

GREEN AUDIT

2019-20 & 2020-21

AUDIT REPORT

Includes Environment, Energy and Green Audit

Studied for

**Nijampur-Jaitane Shikshan Prasarak Mandal's
Jagannath Kadwadas Shah Adarsh College**

Nijampur-Jaitane-424305,
Tal-Sakri, Dist-Dhule, Maharashtra

Analysed by



18 November 2021

Disclaimer

Green Audit Team has prepared this report for **Nijampur-Jaitane Shikshan Prasarak Mandal's Jagannath Kadwadas Shah Adarsh College located at Nijampur-Jaitane-424305, Tal-Sakri, Dist-Dhule, Maharashtra** based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National Standards, the report has thereby been generated based on comparative analysis of the existing facilities and the benchmarks. The suggestions derived as a result of the inspection and research as per inputs which would further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inventory and on-site investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm along with Ar. Nahida Shaikh as an Accredited Green Building Professional.

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

sustainableacademe@gmail.com

Acknowledgement

Green Audit Assessment Team thanks the **Nijampur-Jaitane Shikshan Prasarak Mandal's Jagannath Kadwadas Shah Adarsh College, Nijampur-Jaitane** 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 **Honourable members of Nijampur-Jaitane Shikshan Prasarak Mandal and Shri. Sharadchandra Jagannath Shah, President; J.K.Shah Adarsh College Nijampur-jaitane**

Our heartfelt thanks to **Prin. Dr. Ashok Pitambar Khairnar** for the valuable inputs.

We are also thankful to College's Task force the faculty member who has collected data required for green audit **Mr. Atish Meshram**, IQAC, Coordinator for the inventory and data collection.

We highly appreciate the assistance of Office Superintendent, Accountant and the entire staff for their support while collecting the data.

Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

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1. Introduction

1.1 About Nijampur Jaitane Shikshan Prasarak Mandal

The base of the establishment is to provide knowledge to the underprivileged hilly backward ignorant people. It is one of the premier Educational Societies (Mandal) in the country including some of the most distinguished and eminent Institutions and providing quality education with best state of the art facility and Infrastructure to the students.

1.2 Vision and Mission Statement of College

Our Vision - To make available the best facilities of higher education for the all-around development of the students of hilly area.

Our Mission - Empower the rural and tribal students through value based and life oriented quality education.

Aim – To empower the students from weaker and neglected sections of society

Motto – **Save Tree Save Environment** and **Each One Plant One.**

1.3 Institutions in the premises

The Premises is situated in the rural location of Nijampur-Jaitane amidst the local hilly areas with close proximity recreational and amenities such Hospital. During the entire day schedule with smooth transition of internal student traffic management which is highly commendable.

The Building houses the following Institutes which are recognised by the prominent organizations such as Govt. of Maharashtra. The college has Course of Bachelor of Arts affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon thus helping students excel in profession and career with focus on appropriate skill based learning. The objective of the college is to continuously enhance the teaching methods in order to provide students with an opportunity for their all-round development. It also strives for excellence in academics and makes an effort to induce passion for learning along with the inspiration for decisive thinking and assessment.

Thereby helping them to become the best professionals in their chosen careers. Following are the specific objectives of the Institute.

- To educate the first generation learners.
- To widen the vision of a youth through academic programmes .
- To develop the personality of students through extra-curricular activities.
- To impart value based and moral education.
- To make the students dynamic, skilled, nation loving and visionary citizens.
- To develop communication skills among the students.
- To build confidence for life.

The College aims at training young women and men to be competent, committed and compassionate, and lead in all walks of life.

1.4 Assessment of the College

University - The institution is affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon. The College has got Government Recognition in 1995 and permanent affiliation from North Maharashtra University, Jalgaon in the year 2014.

NAAC - The following are details of the Nijampur-Jaitane Shikshan Prasarak Mandal's Jagannath Kadwadas Shah Adarsh College.

Cycle	Grade	CGPA	Year
First	C	1.67	2009
Second	C	1.75	2016

Table 1: Details of Accreditation of the Institute

UGC - The College has received 2(f) Status of UGC, New Delhi in 2012 and 12(B) status in 2014.

ISO – The College is ISO 9001:2008 Certified in 2021.

1.5 Awards of the Institute

The College has received the prize of '**Jagar Janivancha**' of Rupees One Lakh, Memento and a Certificate by the Government of Maharashtra.



राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद
 विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL
 An Autonomous Institution of the University Grants Commission

Certificate of Accreditation

*The Executive Committee of the
 National Assessment and Accreditation Council
 on the recommendation of the duly appointed
 Peer Team is pleased to declare the
 Nijampur-Jaitane Shikshan Prasarak Mandal's
 Adarsh College of Arts
 Nijampur, Sakri, Dhule, affiliated to North Maharashtra University,
 Maharashtra as
 Accredited
 with CGPA of 1.75 on seven point scale
 at C grade
 valid up to September 15, 2021*

Date : September 16, 2016



[Signature]
 Director

EC(SC)/17/A&A/63.2

2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the College) shows that there are total of **337** students.

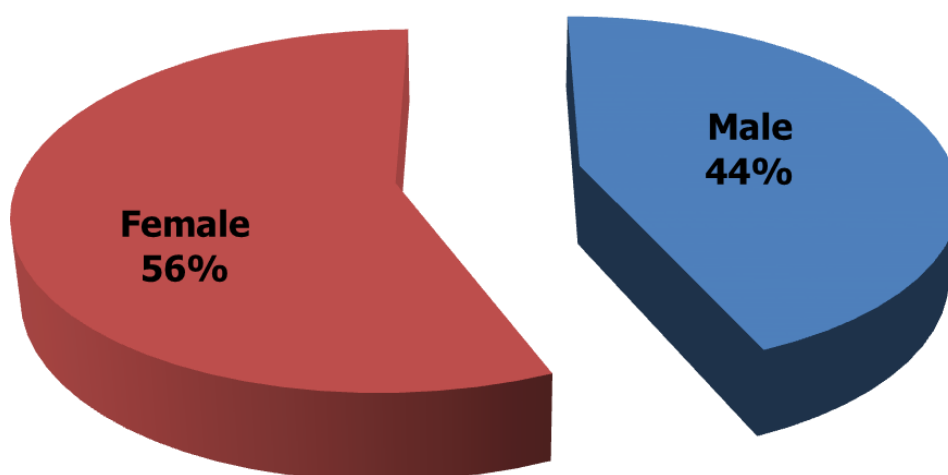


Figure 1: Summary of the students in Academic year 2019-20

The above study shows that **Girls included a major share of the population at 56% with a total of 190 students** though there is only a minor difference as **Boys form 44% of total population at 147 numbers.**

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	15	1	16
Non-Teaching staff	7	0	7
Total	23	1	24

Table 2: Staff data of the Institution for 2019-20

The Staff data shows the premise has a total of **24** staff members.

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the College) shows that there are total of **355** students.

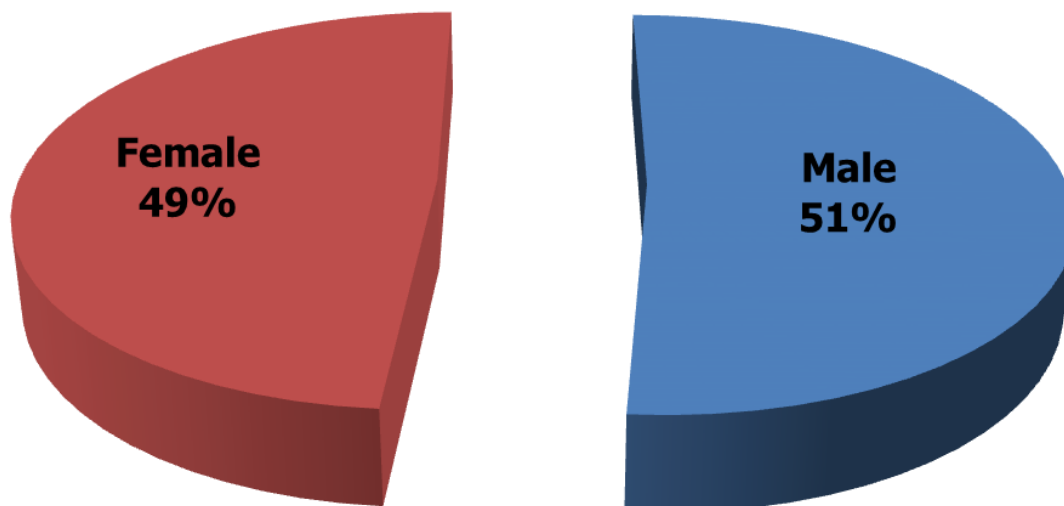


Figure 2: Summary of the students in Academic year 2020-21

The above study shows that **Boys included a major share of the population at 51% with a total of 182 students** though there is only a minor difference as **Girls form 49% of total population at 173 numbers.**

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	1	0	1
Teaching staff	15	1	16
Non-Teaching staff	7	0	7
Total	23	1	24

Table 3: Staff data of the Institution for 2020-21

The Staff data shows the premise has a total of **24** staff members.

2.3 Site analysis

The following listed are some of the positive site elements which are beneficial to the college in terms of tangible and intangible benefits.

