-950 litres of water through Aquaguard like system available in the premise, the taps and water cooler.
- **Toilet blocks**– General usage by occupants in toilets, urinals, bathrooms, wash

basins using approx. 400-600 litres of water daily

- **Cleaning of the premises –** The entire Institution is very well maintained with respect to hygiene and cleaning is one of the major uses of water requirement.

6.3 Areas of water usage

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

- Urinals – 16 Nos.
- Toilets – 16 Nos.
- Wash basins – 95 Nos.
- Taps (Indoors) – 181 Nos.

As per the data shared by the College and on site observation, it was noted that there is no water wastage of water in the form of Cleanliness of toilets.

6.4 Site investigation about water management.

The College has an excellent management system which is very appreciable. We have observed the following points.

- There is **no water leakage in the entire premise;** the pipes are well maintained with adequate hygiene.
- **The premise has an efficient water management in terms of operations and maintenance.** The toilets are kept very tidy and are cleaned every day.
- The **waste water does not mix with ground water and gets directed to storm water drains.** There are sufficient numbers of taps in the premise.

6.5 Survey Results

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor

- Scale 2 – Satisfactory
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- Scale 4 – Very good
- Scale 5 – Excellent

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

Rating for the views regarding the Water management practices adopted in College, following is the result received.

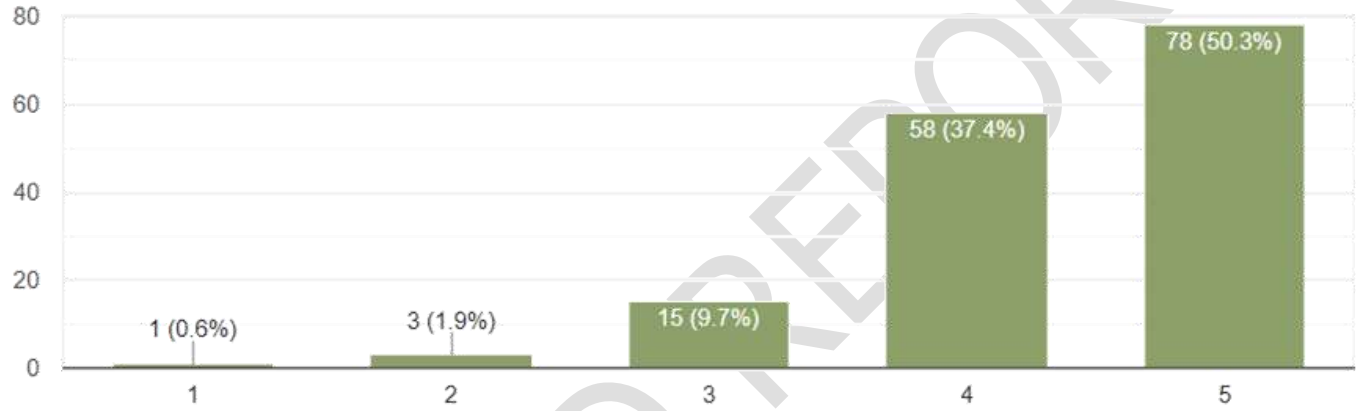

Figure 6: Water management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 50%** and around **37% for rating 4 (Very good).**

6.6 Recommendations related to section Water audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

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

7. Health and Hygiene Audit

The hygiene is a part and parcel of our daily life. It is extremely essential to keep the surroundings clean in the same manner as we would want our houses to be. Educational Institutes have a bigger role to play in order to affect the young minds in the positive manner through better hygienic practices.

7.1 Facilities available

The Institution has the following facilities as part of the premise.

- Washroom facility.
- Hand wash facility
- Drinking water facility in the form of Water coolers and taps
- Ample number of dustbins in the premise

7.2 Observations

The following were specific observations.

- The setback and backyard areas have scope to increase the green cover with vertical gardens as this will lead to improvisation in the current hygiene.
- The Institution is a tobacco and smoke free campus which helps in adapting to a Healthy Institution.
- There are pest controls program practiced with appropriate sanitation facilities and Annual Maintenance Contract for pest control is done once a year by professional Pest control units.
- The Maintenance staffs are allotted the responsibility of the washroom hygiene and they do a very commendable and excellent job to maintain hygiene of the premise.

7.3 Recommendations related to section 'Health and Hygiene'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

7.3.1 Specific inferences

The following inferences should be undertaken by the College as per its suitability.

- **Signboards** – The College should have multiple signboards about 'No smoking' and 'Healthy premises' at every nook and corner of the College.
- **Programmes** - As part of cleanliness programme the initiative of Swachh Bharat Abhiyan of Govt. of India is undertaken during various occasions.

7.3.2 General inferences

The following inferences should be undertaken after due consideration and discussion with Management since it is a shared premises.

- **Courtyards and duct areas** – These are located in the internal and setback should have vertical gardens for beautification.
- **Compound wall** – The compound wall should have awareness messages about 'No Smoking' and 'No Tobacco'

Discussion with the Core Team

On-site review with the team for site management and other features

8. References

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

7.1 National references

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013

7.2 International references

- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
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- Streetscape elements – Chapter 6 on San Francisco
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- Study related to air pollution https://www.airgle.com/
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- Accessibility study https://www.washington.edu/

  Urban heat island effect https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands

ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2020 – 2021 & 2021 – 2022

Sustainability study

AUDIT REPORT

Studied for

Pune District Education Association's

Seth Govind Raghunath

Sable College of Pharmacy

Saswad, Tal- Purandar, Dist-Pune,

Pincode 41230, Maharashtra, India

Studied in the capacity of

Accredited with IGBC and **Certified with ASSOCHAM GEM**

Registered Architect & Green Building Professional

Studied by

Greenvio Solutions

Website https://thegreenviosolutions.co.in/

Issued on **03 February 2023** and Valid till **February 2024**

Background reference image Janko Ferlic on pexels

Disclaimer

The Audit Team has prepared this report for the **Pune District Education Association's Seth Govind Raghunath Sable College of Pharmacy** located at *Saswad, Tal- Purandar, Dist-Pune, Pincode 41230, Maharashtra, India* based on input data submitted by the Institute and analyzed by the team to the best of their abilities.

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

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

The audit is a thorough study based on the inspection and investigation of data collected over a while and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

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

The Study is conducted incapacity of an Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

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Acknowledgment

The Audit Assessment Team thanks the **Pune District Education Association's Seth Govind Raghunath Sable College of Pharmacy, Maharashtra, India** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. Shri Ajitdada Pawar**, President; **Hon. Rajendra Ghadage**, Vice-President; **Hon. Adv Sandeep Kadam**, Hon. Secretary; **Hon. Mohanrao B. Deshmukh**, Treasurer; **Hon. L. M.Pawar**, Asst. Secretary; **Hon. Aatmaram M. Jadhav**, Dy. Asst. Secretary (Admin) and everyone from the Management.

Our heartfelt thanks to the Chairperson of the entire process **Dr.Rajashree Chavan**, Principal, for the valuable input.

We are also thankful to **Institute's Taskforce** who have been instrumental in the data collection – **Dr. Smita Pawar**, Vice-Principal; **Mrs. Vidya Maske**, Office Superintendent; **Mrs. Jayashri Jagtap**, IQAC Coordintaor and Academic Incharge; **Mr. Ganesh Nigade**, Internal Exam. Inchrge and Equipment Incharge; **Mrs. Manjusha Baravkar**, Assistant Professor.

We highly appreciate the assistance of **Mr. Sanjay Rokade**, Store Incharge; **Mr. Shere**, Clerk; the Lab Assistants - **Mr. Sandeep Jadhav, Mr. Sandeep Ursal, Mrs. Reshma Kale, Mrs. Chhaya Zende**; the Lab Attendants **- Mr. Dattatray Jagtap, Mr. Santosh Adhekar; Mr. Deepak Gadekar**, Electrician; **Mr. Yadav**, Peon and the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

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

Contents

1. Introduction

1.1 About the Management

The aim of PDEA is educating even in the rural families of Pune District and to create the bright future generation. Founder member Shri. Baburaoji Gholap started P.D.E.A. on 7th September 1941.

Shri. Baburaoji Gholap was strongly supported by Mr. Annasaheb Awate, Mr. Shankarrao Ursal, Mr. Mamasaheb Mohol, Mr. Mamasaheb Pimple in this Good venture project.