- **Location** - The Nijampur-Jaitane Shikshan Prasarak Mandal's Jagannath Kadwadas Shah Adarsh College is located at Nijampur-Jaitane-424305 falls under the Sakri Taluka, Nijampur Jaitane Village (Postal code 424305); Dhule District. It is under the local jurisdiction of Gram Panchayat as it is situated in a rural area. It belongs to the Khandesh and Northern Maharashtra region of the Nashik Division of Maharashtra State in India.
- **Neighbourhood context** - The premise is surrounding by open spaces and few Commercial (Small shops) on the immediate surroundings of the site.
- **Natural physical features** – The premise includes a rich biodiversity and huge number of plants in the adjacent open space. The site have some different in the land levels (contours). There is slight difference in land level in open spaces. This has proved to be beneficial to college as the rainwater is diverted through pipes into ground and it has helped ground water recharge for the well water over the years as informed by the College.
- **Manmade features** – The premise is situated in a rural and hilly area amidst residential areas with appropriate proximity to necessary amenities. There is sufficient appreciation space for entrance. The materials used for construction are RCC and the landscaping includes innumerable natural trees as well as potted plants.
- **Circulation** – There is a smooth transition of pedestrian traffic inside the premises due to the large entrance gate and the huge open space where vehicles of students and staff is parked.
- **Climate** – The following climate analysis is for Dhule district as Nijampur Jaitane falls under Dhule district.
 - January is the coldest month in Dhule, with an average high-temperature of 29.1°C (84.4°F) and an average low-temperature of 17.8°C (64°F).
 - Throughout the year, in Dhule, there are 110.6 rainfall days, and 607mm (23.9") of precipitation is accumulated.
 - Months with the least rainfall in Dhule are January and February Rain falls

for 0.9 days and accumulates 1mm (0.04") of rain.

- The least humid month is April, with an average relative humidity of 20%.
- April is the month with the highest UV index in Dhule, with an average maximum UV index of 9.
- The warmest month in Dhule is May, with an average high-temperature of 40.9°C (105.6°F) and an average low-temperature of 28.7°C (83.7°F).
- With an average of 12.1h of sunshine, May has the most sunshine of the year in Dhule.
- With an average of 13.4h of daylight, June has the longest days of the year.
- July is the month with the most rainfall. Rain falls for 26.4 days and accumulates 180mm (7.09") of precipitation.
- July, November and December, with an average maximum UV index of 6, are months with the lowest UV index.
- August is the most humid month in Dhule, with an average relative humidity of 77%.
- With an average of 5.9h of sunshine, August has the least sunshine of the year in Dhule.
- December has the shortest days of the year in Dhule, with an average of 10.9h of daylight.
- Overall it has a good climate.

(Source: <https://www.weather-atlas.com/en/india/dhule-climate/>)

2.4 Total Institute Area & College Building Spread Area

2.4.1 Present scenario

The total site area is 3.21 acres and total built-up area is 1,40,000 sq. ft. for approx. 359 footfalls.

2.4.2 Proposed scenario

The Institute has plans for future expansion of the existing infrastructure to an extent that the site area will be increased to 5 acres and the Built-up area will be increased to 2,17,800 sq. ft.

2.5 Institute Infrastructure

2.5.1 Establishment

The building was established in 1995. The Building is a Reinforced Cement Concrete (RCC) framework building. Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premise covers some of the requirements for a Green Habitat.

Though the College is located in a rural area pretty close to the nature the Staff including Hon'ble Principal Dr. Ashok Pitambar Khairnar take immense care towards upgrading the premises, conducting awareness programs through practical and digital mediums as per our analysis this is indeed a very positive point about the Institute.

2.5.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge coconut trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape.

There are no interior ceilings in the campus. The floor to floor height is for Ground floor it is between 10' to 12'. There are no lifts in the premise. There are provisions for CCTV in addition to amenities such as library. The room-wise details are mentioned below:

Sr. No	Room Name	Floor No
1	Principal Cabin	First Floor
2	College Office	First Floor
3	Library	First Floor
4	Conference Hall	First Floor
5	First Floor Gallery	First Floor
6	Staff Room for Gents Teachers	Ground Floor
7	Staff Room for Ladies Teachers	Ground Floor

8	Computer Room	Ground Floor
9	Sports Room	Ground Floor
10	National Service Scheme (NSS)	Ground Floor
11	Smart Room	Ground Floor
12	Vidyarthi Vikas Manch	Ground Floor
13	NAAC Room	Ground Floor
14	Premises Ground	Ground Floor
15	Language Laboratory	First Floor

Table 4: Room-wise space details

2.5.3 Fire Safety

When the building was constructed Fire fighting norms and permission from Chief Fire Officer was not in practice. However, the Institution has taken care for adequate fire safety measures to be adopted. Each floor has an open staircase without any barriers for fire safety measures. These staircases are free of any kind of storage or combustible material. The windows in each classroom are at a low height with fresh air and natural light thereby adding to ample ventilation throughout the day. The college should adopt additional fire safety practices such as fire hydrant, additional fire extinguishers, sand buckets and signages.

2.5.4 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarised in the table. The Institutions are open Monday to Saturday for full day. Sunday is an off for all.

S. No.	Section	Spaces	Time	Hours / day	Days in a year
1	Main Institutional College	Student areas and Teaching faculty (Degree College)	7:00 a.m. to 5:30 p.m.	10.5	180
2	General areas	Admin areas and library, Passage, lift, staircase, toilet, Trust office, Outdoor Compound lights, Outdoor - Pumps	8:00 a.m. to 5 p.m.	9	225

Table 5: Schedule of the timings of the premises

On-site investigation and physical verification

The Institution premises and its various facilities



3. Green Audit

3.1 About the Green Audit

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

3.2 Analysis for the Green 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 campus

Water Audit

- Analysis of the current water consumption of campus
- Scope to include Rain water harvesting and Waste water treatment in campus

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 campus
- Analysis of the flora and fauna of campus
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of campus

3.3 Strategy adopted for conducting Green Audit

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

3.4 Timeline of the activities for Green Audit

- 9 October 2021 – Initiation by the College to conduct Audit
- 28 October 2021 – Survey of the Student and staff submitted
- 30 October 2021 – Data submitted by College
- 18 November 2021 – Submission of Report

Ecological (Environment) Audit



Background reference image Yugal Shrivastava on pexels

4. 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 premise. 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. The premise needs to have facilities for students who are specially abled alike. As part of our study we could state that the Institution has developed eco-friendly practices and sustainable solutions which are well reflected in the rich biodiversity of the Premises. Being situated near the city the appreciation space towards the main entrance provides a welcoming approach to the College.

4.1 Open Spaces

There is a beautiful balance of natural and open spaces in the premise and the open/vegetation spaces are balanced overall. The ground is used by students at present for sports as it is a Physical Education Institute. **There are provisions for natural plantations which have enhanced the Beauty of the space.**

There are a few Maintenance staff allotted for the open spaces and they have done an excellence job in terms of the duty allotted. The infrastructure committee too is involved in this process. The traditional tap and pipe facility is adopted for watering and the college has taken special provisions for the same. The spaces are watered daily in summer. **The efforts to maintain the existing space are commendable.**

4.2 Flora Audit

The above analysis shows the area occupied provides that a huge land area is occupied by the playground and garden. These are planted by students and staff on various occasions in premise and building surrounding. The plantations constitute a **total of 45 varieties amounting to 248 numbers** in premises as follows.

S. No.	Plant name	Type	Nos.	Planted by
1	Neem	Tree	29	Management
2	Gulmohar	Tree	12	Management
3	Kadipatta	Tree	3	Management
4	Peepal	Tree	2	Management
5	Ashoka	Tree	23	Students
6	SitaPhal	Tree	3	Students
7	Aamba	Tree	1	Management
8	Chincha	Tree	3	Management
9	Shisham	Tree	19	Management
10	Saptparni	Tree	14	Management
11	Peru	Tree	5	Management
12	Sonchapha	Tree	3	Management
13	Ficus benghalensis	Tree	2	Management
14	Teak	Tree	1	Management
15	Babhul	Tree	1	Management
16	Sadafuli	Tree	1	Management
18	Nilgiri	Tree	3	Management
19	avala	Tree	1	Staff
20	Gulab	Tree	30	Students
21	Aavli	Tree	15	Students
22	Bakam Limb	Tree	8	Staff
23	Umbar	Tree	4	Staff
24	Parvarun	Tree	3	Staff
25	Subabhul	Tree	9	Staff
26	Jasvandi	Tree	1	Students
27	Chandni	Tree	4	Staff
28	Bakam	Herb	4	Staff
29	Fulkesar	Herb	4	Students
30	Bhendi	Herb	5	Students
31	Mayurpankhi	Herb	9	Staff
32	Jambhul	Herb	1	Students
33	Lajadu	Herb	1	Students

34	Aloe Vera	Herb	3	Students
35	Tulsi	Herb	4	Students
36	Shankhpushpi	Herb	1	Staff
37	Pudina	Herb	5	Staff
38	Bael	Herb	1	Staff
39	Adrak	Herb	2	Staff
40	Ashwagandha	Tree	2	Staff
41	Malama Avocado	Shrub	1	Staff
42	Plumeria	Plant	1	Staff
43	Acalypha	Tropical plant	1	Staff
44	Pandan leaf	Flowering plant	1	Staff
45	Jungle Geranium	Tree	1	Staff
Total			247	

Table 6: List of Trees available in premise

4.3 Green practices

We observed the following points during the Site investigation:

- The Institution uses fertilisers thereby making efforts to maintain and increase ecology. The ample vegetation provides shade thereby benefiting the users. The College has compost pits available in campus which are used to make manure and organic slurry which are used for the plantation. The quantity generated is sufficient and the use of chemical fertilizers is avoided.
- The NSS Team and Admin staffs have joined hands towards the upgrading of the premises from environmental view.
- There are sufficient Maintenance staff who manages the entire campus. Regular tap and water irrigation method is used for watering the garden twice a week.
- Ban on the use of plastic bags in the Premise.

4.4 Eco-friendly initiatives undertaken

The Institution has undertaken the following initiatives through **excellent efforts** towards save environment measures before pandemic. The NSS Department holds the nature club and various activities like tree plantation, nature cleanliness, visits to nearby flora and fauna are carried out.

4.4.1 Physical activities undertaken by the College

- 1) Environmental Awareness Programme on 5 June, 2018
- 2) Environmental Awareness Programme on 5 June, 2019
- 3) Environmental Awareness Programme on 5 June, 2020
- 4) Tree Plantation on 2 August 2018
- 5) Tree Plantation on 9 July 2019

4.4.2 Virtual activities undertaken by the College

- 1) Social Survey on Bio-diversity and Adivasi Swavlamban ya Ghatkacha Samajshastriya Abhyas at Baripadata-Sakri
- 2) Our college collaborated with Department of Sociology Savitribai Phule Pune University, Pune and Non-water Sanitation (NGO), Germany is conducting research project on Socio-cultural barriers to use toilet in rural Maharashtra. Our two college teachers and 50 students has been participating and conducting survey in hilly, rural and tribal padas.
- 3) One Day National Level Online Webinar on Environmental Studies and Society held on 05 June, 2021 via live ZOOM video conferencing
- 4) Add-on Course on Adhunik Sheti conducted on 01 December 2019 to 30 December 2019
- 5) One Month Swachha Bharat Abhiyan on 1 August 2018
- 6) Fifteen Days Swachhata Pakwada on 17 Jan 2020
- 7) Cleanliness Camp, Water Conservation on 21 December 2018
- 8) Cleanliness of Campus on 14 August 2019
- 9) Anti-Tobacco Rally and Collection of Plastic Waste on the Occasion of Mahatma

Gandhi on 01 October 2019

10) Cleanliness of Adopted village Titane 06 October 2019

11) Seminar on Swachhata on 22 Jan 2020

12) Poster Presentation on Hygiene on 23 Jan 2020

13) Guest Lecture on Swachhata, Hygiene Cultural Program & Price Distribution on 23 Jan 2020

14) Hostel Cleaning Campaign on the Occasion of Republic Day on 24 Jan 2020

4.5 Noise Audit

4.5.1 Macro level

On a macro level there are only open spaces on all sides, there are few commercial areas along the East side but as the distance is quite long there is minimal disturbance. However as the college is pretty close to the road there are vehicular disturbance to a certain level but quite minimal. **Overall the noise level is low and less noise Pollution as College falls under silent zone as per our analysis.**

4.5.2 Micro level

The college has huge open space covered with greens which absorb the sound and help in keeping noise levels low and students, staff do not have any disturbance in academics majorly. However there is provision for staff parking which causes some noise. There is provision for staff parking which causes some noise. The college does not have generator and there is no sound problem caused due to the same. There are no particular equipments which cause any effect. **Overall the noise levels inside the premises are between moderate and low which is a good approach.**

4.6 Village adoption scheme the community development approach

The college has done highly commendable work in terms of rural and overall development. The concept of Community development was undertaken as part of the "Village Adoption Scheme" to create awareness about Education, Health and Environment among the stakeholders of the

college by adopting the nearby villages through NSS and conducting activities related to economy, recent trends in market, education, bridge , Remedial issues, General Awareness about Health and Hygiene as well as also creating awareness about seasonal health issue like Malaria, typhoid, cold, flu, COVID, etc. and in case of Environment education many faculty members have even planted trees in their adopted villages and also creating awareness about environment conservation.

4.7 Carbon Footprint Audit

4.7.1 Eco-friendly Commuting Practices

The premise is located in rural and hilly area and students come from nearby villages and there is reduction in using any cng, petrol diesel vehicles thereby not causing harm to the environment as most of the students come to the College by walking or on bicycles.

- **Ease of commuting** – Owing to close proximity to public transport the access is very feasible and walkable.
- **Parent’s commute** - There are 2 Parent-teacher meetings held in a year and the turn-out is around 60%
- **Vehicles details** – The provision provided by College includes s vehicle parking is allowed at present as follows for an area of 500 sq. m

S. No.	Type	Nos.	For (student/ Staff)
1.	Cars	10	Staff – 0; Students - 0
2	Bikes	75	Staff – 23; Students - 52
3	Cycles	100	Staff – 0; Students - 100
4	Electric vehicles	0	Staff – 0; Students - 0

Table 7: Details of the Parking in the premise

- **Commute details** – The students and staff commute from multiple places. The details are summarised below.

S. No.	Name of all the place where student of staff comes from	Distance
1	Khudane, Akhade, Umrandi, Vajdhare, Shivaji Nagar, Runmali	Within or less than 5 km radius from College
2	Sakri, Dhule, Nandurbar, Waghapur, Amkhel, Vihirgaon, Bramhanvel, Titane, Khori, Nagzari, Jamde, Domkani, Ambemore, Masale, Petle, Isarde, Navagaon	More than 5 km and up to 10 km radius from College

Table 8: Details of the places students and staff commute from

4.7.2 Heat Island Reduction

The Institution has adopted the following practices which are yielding positive results in terms of Urban Heat Island Effect which refers to increase in temperature of the surrounding because of ineffective strategies.

- Exposed roof areas - The terrace area is painted in white which reflects the heat, thereby maintaining the Internal temperature in control.
- Exposed non-roof hardscape areas - There is a pathway on all sides of the premises. There are huge open spaces with lush greens these help in maintaining the micro climate of the surrounding to a major extent.

The staff had informed they have ample fresh and pollution free atmosphere which is a very good environment for an Educational Institute.

4.7.3 No Outdoor Light Pollution

The college uses the compound lights occasionally for some functions and these are not upward looking there not causing light pollution.

4.8 Health & Hygiene Audit

4.8.1 Smoke and dust Exposure

As per the site investigation the following analysis has a positive impact on premises.

- The Institution is a tobacco and smoke free campus which helps in adapting to a Healthy Institution. There is a huge open space in premise which is allowed

for social gathering among students. It is also used for sports, outdoor games, annual days, cultural functions.

- The open space is used for physical activities by the students.
- The vehicles parked in the premise do not cause any dust related issues.

A major portion of garbage is dumped in pits a small percentage of the garbage in premise is burnt, these practices should be avoided.

4.8.2 Hygiene

- There is washroom facility including hand wash facility and drinking water facility, further it was found that the hygiene of toilet areas is well maintained.
- The entire premise is cleaned on a daily basis and the college takes regular initiatives to maintain hygiene.
- There is designated staff as Hygiene specialist who keeps a regular check about the operation and maintenance of the toilet areas and the equipments, lights and all facilities on each floor.
- The Food waste and other refuse are removed periodically from food handling areas to avoid accumulation. The areas of water tanks in site on ground floor are clean and no mosquito breeding spots are there.
- The waste collected in campus be accumulated at a place used a dumping pit and some portion is burnt.
- Cleanliness, Pest control facility are undertaken diligently by the Staff which is quite appreciable.

4.9 Universal Campus

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 college has provisions of ramp and handrails along staircase in the premise, thereby making it user friendly for the specially abled students. The design of the premises is appropriate for access with passages and corridors being sufficiently wide. The single loaded corridors are safe from fire safety as there are staircases and fire extinguisher is available on ground floor.

4.10 Survey Results

An online survey was conducted to analyse the student and staff views about the premise, following are some of the reviews.

4.10.1 Participation

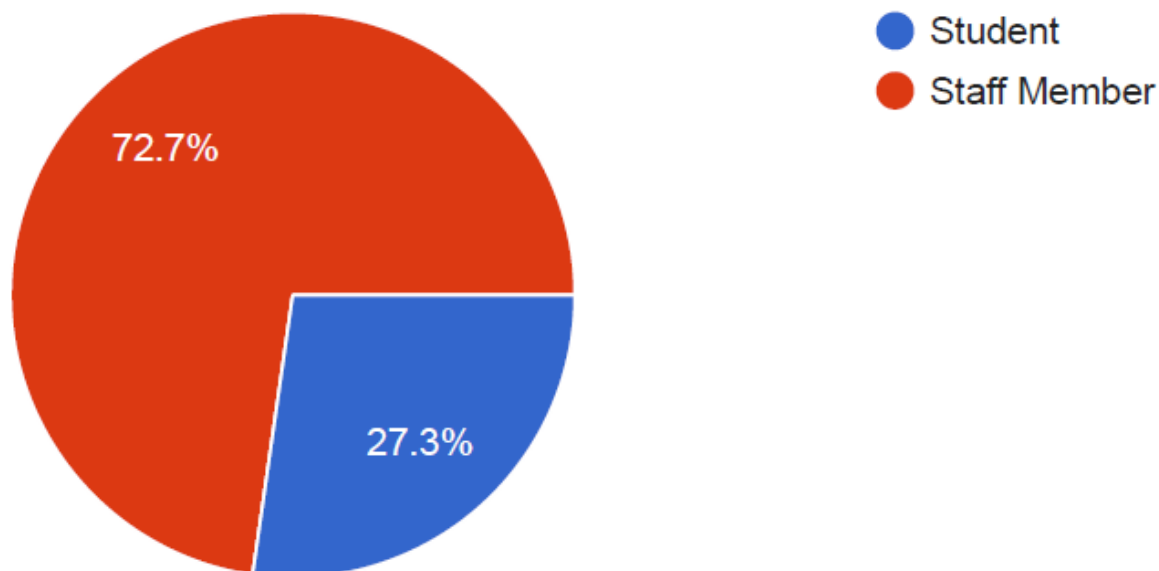


Figure 3: Participation analysis in the survey

A total of **22 responses** were received out of which 73% were students.