Hon. Shri. Ajit Pawar-Guardian Minister of Pune and present President, P.D.E.A. & Dy. Chief Minister of Maharashtra, Finance, Planning & Energy and nephew of Union Agriculture Minister Hon. Shri. Sharad Pawar.

As of today. P.D.E.A. is running Marathi, English Medium Schools, Nurseries-12, Primary-12 & Secondary Schools-55, Higher Secondary Schools-27, Junior Colleges-04, Vocational Colleges-25, Senior Colleges-09 (Arts, Commerce and Science Colleges).

1.2 About the Institute

The College is offering Degree (B. Pharm) and Post graduate (M. Pharm in Pharmaceutics, Pharmaceutical Chemistry and Pharmacology). The College is also an approved research centre for Ph. D. in Pharmaceutical Sciences under University of Pune. The College has built a magnificent infrastructure to provide basic requirements viz. spacious laboratories, class rooms, library, computer room etc. and other amenities. The College also provides hostel facility to its girl students.

The College is led towards excellence by its enthusiastic, highly qualified, knowledgeable staff. The College always emphasizes on overall personality development of its students conducting various student centred activities and providing them opportunities in different spheres. The College conducts various activities for welfare of the students.

The College has Training and Placement cell (TPC) in order to provide various job opportunities to its graduate and post graduate students. TPC publishes a placement

brochure 'Horizon' which acts a bridge between prospective employers and the students.

The Alumni association of the College provides the much sought after communication channel between ex-students and present students for sharing of experiences and knowledge. The College is poised to grow higher towards its goal of ensuring quality education and research along with commitment to social responsibility. **The College received the 'Best College Award by Savitribai Phule Pune University, Pune' in 2016.**

1.3 Mission Statement of the Institute

1.3.1 Vision

The College proposes *"Contributing significantly towards academics and research in the field of Pharmaceutical Sciences by providing state-of-the-art infrastructure and facilities.*

1.23.2 Mission

The College adheres and focuses on *"Empowering students through quality education and inculcation of human values to become responsible pharmacists and excellent human beings."*

1.3.3 Aim

The College has channelizes its efforts "*The institution is committed to its motto of excellence , connected in health education and approach towards higher education through expansion, excellence and equity for achieving rapid and complete growth in pharmacy profession."*

1.3.4 Objective

It is the objective of the College

- *To peruse Excellence in pharmaceutical Education.*
- *To contribute significantly towards quality research in the field of pharmacy.*

- *To make pharmaceutical education more relevant with contemporary needs in order to keep pace with the knowledge and information explosion.*
- *To enhance the students employability skills.*
- *To develop a professionally competent ethically sound and skilled pharmacist.*

1.4 Assessment of the Institute

1.4.1 Affiliations

The College has all its courses approved and affiliated to the **Savitribai Phule Pune University,** formerly the University of Poona, is a collegiate public state university located in the city of Pune, India.

1.4.2 Approvals

- Approved **by All India Council for Technical Education (AICTE), New Delhi.**
- Approved by **Pharmacy council of India (PCI), New Delhi**.
- Approved by **Directorate of Technical Education, Maharashtra.**

1.4.3 Certification

The institute has received the following Certifications

- NIRF – The College is ranked usually above 100 in the NIRF India Rankings.
- AISHE – The code is C-41540.

1.4.4 Accreditation

National Assessment & Accreditation Council (NAAC) - The College received a CGPA of 3.03 with an 'A Grade' in its first cycle of Accreditation in February 2022. The College shall enter its second cycle of NAAC in 2027.

1.4.5 Recognitions

The college has achieved the following recognition from **University Grant Commission (UGC) under section 2 (f) of the UGC Act, 1956 by University Grants Commission, New Delhi.**

2. Institution overview

2.1 Populace analysis for the Academic year 2021-22

2.1.1 Students data

The student data (shared by the Institute) shows there were **a total of 265 Boys and 259 Girl students thus a total of 523 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	06	03	**09**
Teaching Staff	08	16	**24**
Non-Teaching Staff	14	03	**17**
Total Staff Members	**28**	**22**	**50**

Table 1: Staff data of the Institution for 2021-22

The staff data shows the premises had a total of **50** Staff Members.

2.2 Populace analysis for the Academic year 2020-21

2.2.1 Students data

The student data (shared by the Institute) shows there were **a total of 223 Boys and 224 Girl students thus a total of 447 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	05	03	**08**
Teaching Staff	08	16	**24**
Non-Teaching Staff	13	01	**14**
Total Staff Members	**26**	**20**	**46**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **46** Staff Members.

2.3 Total Institute Area & Institute Building Spread Area

The **total site area is 4 acres** and the **total Built-up area of the Institute is 73,566 sq. ft.** for **a total of 573 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in 1993.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 9:00 am to 5:00 pm.

3. Green Building Study as a Research based technical audit

3.1 About the Green Building Study Audit

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

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- Waste Audit - Current waste produced, its segregation, and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

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

3.4 Activities undertaken for the Green Building Study Audit

- Allotment and Initiation by the Institute
- of data collection initiated
- Site visit at the Institute
- Submission of the files

4. Energy Audit

4.1 Sources of Energy consumption

The sources of energy consumption in a building comprise Lighting, Refrigeration, Ventilation, Cooling, Computers, Office equipment, cooking, space-eating, water heating, and others. For study purposes, the sources are divided into primary and secondary sources, where the primary is considered for the generation and consumption purposes and secondary sources are additional sources used as an alternative backup. The study emphasizes the consumption patterns, strategies adopted at present, and recommendations that can be implemented to improve the power consumption and utilization pattern. The following mentioned are sources of consumption and production.

4.1.1 Primary sources

- **Electrical (Metered)** – This source studies the elements which are connected through a metered system of electrical consumption. Light, fans, air conditioners, equipment, and pumps are the consumers that comprise this category.
- **Renewable (Solar)** – There are sources of renewable energy available at present in the form of solar panels.

4.1.2 Secondary sources

Gas cylinders, Inverters, UPS and Batteries– These are utilized in the administrative and academic areas; these are used a backup system.

4.2 Site investigation analysis

The data investigated and collected through interviews are summarised below:

- The **Maintenance Staff, Lab Attendants switches off all equipment** regularly after their appropriate usage.
- All the **computers are shut off after use** and also put on power-saving mode.

4.3 Utility bill audit

4.3.1 General observations as per discussion

The solar panels are installed on the rooftop this has impacted the energy loads in a positive manner.

4.3.2 Documentation of the data

The admin department had shared the bills for Meter which is connected to all Buildings and is main source of energy supply. The details of meter wise unit consumption of the electricity generated are documented below.

S.No.	Month	Year	Unit Consumed	Amount
1	Jan-22	2021-22	484	3,400
2	Feb-22		664	4,520
3	Mar-21		132	1,230
4	Apr-21		0	370
5	May-21		0	-1,450
6	Jun-21		0	-1,080
7	Jul-21		32	-510
8	Aug-21		197	1,090
9	Sep-21		0	370
10	Oct-21		0	380
11	Nov-21		95	960
12	Dec-21		439	3,120
1	Jan-21	2020-21	0	362
2	Feb-21		0	362
3	Mar-20		634	5,774

4	Apr-20		634	5,612
5	May-20		496	3,586
6	Jun-20		496	3,586
7	Jul-20		0	-6,013
8	Aug-20		0	362
9	Sep-20		93	966
10	Oct-20		489	3,540
11	Nov-20		331	2,513
12	Dec-20		0	362

Table 3: Electricity loads of the bills documented information

4.4 Survey Results

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

4.4.1 Participation

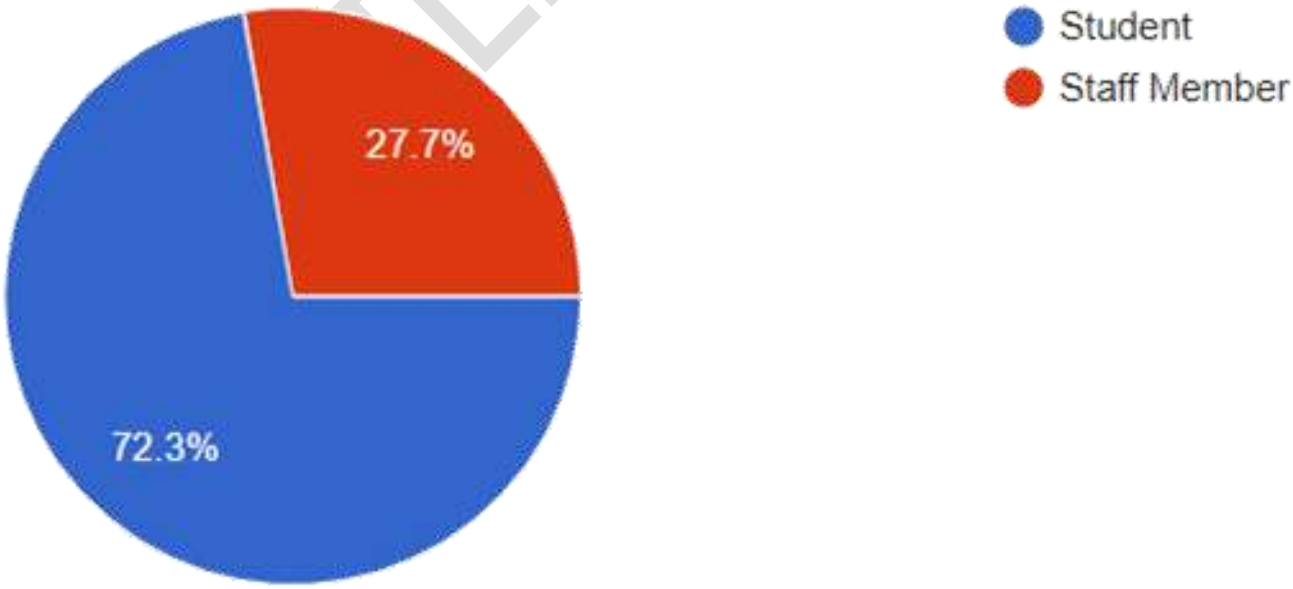

Figure 1: Participation analysis in the survey

A total of **155 responses** were received out of which 72% were students.

4.4.2 Review of the Energy management practices in the premises

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

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

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

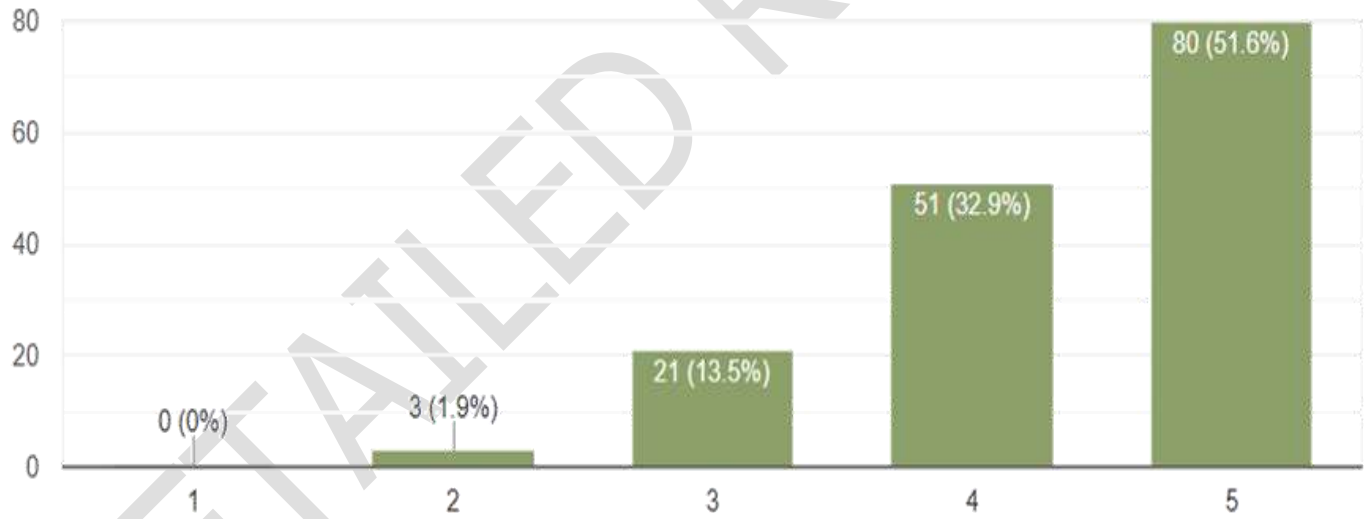

Figure 2: Energy management practices in Institute

Observation: The students and staff *almost 52% of the respondents* found the practices to be Excellent (Rating of 5); whereas *almost 33% of the respondents* found the practices to be Very Good (Rating of 4); and *14% of the respondents found the practices to be Good (Rating of 3).*

Inference: Though the majority responses received is almost 50% which has been given to 'Rating of 5' thus given the populace of the Institute this section requires a lot of improvement.

4.5 Calculated Electrical Consumption as per study

The electricity bills provide actual consumption data. The following is the calculated consumption. It is done to understand the percentage of energy usage in the premises by various applications. It is based on the inventory collection and interviews with the staff.

The additional data such as wattage is taken from market research. In terms of electrical consumption, the main sources are lights, fans, air conditioners, and equipment. The inventory and data collection for sources of energy consumed in the premise are summarised in the following sections.

Note: The following analysis is combined for the entire premise taking into consideration the duration before the pandemic to understand the consumption pattern on a regular day.

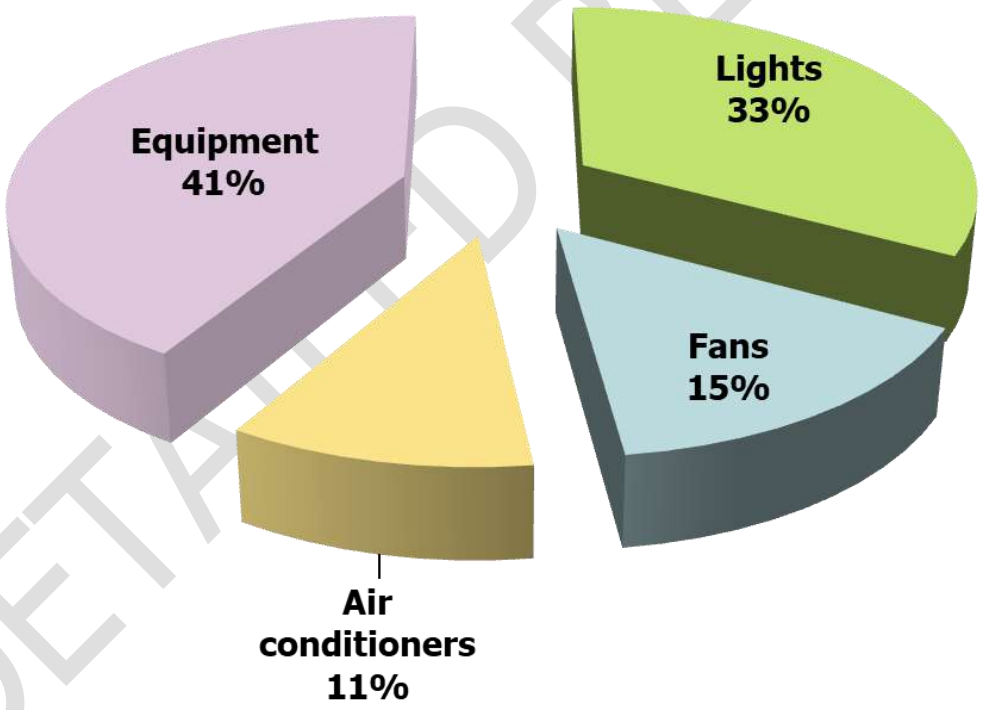

Figure 3: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consumes 41% while the lights consume 33% whereas the fans consume 15% and the air conditioners consume 11% of the total calculated electrical energy.

4.6 Electromechanical systems – Lights

4.6.1 Types of lights based on the numbers

There are a total of **363 lights on the premises;** the following table shows the various types of lights on the premises.

S. No.	Type	Nos.
1	LED	90
2	Non-LED	273

Table 4: Summary of the types of lights on-premise

4.6.2 Types of lights based on the power consumption

The energy consumption of lights is **30,598 kWh** of energy.