4.10.2 Rate the Green awareness practices in College

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

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

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

The result of the review of this section is as follows:

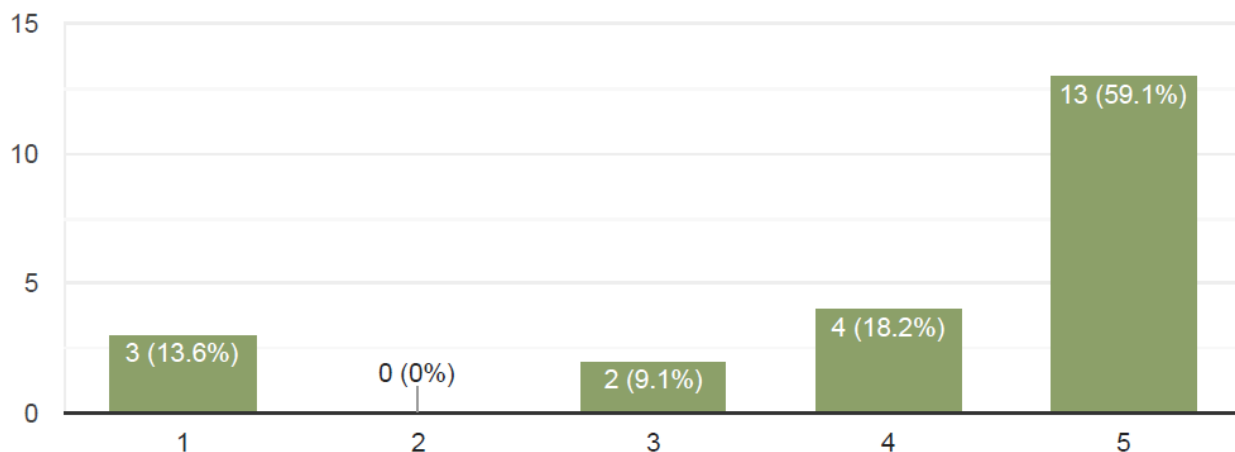


Figure 4: Green awareness practices in College

The students, staff (**almost 59%**) of responses found the practices to be excellent.

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

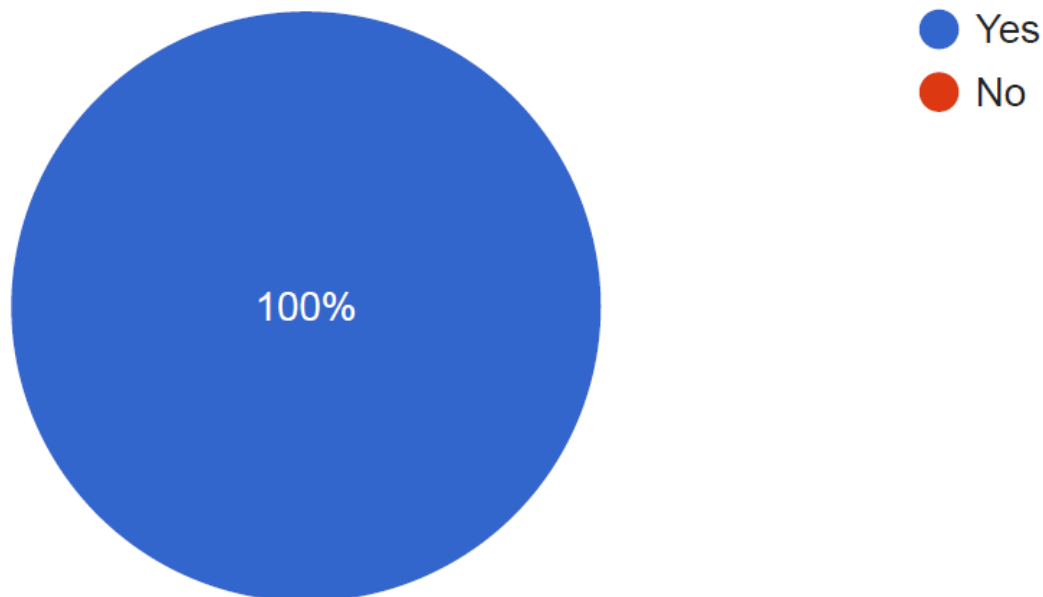


Figure 5: Green awareness practices in College

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

4.10.4 Do you participate in such events?

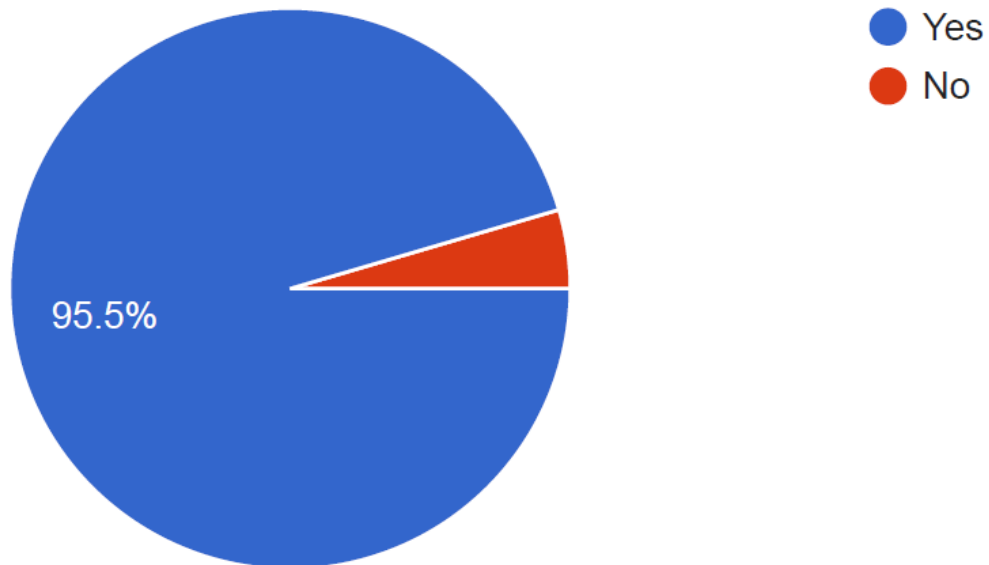


Figure 6: Participation in the Environmental events conducted by the College

The students, staff (**almost 96%**) of the responses confirmed their participation.

4.6 Recommendations for a Sustainable Habitat

a) Universal Toilet

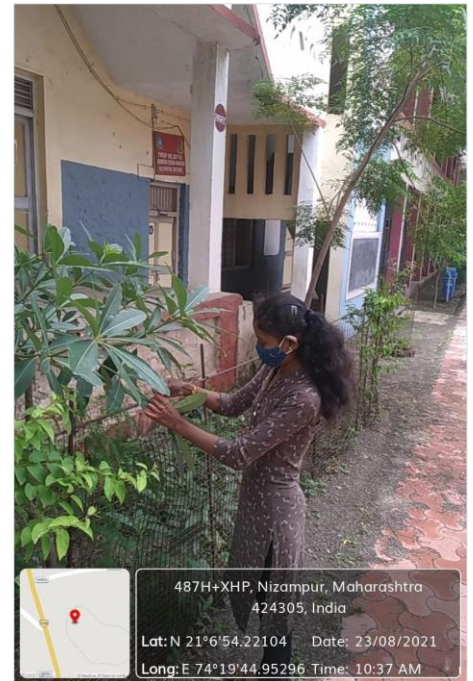
There should be minimum 1 toilet for the specially abled people as per guidelines prescribed by National Building Code 2016 with size being minimum or more than 1.5m x 1.5m

b) Scientific names/ Name plates

There can be names plates for each plant and tree in premises with regular and scientific name to increase awareness.

c) Environmental awareness

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



Data investigation and physical verification
Eco-friendly activities undertaken by the Institute



Waste Audit



Background reference image Polina Tankilevitch on pexels

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 from 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 Premise

The types of waste collected in the campus are as follows, these are separated before processing and not handed over to the local Corporation.