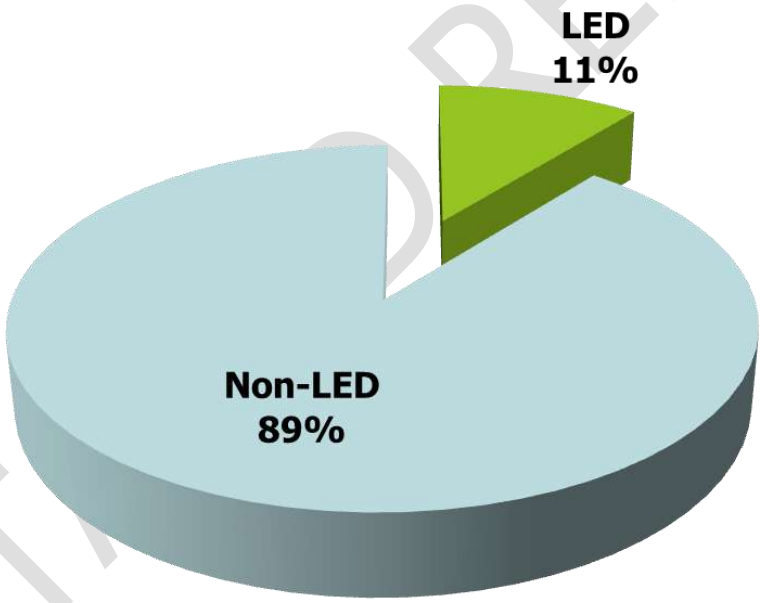

Figure 4: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights on-premises shows **Non-LED lights consume 89%** followed by **LED lights consume 11%**

4.6.3 Energy efficient practices

4.6.3.1 Alternative energy initiative

The institute has installed 10 kW On-Grid connected Solar Photovoltaic Power Generation Plant as a source of renewable energy. **Around 80% energy generated is utilized in the premises & 20% is given back to the grid.**

4.6.3.2 Percentage of lighting power requirement met through LED lights

The premise has LED Lights to contribute to 25% in terms of number and **11% of the power requirement** is met through the same. As per our study, we could conclude that both of these are the highest contributions among all the types of lights.

4.6.4 Site investigation observations

- All lights are in working conditions.
- There was no fuse defect observed.

4.6.5 Section-wise recommendation related to 'lights'

The current light analysis shows that Non-LED lights consume anywhere between 50W to 54W and even more when in use; these should be replaced with LED lights which consume on an average 12-16W when in use.

Our technical analysis shows that there would be a reduction of an average of **67% reduction** in energy consumption through lights specifically as a part of the electro - mechanical system if all **Non-LED lights on all floors** are replaced with an energy efficient appliance whenever the College undergoes renovation.

4.7 Electromechanical systems – Fans

4.7.1 Types of fans based on the numbers

There are a total of **169 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	124
2	Exhaust fans	45

Table 5: Summary of the types of fans in the premises

4.7.2 Types of fans based on the power consumption

The energy consumption of fans is **14,060 kWh** of the energy.

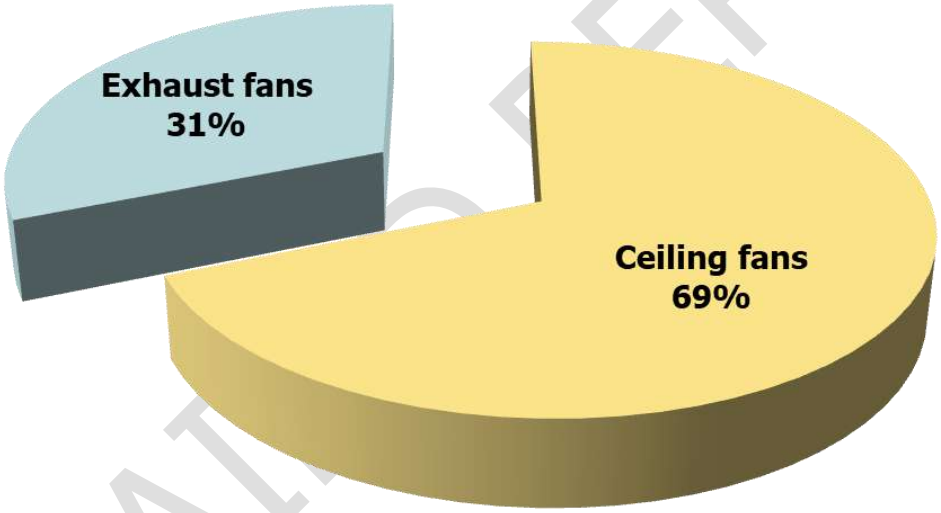

Figure 5: Types of fans based on power consumption

The above analysis shows the **Ceiling fans consume 69%** whereas the **Exhaust fans consume 31%** of the total power.

4.7.3 Space-wise consumption analysis

4.7.3.1 Observations

- The maximum types of fans in terms of numbers and power consumption are ceiling fans.
- All fans are in working conditions.
- Windows do not have cracks and are caulked appropriately.

4.7.3.2 Inferences

- The recommendations shall be checked as follows.
- Since the building is very oriented climatically and geographically there is very fresh air inside the premises and hence there are fewer requirements of fans in the spaces.

4.7.4 Section-wise recommendation related to 'Fans'

*To be considered as **first priority but first in sequence** for implementation under section wise study.*

Our detailed study states that is all the **ceiling fans in all spaces** if replaced with star rated appliance results in a reduction of average of **47% reduction** in energy consumption if replaced with energy efficient appliance. It will be suggested to either replace these now if College can have certain plans else the replacement can be done when fans get damaged or are not in working condition.

4.8 Electromechanical systems – Air conditioners

4.8.1 Types of air conditioners based on the numbers

There are **8 air conditioners** on the entire premises**.**

4.8.2 Types of air conditioners based on the power consumption

The energy consumption of air conditioners is **9,800 kWh** of energy.

4.8.3 Space-wise consumption analysis

4.8.3.1 Observations

- The College has maximum energy consumed by air conditioners in premises.
- There is a major economical expense w.r.t. air conditioners however this adding to the electricity bills.
- The Outdoor units are cleaned properly and do not possess dust collection problems.

4.8.3.2 Inferences

- There is availability of fans in the premises.
- The College should discuss with Management and check out for alternative solutions by using fans to a major extent or check for alternative sources of energy.

4.8.4 About the replacement of current air conditioners

Since all the air conditioners are energy efficient, the recommendations are excluded for this section.

4.9 Electromechanical systems – Equipment

The equipment study plays an important role in the analysis of the electrical consumption. These when considered from the Green building perspective are essential to understand their consumption patterns, in order to determine their inputs towards the power generation contribution.

As an educational institute, it has general equipment with a regular power contribution pattern. During the visit it was observes that utmost measures are taken for the safety and proper handling of the equipment.

4.9.1 Types of equipment based on the numbers

There are **103 nos. of equipment** in the Educational sector. (The scientific equipments have been excluded for this section study as it focuses only on the major use equipment)

4.9.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **38,560 kWh** of energy.

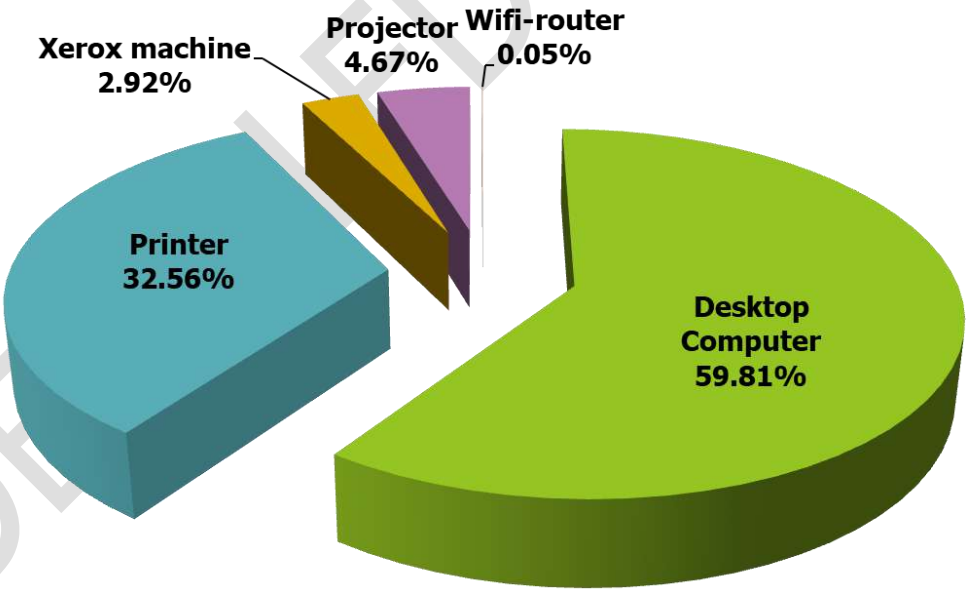

Figure 6: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **desktop computer consumes more energy at 59.81%** while the **printer consumes 32.56%** the **projector consumes 4.67%** and the **Xerox machine consumes 2.92%** these are the maximum consumers as compared to other equipment.

4.9.3 Site investigation observations

Some of the points noticed are as follows:

1. No unnecessary electronic devices are plugged in.
2. During vacations all electrical devices unplugged.
3. All types of equipment are in working conditions and daily monitoring and check are done by the maintenance staff and admin staff skilfully.
4. No defect was found in any equipment of electrical consumption.

4.9.4 Section-wise recommendation related to 'Equipment'

*To be considered as **first priority but first in sequence** for implementation under section wise study*

4.9.4.1 Desktop computers to laptops

Among all equipment, it suggested replacing the desktop computers with laptops as this would be energy efficient. A normal desktop computer consumes an average of 250W and it is to be connected all time when it has to be used. On the contrary, a laptop consumes 40W and has a battery backup that lasts up to 4 hours.

There is **an average 84% reduction** in energy consumption if replaced with an energy-efficient appliance which is a laptop in all the areas. This replacement is however dependent on a variety of factors as follows.

- **Some of the senior staff** members may be more convenient with computers; replacement with a laptop might result in a change of the working patterns and hours which may affect the productivity.
- **Laptops** in case are not handled with care such as if dropped unintentionally might result in data imbalance.
- **Depending on the recent pandemic situation** in case it might be possible due to irregular usage the device might have issues while functioning.

Thus the Institute should analyze the above points and then devise a strategy for the replacement, when the devices get damaged or are not in working condition.

4.9.4.2 Other equipment

The following recommendations are for the other equipment in the premises.

- Replace the Non-LED (Regular) TV Monitors with LED equipment.
- Backup computer files during vacations.
- Refrigerators and all electronic equipments should be cleaned out completely including system check up with AMC during vacations, this should be a periodic activity and the same should be documented every year.

4.10 Consolidated study recommendations related to 'entire Institute'

(Based on the site visit)

These are to be considered as ***second priority*** for implementation, once the section wise recommendations are implemented. The following recommendations should be ***implemented within the next 2.5 – 3.5 years from the date of the Report submission.*** The Institute can execute a plan of action after discussion with Project Head.

- **Solar farms -** This option can be explored with due discussion with the surrounding and adjacent farmland owners. This will serve as a noble project being one of its kind in the locality and will provide dual benefits to the farm land and the College w.r.t to electricity bill power reduction.

- **Solar tree** – Since there are certain space and structural constraints the option of providing an aesthetic beauty to the premises and benefit w.r.t to energy reduction can be provided with installation of solar tree in multiple places in the site.

Plate 1: Understanding the lighting concepts

Source: https://www.archiexpo.com/prod/sunset-energietechnik-gmbh/product-74430-1179445.html

Discussion with the Core Team

On-site review with the team for site management and other features

5. References

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

Specific references for study related to energy

- https://www.energy.gov/eere/buildings/zero-energy-buildings
- https://www.dsaarch.com/zero-net-positive-energy
- U.S. Energy Information Administration
- Energy efficiency measures in buildings, Energy efficiency in electrical utilities, Bureau of energy efficiency, India.
- Energy Efficient lighting for sustainable development, Writing team: Carmen Dienst, Willington Ortiz, Julia Pfaff, Dieter Seifried. Wuppertal Institute for Climate, Environment and Energy

  https://seors.unfccc.int/applications/seors/attachments/get_attachment?code=NG125PFE4WHMWSYAK8TCAKIHMWX0F4QD

Environment Audit

Study Period (Two Years) 2020 – 2021 & 2021 – 2022

Sustainability study

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Issued on **03 February 2023** and Valid till **February 2024**

Background reference image Nic Y C Gua on unsplash

Disclaimer

The Audit Team has prepared this report for the **Pune District Education Association's Seth Govind Raghunath Sable College of Pharmacy** located at *Saswad, Tal- Purandar, Dist-Pune, Pincode 41230, Maharashtra, India* based on input data submitted by the Institute and analyzed by the team to the best of their abilities.

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

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

The audit is a thorough study based on the inspection and investigation of data collected over a while and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

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

The Study is conducted incapacity of an Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

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Acknowledgment

The Audit Assessment Team thanks the **Pune District Education Association's Seth Govind Raghunath Sable College of Pharmacy, Maharashtra, India** for assigning this important work of Environment Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. Shri Ajitdada Pawar**, President; **Hon. Rajendra Ghadage**, Vice-President; **Hon. Adv Sandeep Kadam**, Hon. Secretary; **Hon. Mohanrao B. Deshmukh**, Treasurer; **Hon. L. M.Pawar**, Asst. Secretary; **Hon. Aatmaram M. Jadhav**, Dy. Asst. Secretary (Admin) and everyone from the Management.

Our heartfelt thanks to the Chairperson of the entire process **Dr.Rajashree Chavan**, Principal, for the valuable input.

We are also thankful to **Institute's Taskforce** who have been instrumental in the data collection – **Dr. Smita Pawar**, Vice-Principal; **Mrs. Vidya Maske**, Office Superintendent; **Mrs. Jayashri Jagtap**, IQAC Coordintaor and Academic Incharge; **Mr. Ganesh Nigade**, Internal Exam. Inchrge and Equipment Incharge; **Mrs. Manjusha Baravkar**, Assistant Professor.

We highly appreciate the assistance of **Mr. Sanjay Rokade**, Store Incharge; **Mr. Shere**, Clerk; the Lab Assistants - **Mr. Sandeep Jadhav, Mr. Sandeep Ursal, Mrs. Reshma Kale, Mrs. Chhaya Zende**; the Lab Attendants **- Mr. Dattatray Jagtap, Mr. Santosh Adhekar; Mr. Deepak Gadekar**, Electrician; **Mr. Yadav**, Peon and the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

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

Contents

1. Introduction

1.1 About the Management

The aim of PDEA is educating even in the rural families of Pune District and to create the bright future generation. Founder member Shri. Baburaoji Gholap started P.D.E.A. on 7th September 1941.

Shri. Baburaoji Gholap was strongly supported by Mr. Annasaheb Awate, Mr. Shankarrao Ursal, Mr. Mamasaheb Mohol, Mr. Mamasaheb Pimple in this Good venture project.

Hon. Shri. Ajit Pawar-Guardian Minister of Pune and present President, P.D.E.A. & Dy. Chief Minister of Maharashtra, Finance, Planning & Energy and nephew of Union Agriculture Minister Hon. Shri. Sharad Pawar.

As of today. P.D.E.A. is running Marathi, English Medium Schools, Nurseries-12, Primary-12 & Secondary Schools-55, Higher Secondary Schools-27, Junior Colleges-04, Vocational Colleges-25, Senior Colleges-09 (Arts, Commerce and Science Colleges).

1.2 About the Institute

The College is offering Degree (B. Pharm) and Post graduate (M. Pharm in Pharmaceutics, Pharmaceutical Chemistry and Pharmacology). The College is also an approved research centre for Ph. D. in Pharmaceutical Sciences under University of Pune. The College has built a magnificent infrastructure to provide basic requirements viz. spacious laboratories, class rooms, library, computer room etc. and other amenities. The College also provides hostel facility to its girl students.

The College is led towards excellence by its enthusiastic, highly qualified, knowledgeable staff. The College always emphasizes on overall personality development of its students conducting various student centred activities and providing them opportunities in different spheres. The College conducts various activities for welfare of the students.

The College has Training and Placement cell (TPC) in order to provide various job opportunities to its graduate and post graduate students. TPC publishes a placement

brochure 'Horizon' which acts a bridge between prospective employers and the students.