S. No.	Type of waste	Source and quantity	Current Disposal method	Can be treated/ recycled?	Methodology
1	Solid waste	Toilets–Biodegradable waste of 10kg per week	Led in the storm water drains	Yes	TREATED - Small biogas plant can be proposed in open space
2	E-waste	Computers - Non-biodegradable waste as per the annual year usage	Handed over to vendors if necessary	Yes	RECYCLED - Can be given to e-waste companies
3	Liquid waste	Toilets and laboratories – Around 25 litres per week	Led in the storm water drains	Yes	Connected to local drainage
4	Dry waste in form of leaves	Open space & plantations, papers - Non biodegradable waste of 4kg per week	Composting	Yes	Can continue with the same practice
5	Organic waste	Canteen - Biodegradable waste from Canteen of 0.5kg per week		Yes	Can continue with the same practice

Table 9: Summary of the types of waste produced in the premises

There is no hazardous, medical and unused equipment waste generated in campus.

5.1.2 Bins summary

There are 10 Dustbins in the premise with volume of 7 litres each. The analysis of dustbins is presented below.

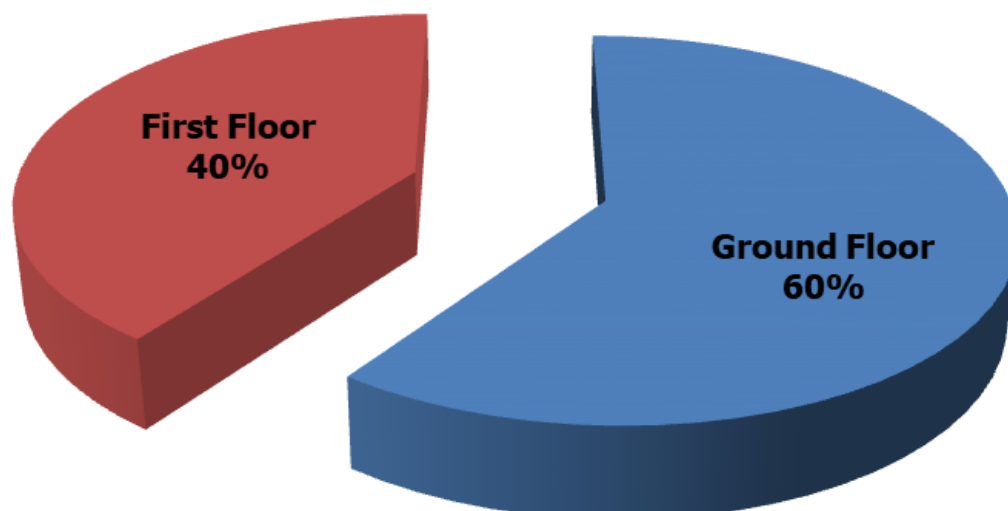


Figure 7: Analysis of dustbins in the premise floor wise

The above analysis shows **60% dustbins are present in the Ground floor** and **40% dustbins are present on the First floor.**

5.2 Waste handling

Quantification wise as per Interview and survey it was found that the Dry leaves and organic waste collected is approximately 20 kg per week. The liquid waste is approximately 50-80 litres per week. The waste produced on campus is segregated. It is collected on a daily basis and liquid waste is led into drain. The specific waste handling is done through the following ways:

- **Compost** - There are two underground leaf compost in the premises. The beds leaf compost is utilized for the plants and trees in college premises.
- **Vermi Compost** - There is one vermin compost bed in the college premises. The vermin compost is also utilized for the flowers and medicinal plants in college campus.

Both of the above strategies are good practices adopted by the Institute.

5.3 Waste management

The college reuses the papers. Ample measures are taken to maintain hygiene. No smell problem or health related issues due to the waste are there. The waste does not pollute the ground or surface water. There is no problem of air pollution from waste as informed. The wastes from toilets are discharged to main drains through underground covered channels (Safety Tanks) thus avoiding any incident. The college practices out 'Swachha Bharat Abhiyan' on the college premises. There is provision for Sanitary Napkin Vending in the premise in Ladies Wash Room for proper & hygienic disposal of sanitary napkins.

5.4 Survey Results

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

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

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

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

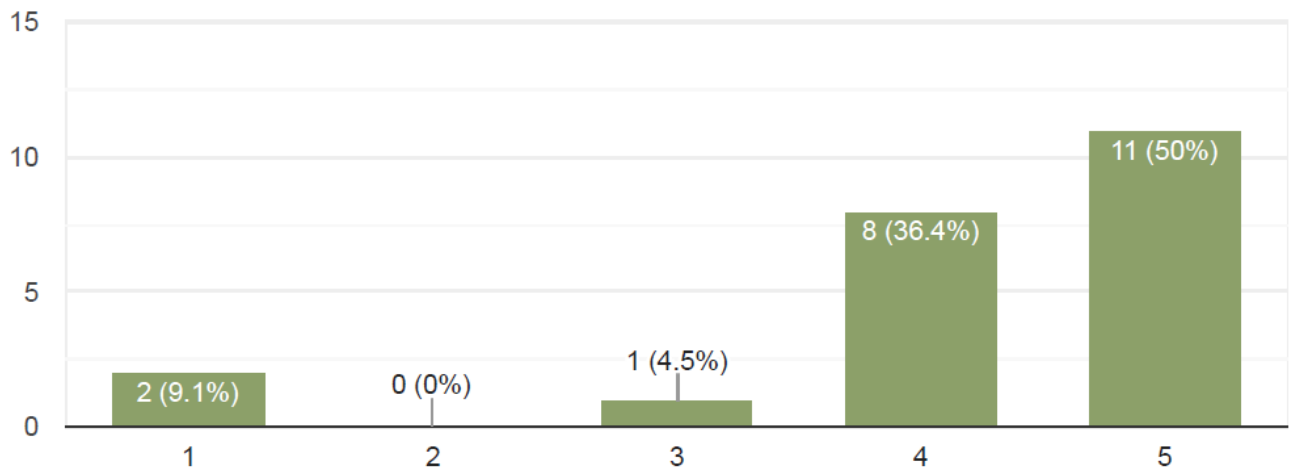


Figure 8: Waste management practices in College

The students, staff (**almost 50%**) of responses found the practices to be Excellent.

5.5 Recommendations for a Sustainable Habitat

The following practice can be adopted for further up gradation.

a) Zero Waste

The college can undertake a zero organic waste protocol. The following practices can be adopted as part of the same.

- The food waste generated by the students and staffs are taken by them to their own home, so that, minimum waste is generated inside the premises.
- The organic waste generated in the canteen is used as feed for a biogas plant and the biogas is used as fuel in college canteen.
- Vegetable waste and other leaf litters can be used to fed in the vermi-compost pit and the resulting vermin-cast is used as manure in the garden.
- The chemicals from the laboratories be disposed in a sealed tank along with water, so that the chemicals undergo neutralization with the water.

As part of the above there will be a requirement for a Biogas plant, vermin-compost pit, awareness signages.

b) Dustbins at 100m

There should be dustbin at every 50-100 in open spaces.

Water Audit



Background reference image Vlad Chetan on pexels

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 main source of water is through well and Rain water harvesting. The College does not require water from the Local Municipality. The total water consumption through the tanks on site is as follows:

S. No.	Type of tank and Location	Nos.	Capacity in litres
1.	Underground Water Tank at Main Entrance	1	1,000 litres
2.	Water Tank on Ground Floor at Gate No. 2 of Campus	1	2,000 litres
3.	Water Tank on the Top of the A-Wing Building No.1	1	1,000 litres
4.	Water Tank on the Ground Floor Building No. 2	1	1,000 litres
Total		4	5,000 litres

Table 10: Tanks in the premise

6.1.2 Sources of Secondary water supply

- a) Total 1 Bore well is available on the site as underground water facility with daily water being pumped for using submersible pump of 1HP pump each for 2 hours a day. On a daily basis nearly 3,000 to 6,000 litres of water is pumped for usage depending on the need.
- b) Rainwater harvesting quantity details – **The Rain water harvesting is done through the ground water recharging and upgrading the water quantity for bore well recharging.** The rainwater collected on terraces, roofs, balconies, and on grounds is smartly directed to the garden area and underground storage area.

6.2 Water requirement

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

- **Drinking water** – General water required for drinking purpose using around 150 litres of water is used on a daily basis in the premise.
- **Toilet blocks and practical laboratories** – General usage by occupants in toilets, urinals, bathrooms, wash basins using approx. 250 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. **The toilet areas are cleaned daily.**
- **Garden and surrounding open space** – Cleaning, watering the plants requires approximately more than 2,000 litres of water on alternate days in winter season and about 2-3 times a day in summer season on a regular climate day it is watered 3 days a week and in rainy season it is dependent on the monsoon showers.

6.3 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has a total of **15 lavatories, 28 urinals, 14 wash basins, 20 taps (including outdoors).**

As per the data shared by the College, it was noted that there is wastage of water to a certain extent in the form of Cleanliness of toilets and laboratories.

6.4 Site investigation about water management.

- There is no water leakage in the entire premise, the pipes well maintained with **extremely good and well maintained hygiene.**
- The premise has an efficient water management in terms of operations and maintenance. The toilets were kept very tidy and are cleaned daily.
- **The waste water does not mix with ground water.**
- There is sufficient number of taps in the premise.

6.5 Survey Results

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

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

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

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

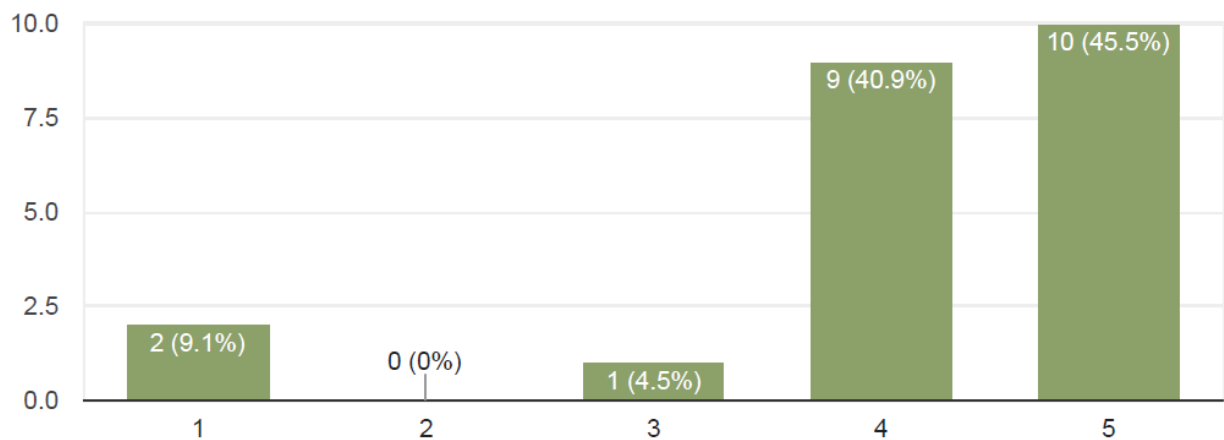


Figure 9: Water management practices in College

The students, staff (**almost 46%**) of the responses found the practices to be excellent.

6.6 Recommendations for a Sustainable Habitat

Below mentioned are few suggestions for better water management practices in the premise.

a) Universal Toilet

At least 1 toilet should be made for specially abled as per universal design norms.

b) Toilet flush system

Replace the existing single flush cisterns with dual flush, if possible to include waterless urinals or e-toilets.

c) Waste water from toilets

This should be collected and a waste water treatment plant can be installed in the open space wherein this water can be treated and reused for gardening and toilet flushing.

d) Signages

Message about avoiding water wastage should be placed at appropriate locations.

e) Water flow stopper

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

Energy Audit

Background reference image Janko Ferlic on pexels

7. Energy Audit

7.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

7.1.1 Primary sources

1. **Electrical (Metered)** – Light, Fans, AC, Equipments, Pumps consume approximately 273 units per month for an amount of Rs. 2,989/- spent monthly on an average.

7.1.2 Secondary sources

1. **Inverter** – There is 1 Inverter and around Rs. 7,000/- is spent towards it.
2. **Batteries** – There are 2 numbers of batteries in premises and around Rs. 33,000/- has been spent towards it.

7.2 Site investigation analysis

The Site investigation observations and interviews with the Maintenance staff, Electrical department in charge are summarised below:

- The **switch-off drills are practised at present**, the inbuilt power saving mode in every Comp is functioning.
- There are **no Ultra-violet lights and any other harmful lights used** in the premise.
- All class rooms and office is **ventilated using natural light**.
- **Smart monitors to save power.**

7.3 Actual Electrical Consumption as per Bills

The admin department had shared the bills for Meter and it is the main source of energy supply. The supplier is Maharashtra State Electricity Distribution Limited. The type of supply is **Low Tension**. The details of unit consumption meter wise are as follows:

Month	Units consumed	Amount per month
Mar-19	53	371
Apr-19	298	2,682
May-19	275	1,840
Jun-19	180	1,560
Jul-19	939	11,800
Aug-19	0	0
Sep-19	339	3,326
Oct-19	386	3,552
Nov-19	270	2,390
Dec-19	337	3,310
Jan-20	318	2,820
Feb-20	284	2,550
Mar-20	266	2,480
Apr-20	101	650
May-20	55	385
Jun-20	48	346
Jul-20	66	462
Aug-20	118	826
Sep-20	188	1,600
Oct-20	173	3,097
Nov-20	215	1,850
Dec-20	188	1,600
Jan-21	215	1,850
Feb-21	262	2,330
Apr-21	210	1,790
May-21	172	3,090
Jun-21	183	1,500
Jul-21	297	2,670
Aug-21	360	3,470
Sep-21	371	3,620
Oct-21	994	12,990
Nov-21	565	12,850
Total	8,726	95,657

Table 11: Study of the electricity consumption of the meters in premise

The above study shows the average consumption varies for each of the month.

7.4 Survey Results

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

The result of the review for this section is as follows:

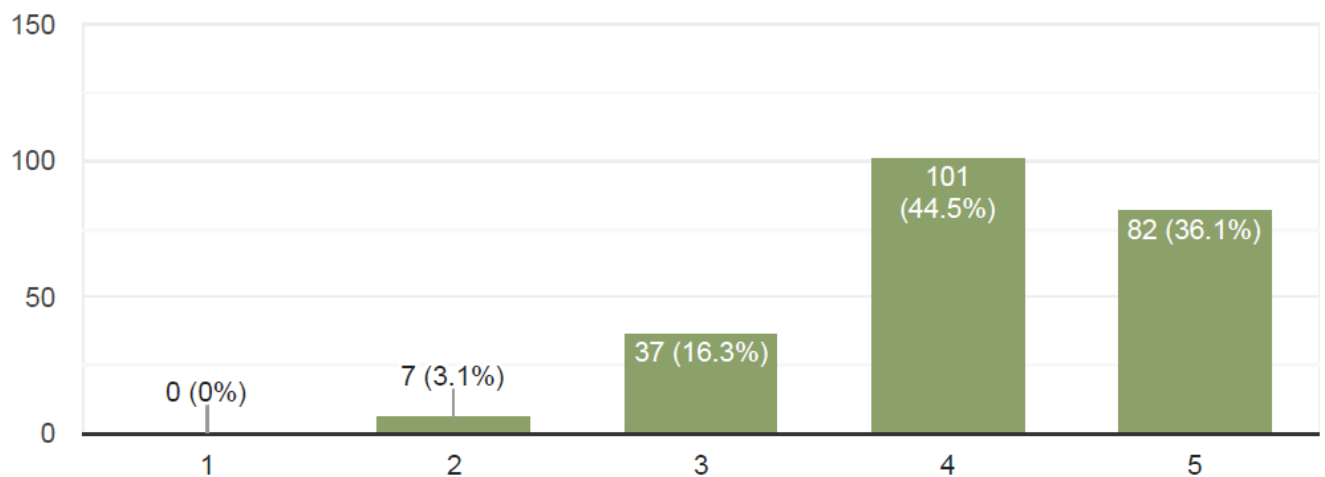


Figure 10: Energy Management practices in College

The students, staff (**almost 45%**) of the responses found the practices to be Very good.

7.5 Calculated Electrical Consumption as per inventory

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 collected 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, ac, equipment. The inventory and data collection for sources of energy consumed in the premise is summarised in the following sections.

Note: The following analysis is combined for entire premise taking into considerations the duration before pandemic to understand the consumption pattern as post pandemic the premise is used only for a few hours.

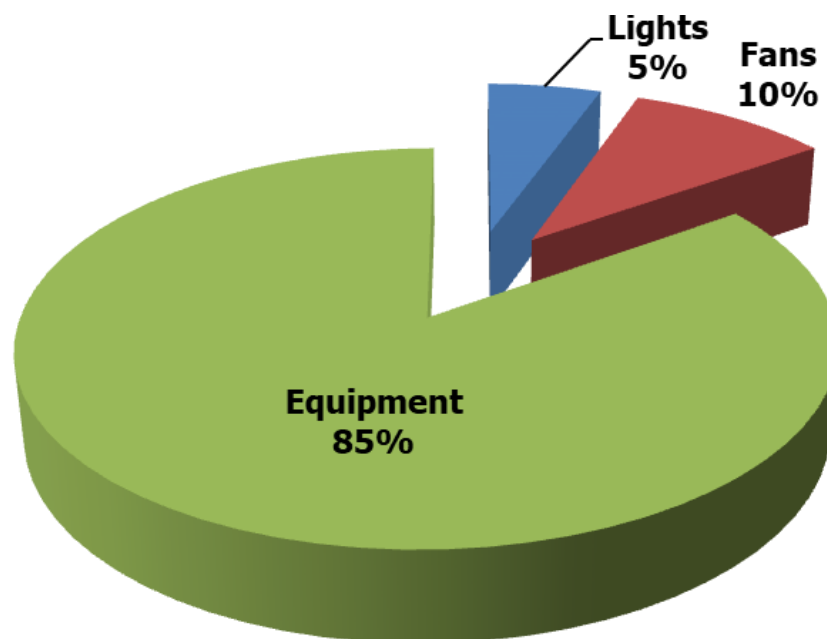


Figure 11: Summary of the Calculated Electrical Consumption as per inventory

The above graph shows that Equipment consumes 85% followed by Fans at 10% and Lights consume 5% of the total calculated electrical energy.

7.6 Lights

7.6.1 Types of lights

There is only one type of Lights in the premises which is LED and there are a total of **32 LED lights in the premises.**

7.6.2 Floor-wise consumption analysis

The energy consumption of Lights is **1,093 kWh** of energy; the following graph shows the floor wise consumption.

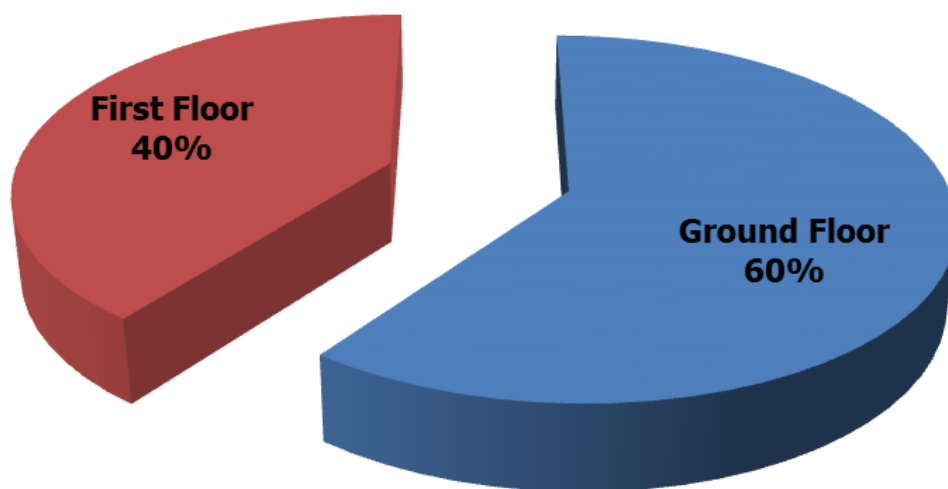


Figure 12: Energy consumed by Lights floor wise

The above analysis shows the lights in the **Ground floor consume the highest amount of energy of 659 kWh at 60%** whereas the **First floor consumes 434 kWh at 40%**

7.6.4 Requirement of NAAC

7.6.4.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are no solar panels available in premise.

7.6.4.2 Percentage of lighting power requirement met through LED bulbs

The premise has LED lights in form of Tubelights, bulbs and **100% of the lighting in terms of numbers and 100% power requirement** is met through LED.

7.6.5 Site investigation observations

Some of the points noticed are as follows:

1. All lights are in working conditions
2. Daily monitoring and check is done by the maintenance staff.
3. There was no fuse defect observed.

7.7 Fans

7.7.1 Types of fans

There are a total of **21 Ceiling fans** in the premise

S. No.	Type	Nos.
1	Ceiling fans	20
2	Table fans	1
Total		21

Table 12: Details of the Fans in the premise

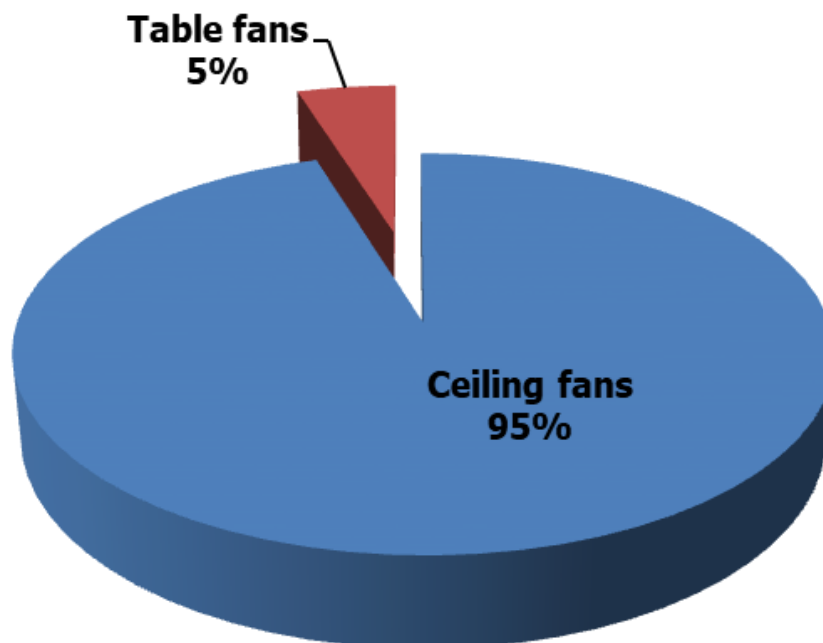


Figure 13: Analysis of the consumption by types of fans

The above analysis shows the **Ceiling fans constitute the maximum numbers and consume 1,847 kWh which is 95%** followed by **Table fans consuming 93 kWh at 5%**

7.7.2 Floor-wise consumption analysis

The energy consumption of Fans is **1,940 kWh** of energy; the following graph shows the floor wise consumption.

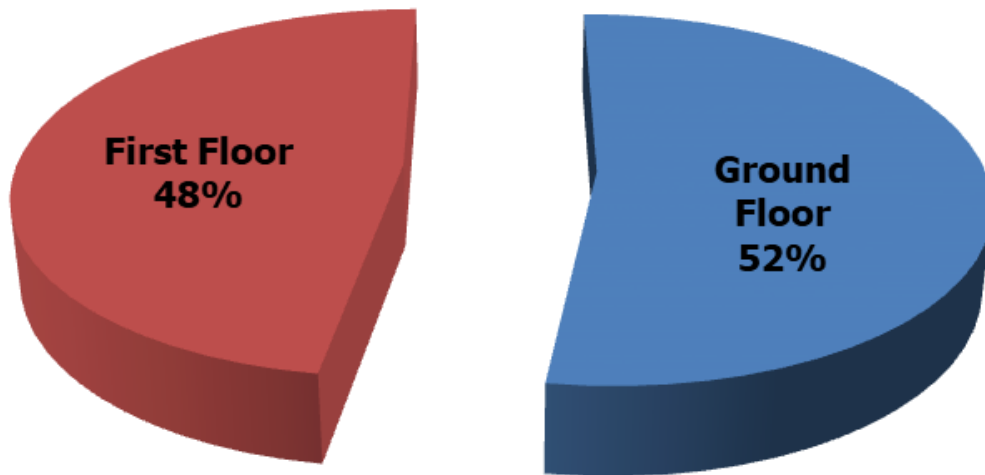


Figure 14: Energy consumed by Equipment floor wise

The above analysis shows the Fans in the **Ground floor consume the highest amount of energy of 1,017 kWh at 52%** followed by **the First floor consumes 923 kWh at 48%**

7.7.3 Site investigation observations

Some of the points noticed are as follows:

1. All fans are in working conditions
2. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.

7.8 Equipment

7.8.1 Types of Equipment

There are a total of **14 types of equipment totalling to 51 in number** in the premise. The various types are mentioned in the table below.

S. No.	Name	Nos.
1	CCTV	5
2	Desktop Computer	31
3	Printer	2
4	Fax	1
5	Landline Phone	1
6	Modem	1
7	Biometric	1
8	Projector	2
9	Scanner	1
10	Sound System	1
11	Vending Machine	1
12	Sound Speakers	2
13	Xerox machine	1
14	Pump	1
Total		51

Table 13: Types of equipment in the premise

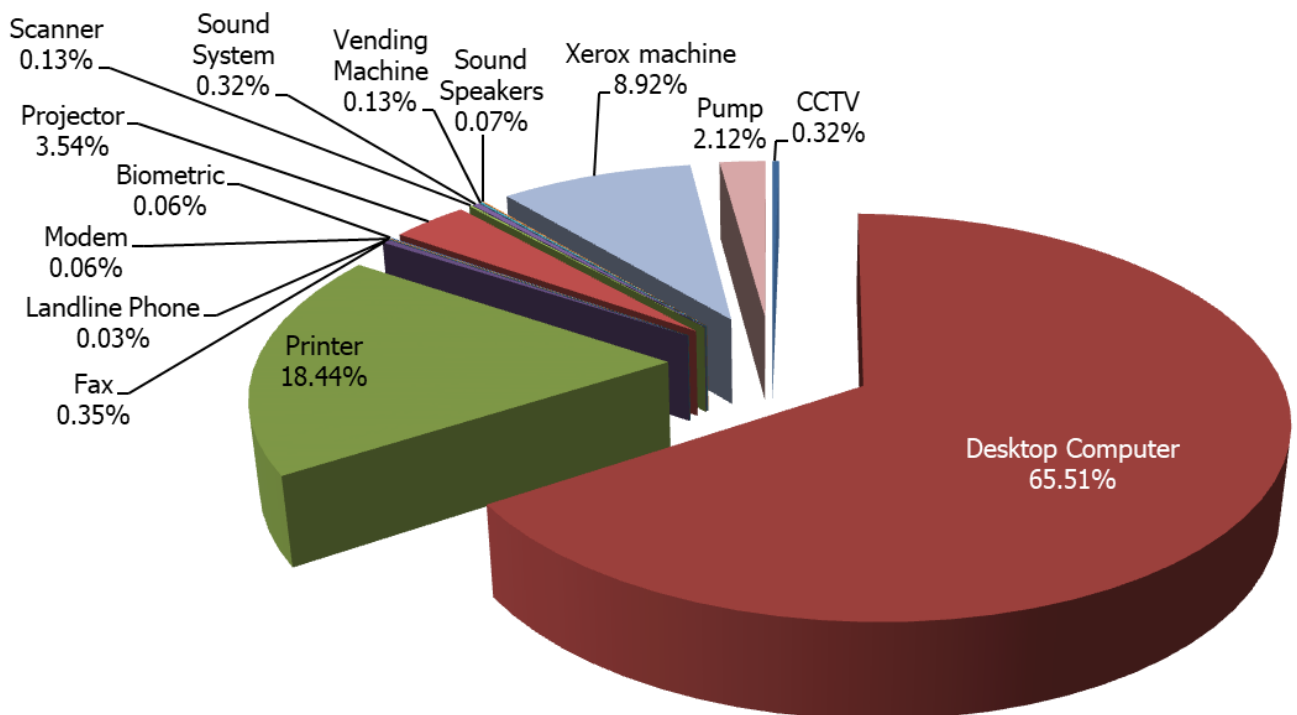


Figure 15: Summary of Energy consumed by Equipment

The above summary shows that **Desktop Computer consumes more energy at 65.51%** while **Printer at 18.44%** the **Xerox Machine at 8.92%** and the **Projector at 3.54%** these are maximum consumers as compared to other equipment. UPS (when used for electrical consumption else it is a battery backup and does not require electricity as an equipment) are also one of the equipment but are excluded in this calculation. The pump for the well is common for the School and College hence it is excluded for the calculation purpose.

7.8.2 Floor-wise consumption analysis

The energy consumption of Equipment is **16,945 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

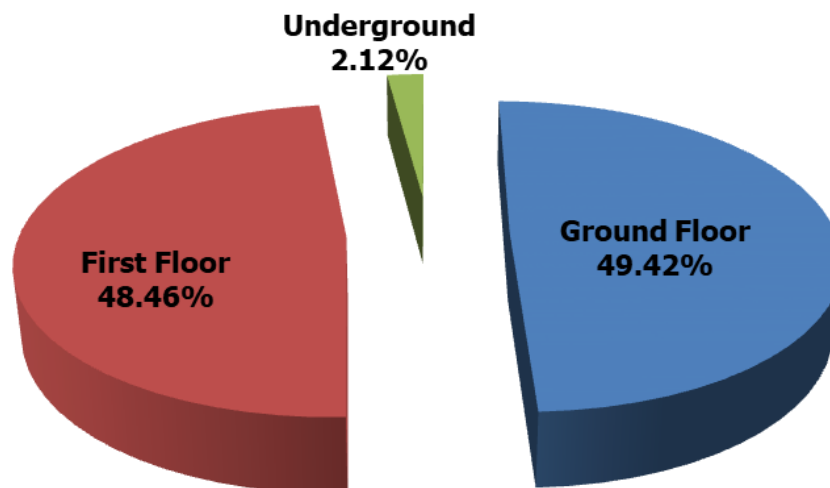


Figure 16: Energy consumed by Equipment floor wise

The above analysis shows the equipment in the **Ground floor consumes the highest amount of energy of 8,374 kWh at 49.42%** whereas the **First floor consumes 8,211 kWh at 48.46%** and the **Underground floor (Considering pump) consumes 360 kWh at 2.12%**

7.8.3 Site investigation observations

Some of the points noticed are as follows:

1. All Equipments are in working conditions and Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. No defect was found in any equipment of electrical consumption.

7.9 Recommendations for a Sustainable Habitat

Over the time energy efficient appliances have been a boon not only to the energy saving parameters they adhere to but also the eco-friendly habits it helps to inculcate. The Institution such as Schools and Colleges are the best way to implement these initiatives. It creates awareness among the students at a young age. The Institutions also act as a symbol and representative of being an energy efficient premise.

Following the analysis we found some of the suggestions which can be implemented for an energy efficient Institution. This would help in reduction of the current electrical consumption by a major percentage.

7.9.1 Fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 60W when in use. These should be replaced with energy efficient fans consuming 32W when in use.

The following graph shows a comparison of the current consumption and consumption of all **ceiling fans on all floors** if replaced with star rated appliance.

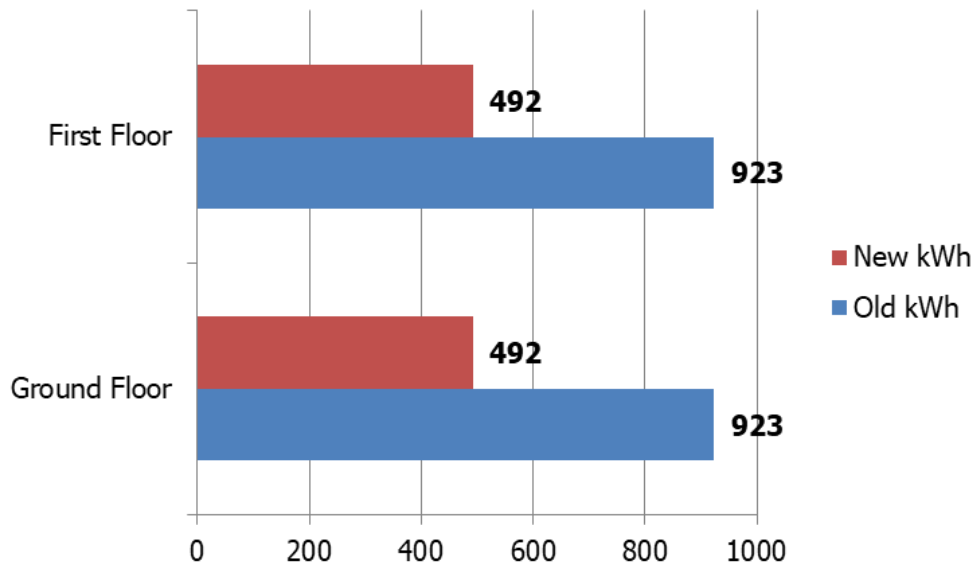


Figure 17: Analysis of current and new fans

The above analysis shows 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.

7.9.2 Equipment

Among all equipment the computers are in maximum number and suggested to be replaced with laptops as this would be energy efficient. A normal computer consumes on an average 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 which lasts up to 4 hours.

The following table shows a comparison of the current consumption and consumption of the **desktop computers** if replaced with laptops.

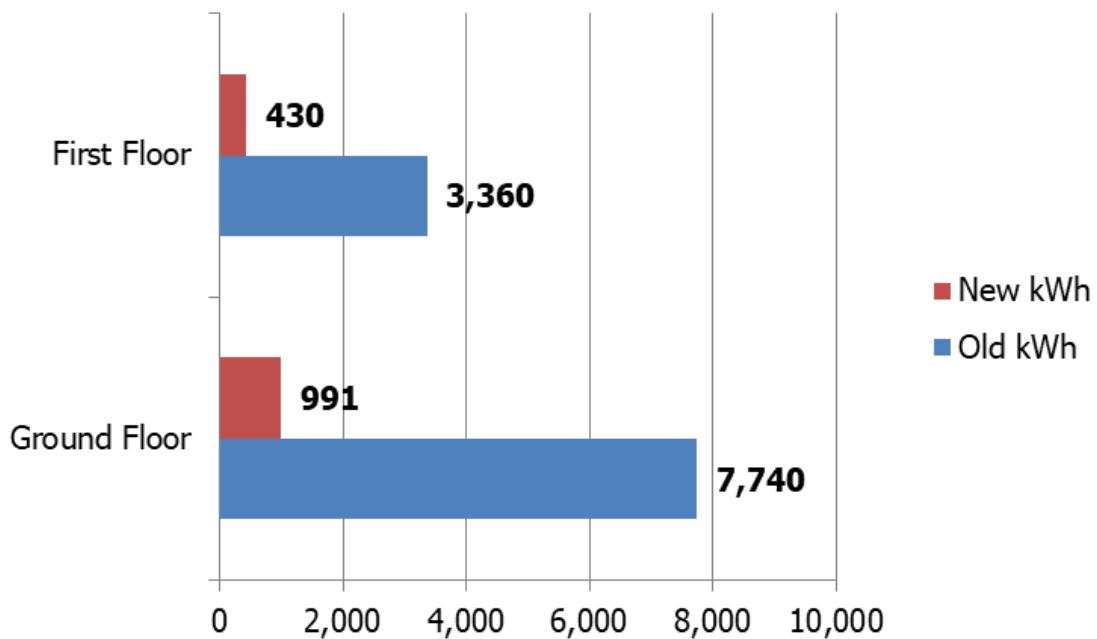


Figure 18: Analysis of current computers and new laptops

The above analysis shows reduction of average of **87% 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 the devices get damaged or are not in working condition.

8. Towards a Healthy & Sustainable Institution

Based on the analysis of the study of premises in addition to the recommendations provided in each section of Ecological, Water, Waste and Energy Audit the College can adopt the following strategies towards a Healthy and Sustainable Institution practices.

- a) 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.
- b) Waste vio** – Stepping up a little further an initiative can be undertaken wherein College can tie up with an organisation and students can be encouraged to collect dry waste and electronic waste such as newspapers, old computers and others and hand over to organisation on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, eco-friendly habits in becoming a responsible citizen.
- c) Signages** – In addition to the signages being in regular language there can be additional signages in braille language for the specially abled students.
- d) Additional fire safety** - The premises at present has only Fire extinguisher as the safety practice but additional fire safety measures should be adopted such as Hose reel, signages, fire-fighting tank, fire alarm and sprinkler system. There should be fire extinguisher minimum two per floor.

9. References

1. Uniform Plumbing Code – India, 2008
2. IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
3. IGBC Green Landscape Rating system, March 2013
4. BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST - Canada
5. Climate data <https://www.weather-atlas.com/en/india/dhule-climate>
6. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.
7. Additional sources for site study include <http://www.onefivenine.com/india/villages/Dhule/Sakri/Jaitane>