The Alumni association of the College provides the much sought after communication channel between ex-students and present students for sharing of experiences and knowledge. The College is poised to grow higher towards its goal of ensuring quality education and research along with commitment to social responsibility. **The College received the 'Best College Award by Savitribai Phule Pune University, Pune' in 2016.**

1.3 Mission Statement of the Institute

1.3.1 Vision

The College proposes *"Contributing significantly towards academics and research in the field of Pharmaceutical Sciences by providing state-of-the-art infrastructure and facilities.*

1.23.2 Mission

The College adheres and focuses on *"Empowering students through quality education and inculcation of human values to become responsible pharmacists and excellent human beings."*

1.3.3 Aim

The College has channelizes its efforts "*The institution is committed to its motto of excellence , connected in health education and approach towards higher education through expansion, excellence and equity for achieving rapid and complete growth in pharmacy profession."*

1.3.4 Objective

It is the objective of the College

- *To peruse Excellence in pharmaceutical Education.*
- *To contribute significantly towards quality research in the field of pharmacy.*

- *To make pharmaceutical education more relevant with contemporary needs in order to keep pace with the knowledge and information explosion.*
- *To enhance the students employability skills.*
- *To develop a professionally competent ethically sound and skilled pharmacist.*

1.4 Assessment of the Institute

1.4.1 Affiliations

The College has all its courses approved and affiliated to the **Savitribai Phule Pune University,** formerly the University of Poona, is a collegiate public state university located in the city of Pune, India.

1.4.2 Approvals

- Approved **by All India Council for Technical Education (AICTE), New Delhi.**
- Approved by **Pharmacy council of India (PCI), New Delhi**.
- Approved by **Directorate of Technical Education, Maharashtra.**

1.4.3 Certification

The institute has received the following Certifications

- NIRF – The College is ranked usually above 100 in the NIRF India Rankings.
- AISHE – The code is C-41540.

1.4.4 Accreditation

National Assessment & Accreditation Council (NAAC) - The College received a CGPA of 3.03 with an 'A Grade' in its first cycle of Accreditation in February 2022. The College shall enter its second cycle of NAAC in 2027.

1.4.5 Recognitions

The college has achieved the following recognition from **University Grant Commission (UGC) under section 2 (f) of the UGC Act, 1956 by University Grants Commission, New Delhi.**

2. Institution overview

2.1 Populace analysis for the Academic year 2021-22

2.1.1 Students data

The student data (shared by the Institute) shows there were **a total of 265 Boys and 259 Girl students thus a total of 523 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	06	03	**09**
Teaching Staff	08	16	**24**
Non-Teaching Staff	14	03	**17**
Total Staff Members	**28**	**22**	**50**

Table 1: Staff data of the Institution for 2021-22

The staff data shows the premises had a total of **50** Staff Members.

2.2 Populace analysis for the Academic year 2020-21

2.2.1 Students data

The student data (shared by the Institute) shows there were **a total of 223 Boys and 224 Girl students thus a total of 447 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	05	03	**08**
Teaching Staff	08	16	**24**
Non-Teaching Staff	13	01	**14**
Total Staff Members	**26**	**20**	**46**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **46** Staff Members.

2.3 Total Institute Area & Institute Building Spread Area

The **total site area is 4 acres** and the **total Built-up area of the Institute is 73,566 sq. ft.** for **a total of 573 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in 1993.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 9:00 am to 5:00 pm.

3. Green Building Study as a Research based technical audit

3.1 About the Green Building Study Audit

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

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- Waste Audit - Current waste produced, its segregation, and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

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

3.4 Activities undertaken for the Green Building Study Audit

- Allotment and Initiation by the Institute
- of data collection initiated
- Site visit at the Institute
- Submission of the files

4. Site Study

4.1 Actual positive points based on the site visit

The following points are based on the site visit observations:

- Availability of open space in the premises.
- Plantation activities and innumerable numbers of plants in premises.
- For safety concern there are CCTV at multiple locations in the premises.
- Cleanliness and appropriate maintenance has resulted in a well-maintained and state of the art infrastructure.

4.2 General positive points

The following points are based on the general observations of discussions:

- **User friendly movability in premises -** There are provisions of Kerb Ramp in the Building premises, also low height hand rail for ease of access.
- **OPAC system -** The system in the library is beneficial for the students.
- **Paperless technologies -** The College has gone technology-friendly and paperless in the functioning of the Premises.
- **Resting places -** There are provisions for resting places on-premises outdoor and indoors.
- **Universally accessible premises -** In addition to availability of ramps, there are provisions for lifts, universal toilets.

5. Ecological (Environmental) Audit

Environment is an essential part for human survival. We co-exist with the environment and it cannot be termed as a separate entity. The Ecological audit helps to understand the flora, fauna that exists and steps that can be taken to improve the same. To denote if there are problems related to sound in and around the surrounding. In terms of the carbon footprint it helps in keeping a tab on the eco-friendly habits incorporated by the inhabitants of the premises. Health today is the topmost priority, a general understanding of the initiatives undertaken along with sufficient hygiene practices adopted. Universal design is applicable to all built and unbuilt spaces.

5.1 Open Spaces

The College is located in the town of Sable; however it has a spacious open space, specific botanical garden with fresh environment.

5.2 Flora audit – Research study

A flora survey was carried out to identify the total number of plants and trees. The detailed study is documented as follows.

Sr.No	Plant Name	Type	Nos.	Planted by
Medicinal Garden				
1	Chitrak	Herb	2	Staff
2	Karanj	Plant	2	Staff
3	Kavat	Tree	1	Staff
4	Muchkund	Plant	1	Staff
5	Shindi	Shrub	1	Staff
6	Shivan	Plant	1	Staff
7	Apta	Shrub	1	Staff
8	Ritha	Plant	2	Staff
9	Hibiscus	Shrub	2	Staff

10	Mango	Plant	3	Staff
11	Narkya	Plant	1	Staff
12	Aloe	Plant	1	Staff
13	Bhokar	Plant	1	Staff
14	Guggul	Shrub	1	Staff
15	Insulin	Shrub	1	Staff
16	Kusumbm	Plant	1	Staff
17	Undi(sultan champa)	Plant	1	Staff
18	Turmeric (Amba Haldi)	Plant	1	Staff
19	Tulsi	Herb	1	Staff
20	Hirda	Plant	1	Staff
21	Curry Tree	Herb	1	Staff
22	Rakta Chandan	Plant	1	Staff
23	Asana	Plant	1	Staff
24	Pomegranate	Plant	1	Staff
25	Hadjod	Plant	1	Staff
26	Bael	Plant	2	Staff
27	Banana	Plant	1	Staff
28	Arjun	Plant	1	Staff
29	Vaijayanti Tulsi	Plant		Staff
30	Eucalptus(Nilgiri)	Plant	1	Staff
31	Premna	Plant	1	Staff
32	Chandan(Sandelwood)	Plant	3	Staff
33	Kardal	Herb	1	Staff
34	Vijayasar(Bjja)	Plant	1	Staff
35	Jackfruit	Plant	1	Staff
36	Ginger	Shrub	1	Staff
37	Kulanjan	Plant	1	Staff
38	Madanphal	Plant	1	Staff

39	Papaya	Plant	1	Staff
40	Cassia	Plant	1	Staff
41	Adulsa(vasaka)	Plant	2	Staff
42	Chiku	Plant	1	Staff
43	All vitamin	Plant	1	Staff
44	Dikmali	Shrub	1	Staff
45	Ashwagandha	Shrub	0	Staff
46	Henna (Mehandi)	Shrub	1	Staff
47	Lemon	Shrub	1	Staff
48	Jambhul	Plant	2	Staff
49	Erendel	Shrub	1	Staff
50	Vala	Climbers	1	Staff
51	Amla	Shrub	1	Staff
52	Ramphal	Plant	2	Staff
53	Kaner	Plant	1	Staff
54	Tetu	Plant	1	Staff
55	Gunjpala	Plant	1	Staff
56	Ritha	Plant	1	Staff
57	Behada	Plant	1	Staff
58	Vinca	Plant	1	Staff
59	Mint Japnees	Plant	1	Staff
60	Ber(Chinee Apple)	Plant	1	Staff
61	Sago	Plant	2	Staff
62	Shatavari	Plant	2	Staff
63	Pandhra Chafa	Plant	1	Staff
64	Betel Leaf	Plant	1	Staff
65	Owa (Ajwain)	Plant	1	Staff
66	Kalmegh	Plant	1	Staff
67	Lajalu	Plant	2	Staff

68	Menthol	Plant	1	Staff
69	Gavatichaha	Plant	1	Staff
70	Neche	Plant	1	Staff
71	Vekhand	Plant	1	Staff
72	Odomos	Plant	1	Staff
73	Sitafal	Plant	1	Staff
74	Rui (crown flower)	Plant	1	Staff
75	Coconut	Tree	2	Staff
76	Satap	Plant	1	Staff
77	Nirgudi	Plant	1	Staff
78	Gulvel	Plant	1	Staff
79	Chinch	Tree	1	Staff
80	Subhabul	Plant	1	Staff
81	Neem	Tree	1	Staff
82	Damvel	Tree	1	Staff
83	Pichkari	Tree	1	Staff
84	Krishna Kamal	Plant	3	Staff
85	Palm	Plant	20	Staff
86	Datura	Shrub	1	Staff
87	Lantana	Shrub	1	Staff
88	Shikaki	Shrub	1	Staff
89	Subja	Shrub	1	Staff
90	Geranium	Shrub	1	Staff
91	Padal	Shrub	1	Staff
92	Stevia(Sugar leaf)	Shrub	1	Staff
93	Gholaphal	Plant	1	Staff
94	Barsera	Plant	1	Staff
Academic Year 2020-21				
1	Naral	Tree	11	Student & Staff

2	Ashoka	Tree	8	Student & Staff
3	Gulmohar	Tree	16	Student & Staff
4	Chinch	Tree	32	Student & Staff
5	Lemon	Tree	11	Student & Staff
6	Nilgiri	Tree	12	Student & Staff
7	Pimpal	Tree	7	Student & Staff
8	Mango	Tree	5	Student & Staff
9	Devdhar	Tree	2	Student & Staff
10	Apata	Tree	3	Student & Staff
11	Nilmohar	Tree	3	Student & Staff
12	Pilmohar	Tree	3	Student & Staff
13	Vad	Tree	3	Student & Staff
14	Shabudana	Tree	2	Student & Staff
15	Bel	Tree	1	Staff
16	Ramphal	Tree	1	Staff
17	Chandan	Tree	3	Student & Staff
18	Subabhal	Tree	2	Student & Staff
19	Pichkari	Tree	1	Staff
20	Karanj	Tree	1	Staff
21	Adulsa	Tree	2	Student & Staff
22	Mukachand	Tree	1	Student & Staff
23	Bhokar	Tree	1	Student & Staff
24	Awla	Tree	1	Student & Staff
25	Shivan	Tree	1	Student & Staff
26	Chiku	Tree	1	Student & Staff
27	Bibul	Tree	1	Student & Staff
28	Narkya	Tree	1	Student & Staff
29	Jackfruit	Tree	1	Student & Staff
30	Tetu	Tree	1	Student & Staff

31	Chafa	Tree	2	Student & Staff
32	Kawat	Tree	1	Student & Staff
33	Jamun	Tree	1	Student & Staff
As per record Trees (2021-22)				
1	Naral	Tree	11	Student & Staff
2	Ashoka	Tree	8	Student & Staff
3	Gulmohar	Tree	16	Student & Staff
4	Chinch	Tree	32	Student & Staff
5	Lemon	Tree	11	Student & Staff
6	Nilgiri	Tree	12	Student & Staff
7	Pimpal	Tree	7	Student & Staff
8	Mango	Tree	5	Student & Staff
9	Devdhar	Tree	2	Student & Staff
10	Apta	Tree	3	Student & Staff
11	Nilmohar	Tree	3	Student & Staff
12	Pilmohar	Tree	3	Student & Staff
13	Vad	Tree	3	Student & Staff
14	Shabudana	Tree	2	Student & Staff
15	Bel	Tree	1	Student & Staff
16	Ramphal	Tree	1	Student & Staff
17	Chandan	Tree	3	Student & Staff
18	Subabhal	Tree	2	Student & Staff
19	Pichkari	Tree	1	Student & Staff
20	Karanj	Tree	1	Student & Staff
21	Adulsa	Tree	2	Student & Staff
22	Mukachand	Tree	1	Student & Staff
23	Bhokar	Tree	1	Student & Staff
24	Awla	Tree	1	Student & Staff
25	Shivan	Tree	1	Student & Staff

26	Chiku	Tree	1	Student & Staff
27	Bibul	Tree	1	Student & Staff
28	Narkya	Tree	1	Student & Staff
29	Jackfruit	Tree	1	Student & Staff
30	Tetu	Tree	1	Student & Staff
31	Chafa	Tree	2	Student & Staff
32	Kawat	Tree	1	Student & Staff
33	Jamun	Tree	1	Student & Staff
Ground Floor				
1	Royal Poinciana	Plant	1	Student & Staff
2	Ashoka tree	Plant	8	Student & Staff
3	Garden Croton	Plant	22	Student & Staff
4	Aglaonema	Plant	3	Student & Staff
5	Curcuigo	Plant	1	Student & Staff
6	Cymbidium	Plant	1	Student & Staff
7	Chinees evergreen	Plant	3	Student & Staff
8	Norflok island pine	Plant	1	Student & Staff
9	Spathiphyllum	Plant	1	Student & Staff
10	Brunfelsia latifolia	Plant	1	Student & Staff
11	Graptophyllum	Plant	1	Student & Staff
12	Ti Plant	Plant	2	Student & Staff
13	Arrowhead plant	Plant	2	Student & Staff
14	Song of India	Plant	1	Student & Staff
15	Moses	Plant	10	Student & Staff
16	Dieffenbachia	Plant	1	Student & Staff
17	Cyrtanthus	Plant	1	Student & Staff
18	Nepenthes	Plant	1	Student & Staff
19	Chives	Plant	1	Student & Staff
20	Crinum asiaticum	Plant	1	Student & Staff

21	Philodendron	Plant	1	Student & Staff
22	Livistona	Plant	2	Student & Staff
23	Rockymountain	Plant	1	Student & Staff
24	Crossandra infundibuiformis	Plant	1	Student & Staff
25	Rose Plant	Plant	25	Student & Staff
26	Cockscomb	Plant	6	Student & Staff
27	Touchmenot	Plant	2	Student & Staff
28	Pandanusveitchli	Plant	18	Student & Staff
29	Tulsi	Plant	6	Student & Staff
30	Toxicodendron Vermix	Plant	1	Student & Staff
31	Elaeagnus	Plant	1	Student & Staff
32	Tomato Chlorosis	Plant	1	Student & Staff
33	Blue lil	Plant	1	Student & Staff
34	Kalanchoe mangini	Plant	1	Student & Staff
35	Chinees evergreen	Plant	1	Student & Staff
36	Green yellow croton	Plant	1	Student & Staff
37	Umber	Plant	1	Student & Staff
38	Chini gulab	Plant	6	Student & Staff
39	Mogra	Plant	5	Student & Staff
40	Yaccaloifolia	Plant	1	Student & Staff
41	Shevanti flowers	Plant	17	Student & Staff
42	Iach Plant	Plant	1	Student & Staff
43	Sitaphal	Plant	1	Student & Staff
44	Champa	Plant	1	Student & Staff
45	Dieffenbachia	Plant	1	Student & Staff
46	coleus	Plant	1	Student & Staff
47	Pinwheel flower	Plant	1	Student & Staff
48	Eucalptus	Plant	4	Student & Staff
49	Mass rose	Plant	1	Student & Staff

50	Glossyprievet	Plant	1	Student & Staff
51	Pogostemon	Plant	1	Student & Staff
52	Noni	Plant	1	Student & Staff
53	China pink	Plant	1	Student & Staff
54	Vincetoxicum	Plant	1	Student & Staff
55	Hibiscus	Plant	1	Student & Staff
56	Krushnkamal	Plant	1	Student & Staff
57	Daphne Plant	Plant	1	Student & Staff
58	Duranta erecta	Plant	1	Student & Staff
59	Dill	Plant	3	Student & Staff
60	Indian cork tree	Plant	1	Student & Staff
61	Ti Plant	Plant	2	Student & Staff
62	Padal	Plant	1	Student & Staff
63	Money plant	Plant	1	Student & Staff
64	Polyscies	Plant	1	Student & Staff
65	Oleander	Plant	1	Student & Staff
66	Chiness ixora	Plant	1	Student & Staff
67	Chines Fringte	Plant	1	Student & Staff
68	Michelia	Plant	1	Student & Staff
69	Rose Plant	Plant	18	Student & Staff
70	Plinia	Plant	1	Student & Staff
71	Acalypha	Plant	1	Student & Staff
72	Indonesia leaf	Plant	1	Student & Staff
73	Saptaparni(Dwarf umbrella)	Plant	1	Student & Staff
74	Ardisiasquamulosa	Plant	1	Student & Staff
75	Meditamin	Plant	1	Student & Staff
First Floor				
1	Philodradron	Plant	6	Student & Staff
2	Eugenia	Plant	1	Student & Staff

3	Chiness Evergreen	Plant	2	Student & Staff
4	Song of India	Plant	3	Student & Staff
5	Polyscias Fruticoses	Plant	1	Student & Staff
6	Common lilly pilly	Plant	1	Student & Staff
7	Arrow head plant	Plant	5	Student & Staff
8	Polyscias Scutellaria	Plant	1	Student & Staff
9	Polyscias	Plant	1	Student & Staff
10	Moses	Plant	7	Student & Staff
11	Screwpine	Plant	1	Student & Staff
12	Dieffenbachia	Plant	1	Student & Staff
13	Philodendron	Plant	1	Student & Staff
14	Eugenia Puriformis	Plant	1	Student & Staff
15	Polyscias	Plant	1	Student & Staff
16	Arrow head plant	Plant	5	Student & Staff
17	Lycium chineese	Plant	1	Student & Staff
18	Basket Plant	Plant	1	Student & Staff
19	Areca palm	Plant	1	Student & Staff
20	Garden croton	Plant	1	Student & Staff
21	Impatiens	Plant	1	Student & Staff
22	Agave	Plant	1	Student & Staff
23	Green mature seed	Plant	1	Student & Staff
24	Ti plant	Plant	1	Student & Staff
25	Common purslane	Plant	1	Student & Staff
26	Dracaena	Plant	1	Student & Staff
27	Psychotria viridis	Plant	1	Student & Staff
28	Garden croton	Plant	4	Student & Staff
29	Brasilipuntia	Plant	1	Student & Staff
30	Caapi	Plant	1	Student & Staff
31	Money plant	Plant	3	Student & Staff

32	Pentas	Plant	1	Student & Staff
33	Green island red	Plant	1	Student & Staff
34	Song of India	Plant	1	Student & Staff
35	Jasmine	Plant	1	Student & Staff
36	Green island	Plant	1	Student & Staff
37	Plumeria Pudica	Plant	1	Student & Staff
38	Saribus	Plant	1	Student & Staff
39	Holly basil	Plant	1	Student & Staff
40	Nepthytis	Plant	1	Student & Staff
Second Floor				
41	Miracle Fruit	Plant	2	Staff
42	Euphorbia	Plant	1	Staff
43	Syzygium	Plant	1	Staff
44	Vinca	Plant	1	Staff
45	Aloe vera	Plant	1	Staff
46	Gavati Chaha	Plant	1	Staff
47	Thaumatophyllum	Plant	1	Staff
48	Cardamom Plant	Plant	1	Staff
49	Heart Leaf	Plant	1	Staff
50	Crown of thorns	Plant	1	Staff
51	Saribus	Plant	1	Staff
52	Fig tree	Plant	1	Staff
53	Chlorophytum	Plant	1	Staff
54	Daughter croton	Plant	1	Staff
55	Dwarf umbrella	Plant	1	Staff
56	Night blomming	Plant	1	Staff
57	Euphorbia	Plant	1	Staff
58	Lemon myrtle	Plant	1	Staff
59	Dieffenbachia	Plant	1	Staff

60	Polyscias	Plant	1	Staff
61	Excoecarie	Plant	1	Staff
62	Garden croton	Plant	1	Staff
63	Appendicula	Plant	1	Staff
64	Ti plant	Plant	1	Staff

Table 3: Details of the Flora in the premises

At present, there are **more than 700 nos. plantations on the premises.**

5.3 Noise Audit

5.3.1 Macro level

On a macro level the College being an educational institute falls under silent zone and thus **there is no negative effect related to noise felt by the students / staff in the premises.**

5.3.2 Micro level

The College has sufficient nos. of trees. These act as a noise barriers. There are no particular equipments which cause any noise effect. **Overall the noise levels inside the premises are low that is a good approach.**

5.4 Carbon Footprint Audit

5.4.1 Eco-friendly Commuting Practices

Based on data collection and discussion with staff the following points were noted:

- **Ease of commuting –** Owing to close proximity to public transport the access is very feasible and walk able.
- **Parent's commute -** There are 2 Parent-teacher meetings held in a year and the turn-out is around 40-60%

5.4.2 Heat Island Reduction

- The top floor has a flat roof which is absolutely clean and well maintained.
- The Buildings are covered with white paint and the Maintenance staffs along with Management have taken ample measures to maintain the same.

- **There was no weathering of roof observed.**
- The current practices are well maintained and thus there is no great extent of urban heat island effect felt in the building.

5.4.3 Outdoor Light Pollution Study

The College compound lights are not upward looking thus, these do not cause light pollution.

5.5 Universally accessible premises

As per World Report on Disability, 2011 there are 180 million approx. Persons with Disabilities that makes it 15% of total population of India.

The following facilities are available on the premises for the specially-abled as part of universally accessible premises initiatives.

- **Wheelchair availability.**
- **Ramps at the entrance area**
- **Handrails along the staircase and Low height risers in the staircases**
- **Toilets for the disabled friendly**

5.6 Fire Safety

Only fire extinguishers are available as a Fire and life safety measure.

6. Inferences as Consolidated study

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

6.2.1 Site beautification

- **Nutrition pits** - Certain pits can be demarcated as 'Nutrition pits' where the organic food from the kitchen and Canteen fruit peels and fruits or vegetables can be degraded for making nutrition-rich soil.
- **Garden development** - The existing open space should be designed as an Architectural landscape.
  - ⇒ *The roofs of the buildings should be turned into **Green roofs** (By introducing terrace or vertical gardens).*
  - ⇒ ***Introduce various types of gardens** inside the premises such as Flower gardens, Woodland gardens, Rock gardens, Water gardens, Vegetable and herb gardens, Roof gardens, Scented gardens, Medicinal gardens and Botanical gardens.*
- **Additional facilities for birds -** There can be provision for drinking water and food facility for birds visiting the College premise.

6.2.2 Fire and life safety

- One fire extinguisher in every space which has an air conditioner.
- Every laboratory space should have both sand bucket and fire extinguisher.
- Every space which has a gas cylinder or combustible equipment should have a provision for additional safety including the barricade around the gas cylinders, appropriate safety boards.
- Regular seminars/ webinars by experts such as Architects, Govt. Fire department on subjects related to fire and life safety should be organized and the outputs should be adopted and documented.

6.2.3 Sustainable features

- **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the especially abled students.

- **Cutlery in the Canteen –** The regular plastic and steel plates, spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straw, disposable plates, edible spoons and tables made out of sugarcane waste or bamboo. This will be first of its kind initiative to be adopted and practiced thus also inculcating the healthy practices in students.

- **Increase the green cover** – There can be provisions to improve the courtyard area; terrace gardens; vertical gardens along the duct areas.

6.2.4 Pollution Control

- **Bicycles as a gift -** As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.

- **Determination of Plastic (orange) zones** – The study and execution can be undertaken through a pilot project where the waste plastic can be collected through areas within 5 km of the premises and a product can be developed.

Discussion with the Core Team

On-site review with the team for site management and other features

7. References

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

7.1 National references

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013

7.2 International references

- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
- The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- Streetscape elements – Chapter 6 on San Francisco
- American lung association https://www.lung.org/
- Study related to air pollution https://www.airgle.com/
- Exploring the light pollution https://education.nationalgeographic.org/
- Accessibility study https://www.washington.edu/

  Urban heat island effect https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands