QUALITY AUDIT REPORT

ON

WATER AUDIT, ENERGY AUDIT,

WASTE MANAGEMENT AUDIT,

GREEN CAMPUS MANAGEMENT AUDIT

AND ENVIRONMENT AUDIT

OF

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE,

19, 3RD CROSS, CSI COMPOUND

BENGALURU-560 027.

ECO ENERGIME ENGINEERS LLP

ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

OF

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE

BANGALORE

2022 – 2023

FOR MORE INFORMATION

Eco Energime Engineers LLP
14, S-1, 3rd Main, 14th Cross
AECS Layout, B – Block
Singasandra
Bangalore–560 068

Mobile: +91 9449 777 000
+91 8050 387 500
Email: info@eeellp.com
Web: www.eeellp.com

PROJECT TEAM

- Mr A Govindaraj - EA 5212
- Mr M Faizal

PROJECT ADVISOR

- Mr Prabu Das
- Ms Aparna Reddy

ACKNOWLEDGEMENTS

We are thankful to the Honorary Chairman, Principal and entire team of Bishop Cotton Women's Christian College, Bangalore, for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

We received full co-operation and support from the principal and staff members of the college. They took key interest and gave valuable inputs during the course of study.

Smart Solutions for Sustainable Tomorrow

Eco Energime Engineers LLP

Certificate

This is to certify that M/s. Eco Energime Engineers LLP, Bengaluru has conducted **Green Audit** and **Quality Audit** of **"Bishop Cotton Women's Christian College, Bengaluru"** during April 2023 to May 2023. The Audit includes water audit, energy audit, waste management audit, green campus management audit and aspects of environment audit.

The audit involves field visit, measurements and observations, verification of bills, log books, data base, maintenance registers and interview with staffs, and this gives an overview of the existing system. In an opinion and to the best of our information and according to the information given to us, said Quality Audit gives a true and fair view in conformity with auditing principles.

For Eco Energime Engineers LLP

Authorized Signatory

No.14, S-1, 3rd Main, 14th Cross, AECS Layout, B-Block, Singasandra, Bangalore - 560 068, Karnataka
80503 87500 www.eeellp.com info@eeellp.com

EEELLP ACKNOWLEDGEMENT

EEELLP team thanks the management of **"Bishop Cotton Women's Christian College, Bengaluru"** for assigning this interesting work to us. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to Principal & Team of colleagues for giving us necessary inputs to carry out this very vital exercise. We would like to thank all the head of the departments and staff members who were actively involved while collecting the data and conducting field measurements.

For Eco Energime Engineers LLP

Authorized Signatory

No.14, S-1, 3rd Main, 14th Cross, AECS Layout, B-Block, Singasandra, Bangalore - 560 068, Karnataka
80503 87500 www.eeellp.com info@eeellp.com

DISCLAIMER

The Audit Team has prepared this report for Bishop Cotton Women's Christian College, Bengaluru based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

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

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report

For Eco Energime Engineers LLP

Authorized Signatory

No.14, S-1, 3rd Main, 14th Cross, AECS Layout, B-Block, Singasandra, Bangalore - 560 068, Karnataka
80503 87500 www.eeellp.com info@eeellp.com

TABLE OF CONTENTS

1. Introduction 17

2. Pre – Audit Phase 21

2.1. Audit Schedule 21

3. On-Site Audit Phase 23

3.1. Scope / Target Areas of Quality Auditing 23

3.1.1. Water Audit 23

3.1.2. Energy Audit 23

3.1.3. Waste Management Audit 23

3.1.4. Green Campus Management Audit 23

3.1.5. Environment Audit 23

3.2. Audit Methodology and Approach 23

3.2.1. Review of Document and Records 24

3.2.2. Review of Policies 24

3.2.3. Review of best practices implemented 26

3.2.4. Site Walk through 26

3.2.5. Interviews 27

4. Water Audit 32

4.1. Facility description 32

4.1.1. Raw Water System 35

4.1.2. Drinking Water System 35

4.1.3. Rain Water System 36

4.1.4. Sewage Water System 36

4.2. Institutional Initiatives for Water Conservation 38

4.2.1. Rain water harvesting pits 38
4.2.2. Regular maintenance of water distribution system 39
4.2.3. BWSSB Water flow meter 40
4.2.4. Open Well Recharge (ground water recharge) Pits 41
4.2.5. Tanks / bunds 42
4.3. Recommendations 43
4.3.1. Waste water recycling plant 43
4.3.2. Low flow taps 43
4.3.3. Regular Water Quality Testing: 45
4.3.4. Water conservation opportunities 45
5. Energy Audit 46
5.1. Facility Description 46
5.2. Institutional Initiatives for Conservation of Energy 49
5.2.1. Day light integration 49
5.2.2. Usage of LED tube lights 50
5.2.3. Usage of LED/LCD monitors: 52
5.2.4. Fencing to avoid unauthorized entry 53
5.2.5. Automatic Rescue Device for Lifts 54
5.3. Recommendations 55
5.3.1. Installation of Sensors based energy savings 55
5.3.2. Installation of Solar Roof Top PV (SRTPV) system 55
5.3.3. Replacing existing Conventional Fans by Energy Efficient (EE) Fans: 56
5.3.4. Other Recommendations 57
6. Waste Management Audit 58

6.1. Facility Description 58
6.1.1. Dry Waste Management 58
6.1.2. Wet Waste Management 60
6.1.3. E- Waste Management 60
6.1.4. Liquid Waste Management 61
6.1.5. Bio- Waste Management 61
6.2. Institutional Initiatives for Waste management 62
6.2.1. Regular Cleaning of the campus 62
6.3. Recommendations 64
6.3.1. Conducting waste management (collection) drives & awareness programs 64
7. Green Campus Management Audit 65
7.1. Facility Description 65
7.1.1. Plantations and Lawn 65
7.2. Institutional Initiatives for Green Campus Management 72
7.2.1. Regular maintenance of greeneries 72
7.3. Recommendations 73
8. Environment Audit (Carbon footprint Analysis) 74
8.1. Facility Description 74
8.2. Institutional Initiatives for Environment Conservation 75
8.2.1. Use of Electric vehicle 75
8.2.2. Usage of LED tube lights 76
8.2.3. Rain water harvesting pits 77
8.2.4. Other Environment conservation practices implemented 78
8.3. Recommendations 79

9. Annexures 80

9.1. Data Collection Questionnaire 80

9.1.1. General information of the college: 80

9.1.2. Water Audit details: 83

9.1.3. Energy consumption details: 85

9.1.4. Waste management details: 88

9.1.5. Green campus management details: 89

9.1.6. Carbon footprint management details: 91

9.1.7. Photos required for Audit: 91

Table of Tables

Table 1-1: College Campus & Built-up area 20

Table 2-1: Audit Schedule 22

Table 3-1: Number of staff and students 31

Table 5-1: Name plate details of transformer 47

Table 5-2: UPS details 48

Table 5-3: Cost savings achieved per year due to 20 and 40 W LED tube lights 50

Table 5-4: Estimation of proposed SRTPV system 55

Table 5-5: Calculations for replacement of Conventional Fans with EE Fans 56

Table 6-1: Types of Waste Generated in the college 58

Table 8-1: Cost savings achieved per year due to 18 W LED tube lights 76

Table 9-1: Internal Quality Audit team 80

Table 9-2: General information of the college 81

Table 9-3: Detail Infrastructure of the college 81

Table 9-4: Details of the departments 82

Table 9-5: Details of the Staff 82

Table 9-6: Details of the Students 82

Table 9-7: Details of the departments 83

Table 9-8: Water management details 84

Table 9-9: Details of STP 85

Table 9-10: Details of RO Plant 85

Table 9-11: Details of Energy consumption 86

Table 9-12: Details of Solar Energy 86

Table 9-13: Details of Electrical Equipment 87

Table 9-14: Basic details of waste management 88

Table 9-15: Types of waste generated..... 88

Table 9-16: Segregation of waste..... 89

Table 9-17: Waste Disposal methods..... 89

Table 9-18: List of plantation details..... 90

Table 9-19: List of plants/trees in campus 90

Table 9-20: Details of Carbon footprint management..... 91

Table 9-21: List of photos 92

Table of Figures

Figure 1-1: IQAC members list 19

Figure 3-1: Sample image of Fire Extinguisher 24

Figure 3-2: No-Ragging poster 25

Figure 3-3: Tentative college schedule 29

Figure 3-4: List of holidays 30

Figure 4-1: Water flow meter 32

Figure 4-2: Water sump 33

Figure 4-3: Raw water storage sump 33

Figure 4-4: Overhead tank 34

Figure 4-5: Rain water storage system and tanks 34

Figure 4-6: RO water purifier 35

Figure 4-7: Rain water harvesting system 36

Figure 4-8: Schematic of sewage water system 37

Figure 4-9: Rain water harvesting system 38

Figure 4-10: Plumbing item purchase bill 39

Figure 4-11: BWSSB water flow meter 40

Figure 4-12: Ground water recharge pit 41

Figure 4-13: Tank bund in the college premises 42

Figure 4-14: sample photo of tap with aerator 44

Figure 5-1: Transformer yard 46

Figure 5-2: Diesel Generator (DG) Set 47

Figure 5-3: UPS in the college 48

Figure 5-4: Well-ventilated and day-light in Library 49

Figure 5-5: Well-ventilated and day-light integrated sample photo of classroom 49

Figure 5-6: Use of LED tube lights 50

Figure 5-7: LED purchase bill 51

Figure 5-8: Sample Photo of LED monitors in the computer lab 52

Figure 5-9: Protection to avoid unauthorized entry 53

Figure 5-10: AMC for lifts 54

Figure 6-1: Dust collection bins 58

Figure 6-2: Waste storage bins 59

Figure 6-3: Vermicompost 59

Figure 6-4: MoU for E-waste 60

Figure 6-5: Napkin Dispenser and Incinerator for Bio – waste management 61

Figure 6-6: House keeping items purchase bill 62

Figure 6-7: House keeping items purchase bill 63

Figure 7-1: List of medicinal plants in herbal garden 65

Figure 7-2: Sample photos of plantations 66

Figure 7-3: Sample photos of landscaping 67

Figure 7-4: Sample photos of Herbal Plants 68

Figure 7-5: List of shrubs 69

Figure 7-6: List of trees 70

Figure 7-7: List of potted plants 71

Figure 8-1: Electric bikes 75

Figure 8-2: Use of LED tube lights 76

Figure 8-3: Rain water harvesting system 77

ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
4.	BESCOM	:	Bangalore Electricity Supply Company
5.	BWSSB	:	Bangalore Water Supply and Sewerage Board
6.	CC Camera	:	Closed Circuit Camera
7.	CFL	:	Compact Fluorescent Lamp
8.	DG	:	Diesel Generators
9.	EE Fan	:	Energy Efficient Fan
10.	E-Waste	:	Electronic Waste
11.	etc	:	Etcetera
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	Lab	:	Laboratory
30.	LCD	:	Liquid Crystal Display
31.	LED	:	Light Emitting Diode
32.	LT	:	Low Tension
33.	mA	:	Milli Amperes
34.	MoU	:	Memorandum of Understanding
35.	NA	:	Not Applicable
36.	NAAC	:	National Assessment and Accreditation Council
37.	Nos.	:	Numbers
38.	NSS	:	National Service Scheme
39.	Prim/Sec	:	Primary/Secondary
40.	PF	:	Power factor

41.	PG	:	Post Graduate
42.	Rs.	:	Rupees
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	S. No.	:	Serial Number
46.	Sq. Ft.	:	Square Feet
47.	Sq. m.	:	Square Meter
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	UG	:	Under Graduate
52.	V	:	Volts
53.	W	:	Watts
54.	Wi-Fi	:	Wireless Fidelity
55.	#	:	Number

1. INTRODUCTION

Bishop Cotton Women's Christian College is an offshoot of the Bishop Cotton Girls' School and carries with it a rich tradition of more than 150 years of experience in imparting education. Bishop Cotton Women's Christian College was established in 1985 by the CSI TA Karnataka Central Diocese (Church of South India Trust Assocation) with a mission to serve the educational needs of women in our society. Character formation, academic excellence and service to the student community are our goals. While the institution is open to students from different communities, nationalities and economic status, its commitment is in accordance to the avowed intentions of the founders, which is to provide education and opportunities for the upward mobility of the Christian community.

The Chairman, members of the Board of Management, Principal and the faculty of Bishop Cotton Women's Christian College, work tirelessly to forward the vision and the mission of the institution. The college has a self–contained campus, with 100 faculty members, 2200 students and 40 administrative and support staff. It comprises several departments in various disciplines of Arts, Science and Commerce with state-of-the-art laboratory and library facilities. The Bishop, Karnataka Central Diocese and Chairman, Board of Management, Rt. Rev. Dr Prasanakumar Samuel, is a visionary leader. A progressive Board, faculty with academic expertise, vibrant student community, an efficient administration, and support staff have all contributed to the growth of the institution.

The path trodden by the institution is illumined by a spirit of commitment to excellence. The College envisions itself as being a charismatic educational institution addressing the multiple challenges thrown at students by society.

Bishop Cotton Women's Christian College stands faithful to its motto "Nec Dextrorsum Nec Sinistrorsum", an extract from the Bible and a commandment given by God to Joshua, the new leader of the Israelites. Joshua was instructed not to lose his focus, to be determined and confident, turning neither to the right nor to the left but always moving "On Straight On". Based on this precept, the young women who enter our portals are challenged to embrace the highest levels of integrity and justice; to be humane and constructive members of society.

Bishop Cotton Women's Christian College recognizes the need to move forward. In true Cottonian spirit, the college looks to new horizons, re-dedicating itself to the cause of women's empowerment. The institution encourages individuals to think and act as ethical leaders who help in the creation of a new order based on human dignity, equality and opportunity with social, political and economic justice. It will send into the world, women of substance, worthy of a place in society.

VISION

To educate individuals to think and act as ethical leaders which will help in the creation of a new social order based on human dignity, equality and opportunity with social, political and economic justice

MISSION

To be a prominent Christian Educational Institution in the country which values academic achievement, personal freedom and integrity, dignity and respect of the individual, tolerance and service to fellow human beings

Committee and Cells:

Internal Quality Assurance Cell (IQAC):

The aim of IQAC is to develop a system for conscious, consistent & catalytic improvement in the overall performance of the institution. It ensures timely, efficient and progressive performance of academic, administrative and financial tasks.

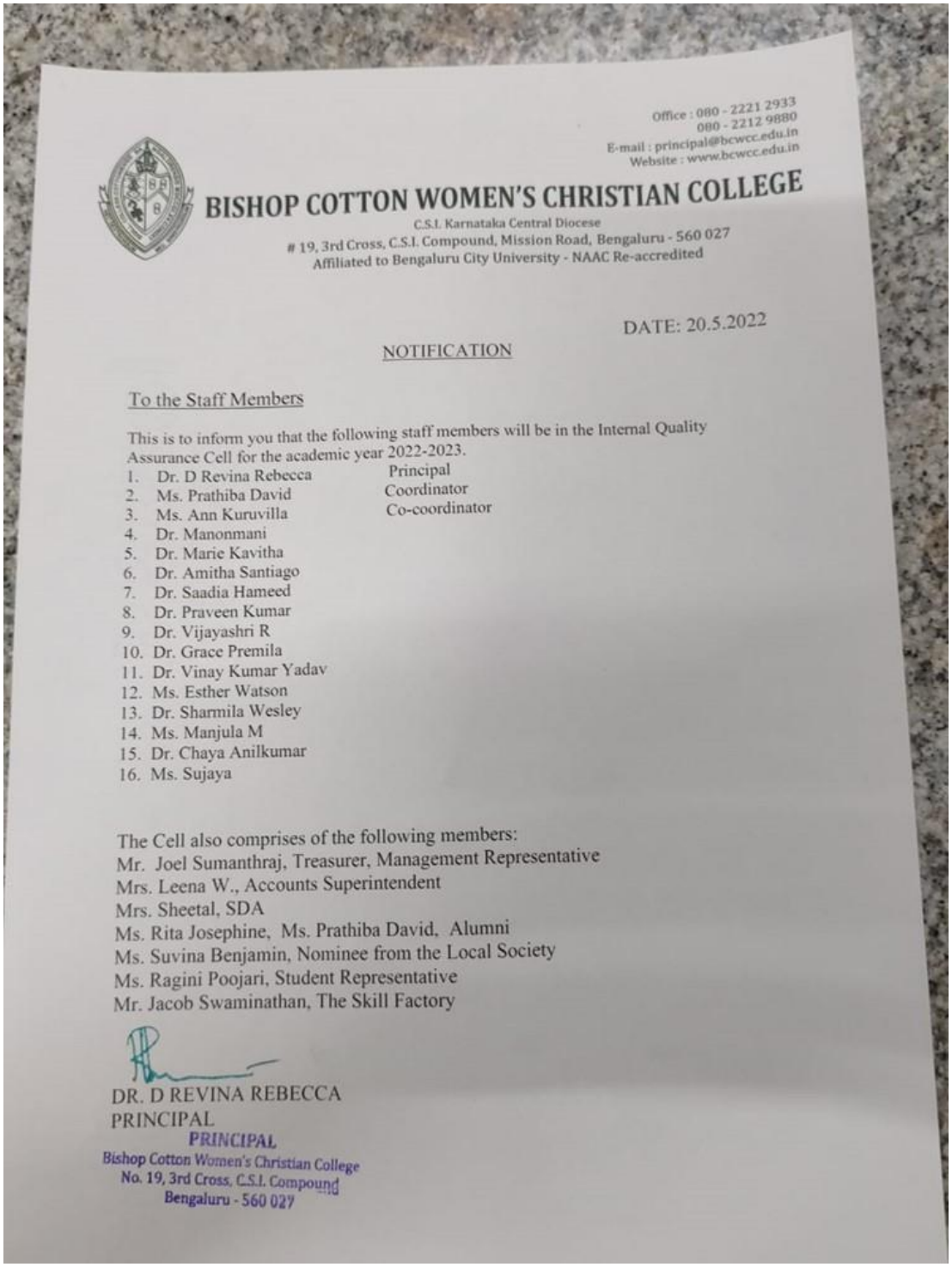
The coordinator of the IQAC and the secretary will have a major role in implementing these functions. The IQAC may derive major support from the already existing units and mechanisms that contribute to the functions listed above. The operational features and functions discussed so far are broad-based to facilitate institutions towards academic excellence and institutions may adapt them to their specific needs.

IQAC committee comprises of Principal, IQAC Convenor, member from the Board of Management, senior faculty members, senior administrative officers, nominee from employer, representative from local community and student representative.

Various committees and cells are alumini, admission, annual report & magazine, assembly, attendance, adventure club, bulletin board – news board – departmental newsletter, certificate courses, chapel, choir, Christian fest, SCM, UWCA, college calendar & log book, counseling / value education, discipline, eco-watch club, entrepreneur cell, student welfare, excursion staff & students, IQAC, legal, NCC, NSS, placement cell & career guidance, red cross society unit, remedial class, Rotaract club, staff welfare, time table, sexual harassment redressal cell, anti-ragging cell, grievance redressal cell, internal complaints committee, theatre club, personality development club, photography club, foreign admissions, examination committee, and electoral literacy club.

Internal Quality Assurance Cell – 2022 – 2023

The college management constitutes the Internal Quality Assurance Cell including management representative, staff and students every year. Figure 1-1 shows the list of Internal Quality Assurance Cell members of the college.



Office : 080 - 2221 2933
080 - 2212 9880
E-mail : principal@bcwcc.edu.in
Website : www.bcwcc.edu.in

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE
C.S.I. Karnataka Central Diocese
19, 3rd Cross, C.S.I. Compound, Mission Road, Bengaluru - 560 027
Affiliated to Bengaluru City University - NAAC Re-accredited

DATE: 20.5.2022

NOTIFICATION

To the Staff Members

This is to inform you that the following staff members will be in the Internal Quality Assurance Cell for the academic year 2022-2023.

1. Dr. D Revina Rebecca — Principal
2. Ms. Prathiba David — Coordinator
3. Ms. Ann Kuruvilla — Co-coordinator
4. Dr. Manonmani
5. Dr. Marie Kavitha
6. Dr. Amitha Santiago
7. Dr. Saadia Hameed
8. Dr. Praveen Kumar
9. Dr. Vijayashri R
10. Dr. Grace Premila
11. Dr. Vinay Kumar Yadav
12. Ms. Esther Watson
13. Dr. Sharmila Wesley
14. Ms. Manjula M
15. Dr. Chaya Anilkumar
16. Ms. Sujaya

The Cell also comprises of the following members:
Mr. Joel Sumanthraj, Treasurer, Management Representative
Mrs. Leena W., Accounts Superintendent
Mrs. Sheetal, SDA
Ms. Rita Josephine, Ms. Prathiba David, Alumni
Ms. Suvina Benjamin, Nominee from the Local Society
Ms. Ragini Poojari, Student Representative
Mr. Jacob Swaminathan, The Skill Factory

DR. D REVINA REBECCA
PRINCIPAL

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 1-1: IQAC members list

Campus Area and Built-up area

The area of the campus (built up and total) is given in table 1-1.

S. No.	Description	Units	Details
1	Campus area	Acres	2.22
2	Campus Built up area	Sq. Meters	9979

Table 1-1: College Campus & Built-up area

Overview of Quality Audit:

Quality Audit helps college / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A pre-audit meeting is a prerequisite for the Audit; it helps to meet and discuss the schedule and documents required during the audit. The pre-audit meeting was conducted at Bishop Cotton Women's Christian College, Bengaluru in March 2023. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college has shown significant commitment towards Quality Auditing during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities which are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

The college administration is vital to the process of realizing campus sustainability and college policy is an essential instrument for any substantial change in the campus environment.

Scope and goals of Quality Auditing

A clean and healthy environment aids effective and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Quality Auditing is one among them for educational institutions.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

2.1. Audit Schedule

Quality Audit schedule includes the pre-audit phase, on-site / audit phase and post audit phase. Table 2-1 details the complete Quality Audit schedule.

S. No	Description	Timeline
1.	Pre-audit Phase	17 Apr 23 to 21 Apr 23
2.	Onsite-audit Phase	03 May 23 to 10 May 23
3.	Post-audit Phase	22 May 23 to 26 May 23
4.	Report Submission	30 May 23

Table 2-1: Audit Schedule

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water sources, water consumption, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Audit

Environment Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough

- Data Collection
- Interviews

3.2.1. Review of Document and Records

Electricity bills, Water bills, equipment register, list of appliances, office registers, internal Quality Audit document, purchase document, were reviewed and relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

College has various policies that include safety policy, environment policy, and Anti-ragging policy.

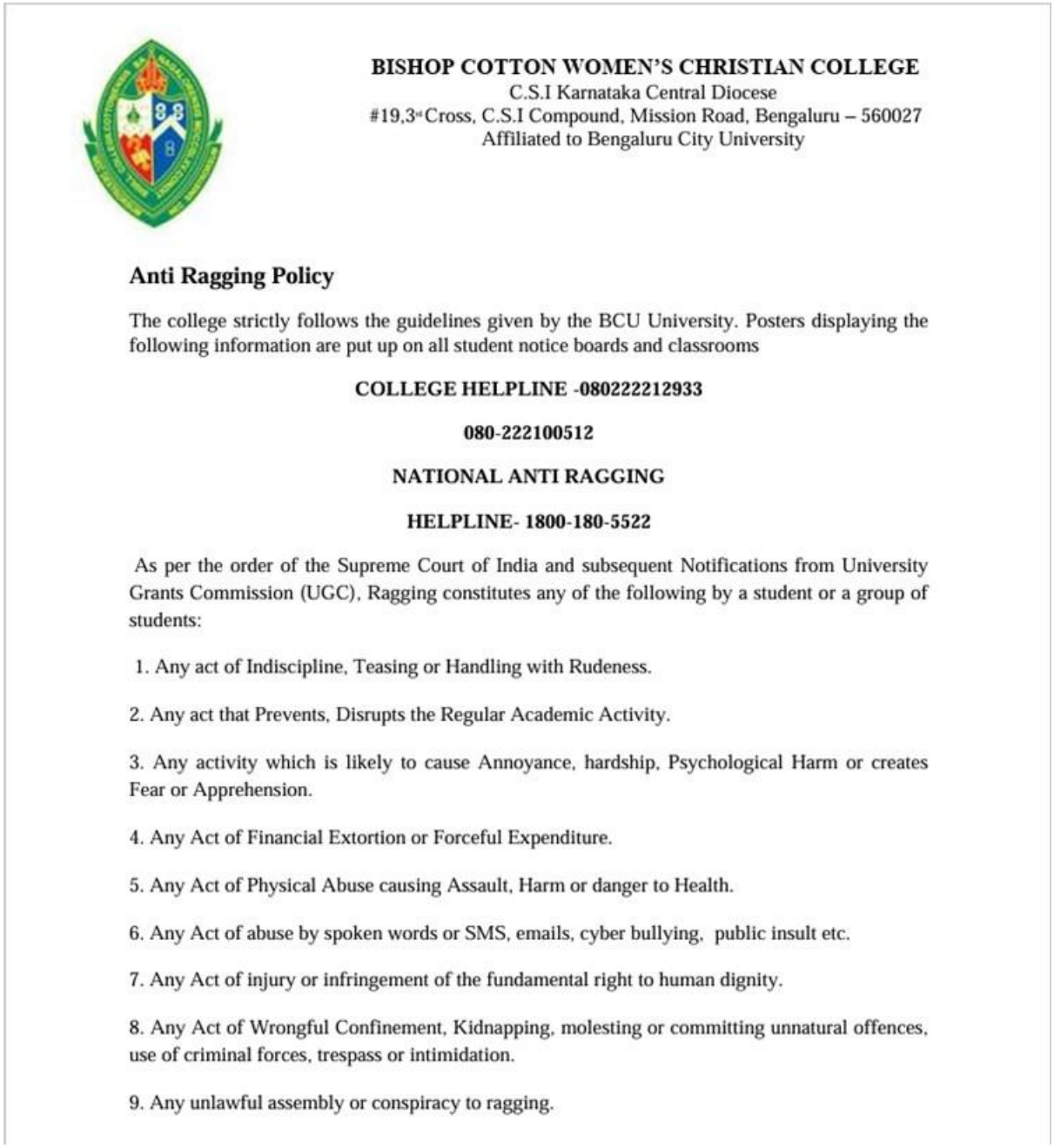
A. Safety Policy:

The organization's safety policy is recognized to protect the health and safety of the staff and students as well as the surrounding community. Staff have been given the training to use fire extinguishers in emergency situations of fire and explosion. Fire extinguishing cylinders have been installed in accessible locations for approach and use; sample picture of Fire extinguisher is as shown in the figure 3-1.

Figure 3-1: Sample image of Fire Extinguisher

B. Anti-Ragging policy:

Anti-Ragging Committee will be the supervisory and advisory committee in preserving a culture of Ragging Free Environment in the college campus. 'Anti – Ragging' policy is shown in figure 3-2.



BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE
C.S.I Karnataka Central Diocese
#19,3rd Cross, C.S.I Compound, Mission Road, Bengaluru – 560027
Affiliated to Bengaluru City University

Anti Ragging Policy

The college strictly follows the guidelines given by the BCU University. Posters displaying the following information are put up on all student notice boards and classrooms

COLLEGE HELPLINE -080222212933

080-222100512

NATIONAL ANTI RAGGING

HELPLINE- 1800-180-5522

As per the order of the Supreme Court of India and subsequent Notifications from University Grants Commission (UGC), Ragging constitutes any of the following by a student or a group of students:

1. Any act of Indiscipline, Teasing or Handling with Rudeness.

2. Any act that Prevents, Disrupts the Regular Academic Activity.

3. Any activity which is likely to cause Annoyance, hardship, Psychological Harm or creates Fear or Apprehension.

4. Any Act of Financial Extortion or Forceful Expenditure.

5. Any Act of Physical Abuse causing Assault, Harm or danger to Health.

6. Any Act of abuse by spoken words or SMS, emails, cyber bullying, public insult etc.

7. Any Act of injury or infringement of the fundamental right to human dignity.

8. Any Act of Wrongful Confinement, Kidnapping, molesting or committing unnatural offences, use of criminal forces, trespass or intimidation.

9. Any unlawful assembly or conspiracy to ragging.

Figure 3-2: No-Ragging poster

3.2.3. Review of best practices implemented

During the Quality Audit study, it was observed the college has taken various initiatives in conserving natural resources that include:

- Quality Audit team including Management, Staff and Students
- Rain water storage system is adopted
- Installation of LED tube lights to reduce electricity consumption
- Usage of LED/LCD monitors in all the computer labs.
- Switching OFF lights and fans whenever not in use to save electricity
- Integration of Daylight in campus to reduce the need for energy
- Installation of sanitary dispensers and incinerators for hygiene
- MoU of e-waste to the vendors
- Many Indoor pot plantations were found to keep the campus green
- Encourage the use of bicycles and electric vehicles

3.2.4. Site Walk through

Site walk through was conducted with staff members, students and audit team members. Staff and students have shown very keen interest in the data collection process and methods to be followed in field data collection. The staff and students have given inputs and suggestions for resource conservation as well.

College Infrastructure

The college campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories libraries and many more. Details of infrastructure are as follows:

- Bank and ATM
- Outdoor games
- Indoor games
- Cafeteria/Canteen/Food Courts
- Courier/DTP
- Sports and Games
- Power Backup
- Sick room
- Facilities like lift, ramps and toilets for specially abled students
- Seminar Halls
- Board Room
- Rain water harvesting
- Library
- ICT Enabled class rooms

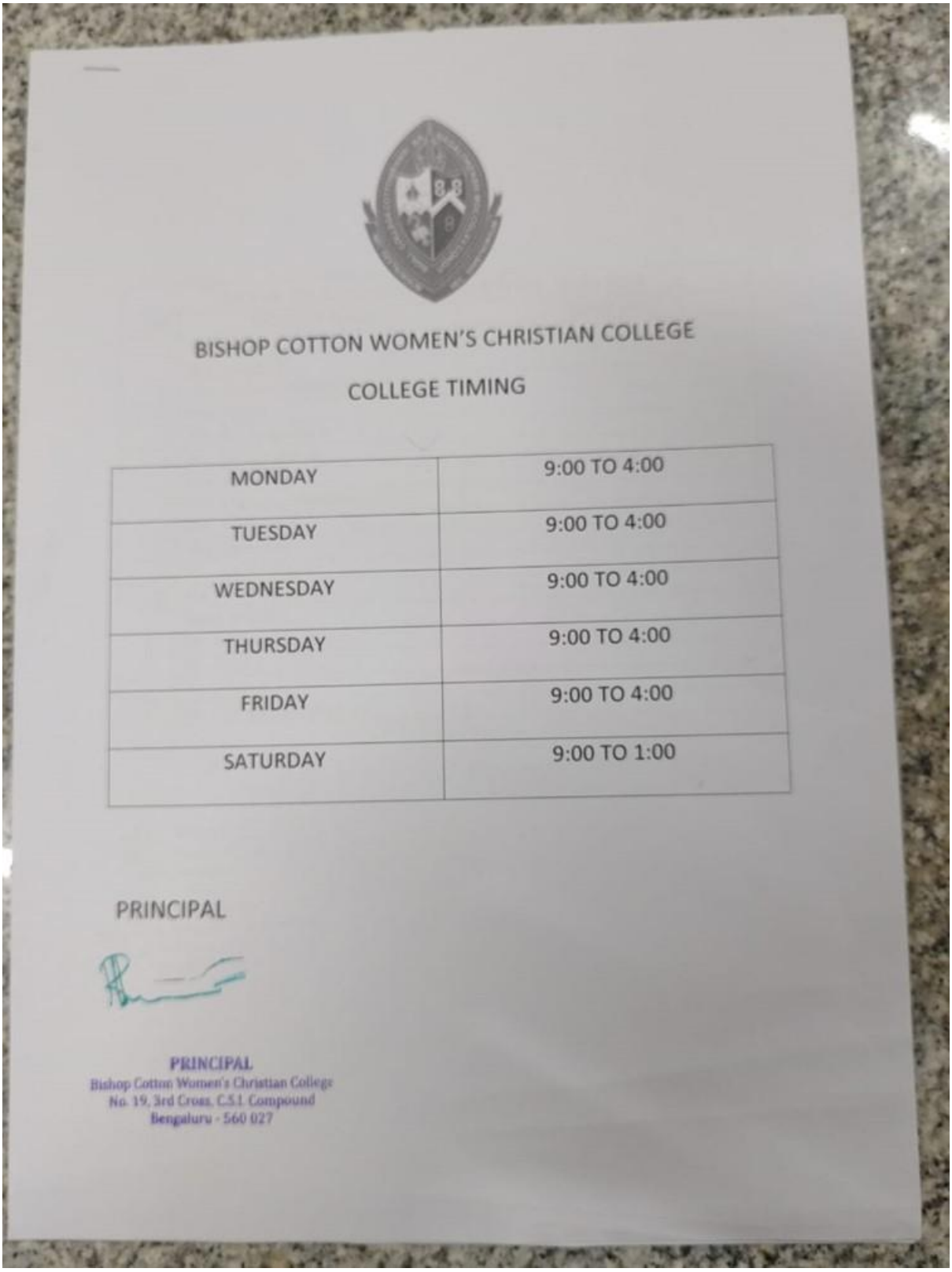
All the classrooms and staff rooms are well ventilated and the integration of day-light is well utilized. This has helped in optimized usage of electricity for lights and fans during day time.

3.2.5. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-section

3.2.5.1. Tentative Schedule of College:

1. The tentative schedule of the college:
    a. Monday to Friday : 9.00 AM to 4.00 PM
    b. Saturday: 9.30 AM to 1.00 PM
    c. The tentative schedule of college is given in figure 3.3.
2. The list of holidays is given in figure 3.4.



BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE

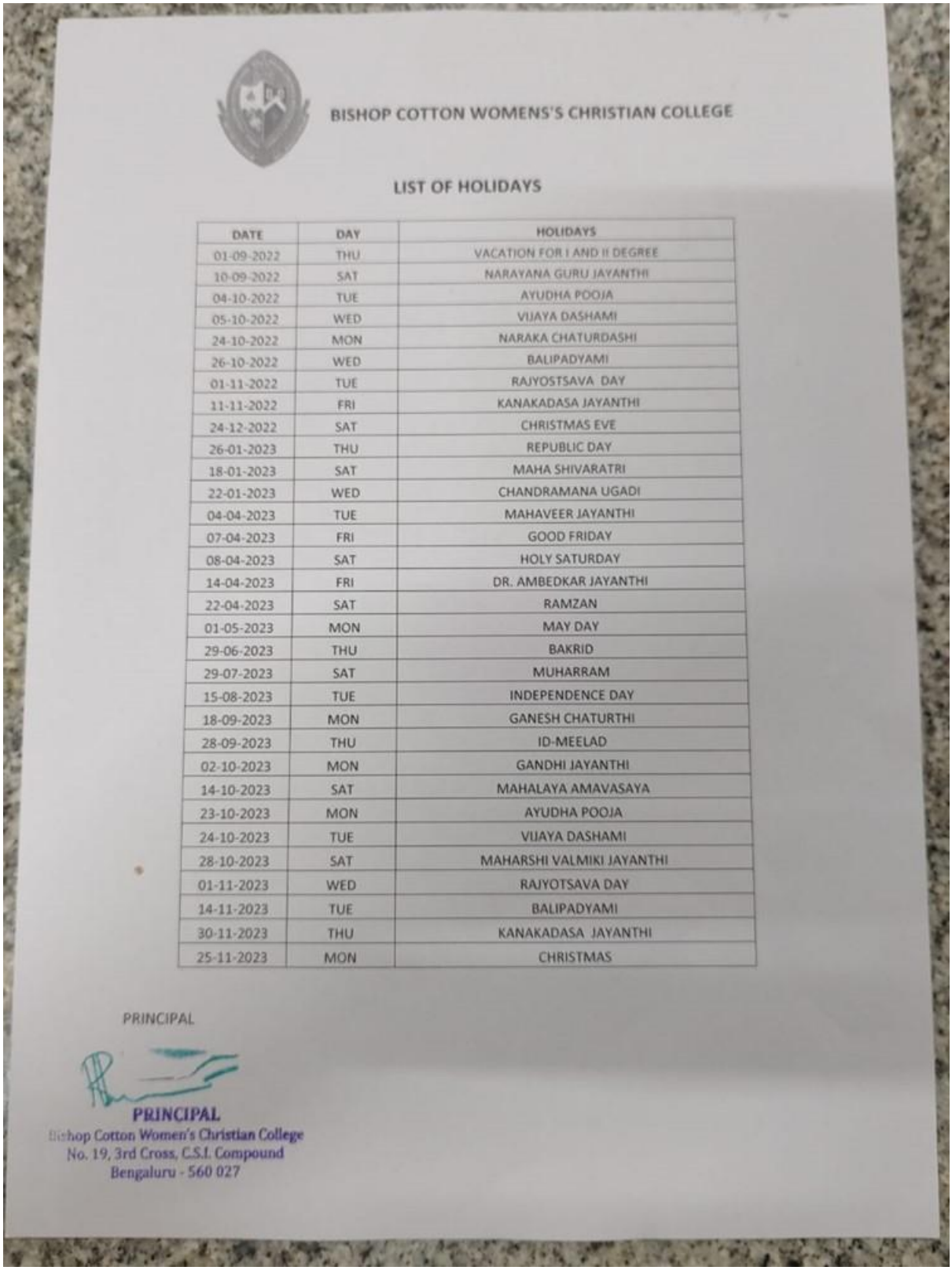
COLLEGE TIMING

MONDAY	9:00 TO 4:00
TUESDAY	9:00 TO 4:00
WEDNESDAY	9:00 TO 4:00
THURSDAY	9:00 TO 4:00
FRIDAY	9:00 TO 4:00
SATURDAY	9:00 TO 1:00

PRINCIPAL

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 3-3: Tentative college schedule



BISHOP COTTON WOMENS'S CHRISTIAN COLLEGE

LIST OF HOLIDAYS

DATE	DAY	HOLIDAYS
01-09-2022	THU	VACATION FOR I AND II DEGREE
10-09-2022	SAT	NARAYANA GURU JAYANTHI
04-10-2022	TUE	AYUDHA POOJA
05-10-2022	WED	VIJAYA DASHAMI
24-10-2022	MON	NARAKA CHATURDASHI
26-10-2022	WED	BALIPADYAMI
01-11-2022	TUE	RAJYOSTSAVA DAY
11-11-2022	FRI	KANAKADASA JAYANTHI
24-12-2022	SAT	CHRISTMAS EVE
26-01-2023	THU	REPUBLIC DAY
18-01-2023	SAT	MAHA SHIVARATRI
22-01-2023	WED	CHANDRAMANA UGADI
04-04-2023	TUE	MAHAVEER JAYANTHI
07-04-2023	FRI	GOOD FRIDAY
08-04-2023	SAT	HOLY SATURDAY
14-04-2023	FRI	DR. AMBEDKAR JAYANTHI
22-04-2023	SAT	RAMZAN
01-05-2023	MON	MAY DAY
29-06-2023	THU	BAKRID
29-07-2023	SAT	MUHARRAM
15-08-2023	TUE	INDEPENDENCE DAY
18-09-2023	MON	GANESH CHATURTHI
28-09-2023	THU	ID-MEELAD
02-10-2023	MON	GANDHI JAYANTHI
14-10-2023	SAT	MAHALAYA AMAVASAYA
23-10-2023	MON	AYUDHA POOJA
24-10-2023	TUE	VIJAYA DASHAMI
28-10-2023	SAT	MAHARSHI VALMIKI JAYANTHI
01-11-2023	WED	RAJYOTSAVA DAY
14-11-2023	TUE	BALIPADYAMI
30-11-2023	THU	KANAKADASA JAYANTHI
25-11-2023	MON	CHRISTMAS

PRINCIPAL

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 3-4: List of holidays

3.2.5.2. Staff and Students of College:

The number of staff includes teaching, non-teaching, and house-keeping is given in the table 3-2. The number of students includes both boys and girls.

S. No.	Description	Male	Female	Total
1	Students	--	1075	1075
2	Faculties	--	67	67
3	Non – teaching staffs	--	22	22

Table 3-1: Number of staff and students

4. WATER AUDIT

The study involved carrying out various data collections, observations, analysis to realistically assess water wastage and potential for water conservation.

4.1. Facility description

Municipal water is the only source of water, for facilitating the water requirement of the college. The water supply is monitored with help of water flow meter installed. The picture of water flow meter is shown in figure 4.1.

Figure 4-1: Water flow meter

The municipal water is collected and stored in sump. One number of sump with 24 kL capacity is available in the college for water storage. Picture of water sump is show in figure 4.2.

Figure 4-2: Water sump

The water is pumped from sump to overhead tank for the usage in the campus. The pump used for pumping water from sump to overhead tank is shown in figure 4.3.

Figure 4-3: Raw water storage sump

Four numbers of syntax tanks have been installed on the college terrace for the water storage. 5000 litres x 2 nos, 2500 litres x 1 no. and 1000 litres x 1 no. of overhead tank is available. The sample photo of over-head tank is shown in figure 4-4.

Figure 4-4: Overhead tank

Two number of rain water harvesting system with filters are available in the campus. The pictures of rain water harvesting system and water storage tank is given in figure 4.5.

Figure 4-5: Rain water storage system and tanks

Based on the source and usage, water is classified as following types in the college campus that include:

- Raw Water
- Drinking Water
- Rain Water
- Sewage Water
- Water purifier Reject Water

Details of the various types of water usages are discussed in detail, in the following sections.

4.1.1. Raw Water System

The raw water is consumed in the following areas:

- Water purifier
- Toilets & Handwash
- Gardening

Municipal water is collected to the sump. The water collected in sump, is pumped to four number of overhead tanks using pump. From the overhead tanks the raw water is distributed to consumption points i.e., water purifier, toilets, handwash, and gardening.

4.1.2. Drinking Water System

To provide drinking water facility, water purifiers is installed in the campus. Sample photo of the water purifier is shown in figure 4-6.

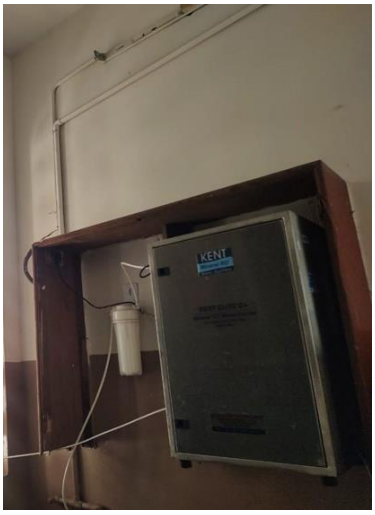


Figure 4-6: RO water purifier

4.1.3. Rain Water System

The rain water from terrace is brought to ground level using a dedicated pipeline. The rain water is let in to the rain water storage tanks. There are two numbers of rain water harvesting filters and three numbers of rain water storage tanks. The rain water harvesting system is shown in figure 4-7.

Figure 4-7: Rain water harvesting system

4.1.4. Sewage Water System

The sources of waste water in the college campus are as follows

- Handwash
- Toilets
- Water purifier reject water

Waste water from the handwash, toilets, and water purifier reject water are connected to the waste water chamber. Then, from waste water sump it is sent out to the BWSSB drainage.

Schematic of sewage water system is shown in figure 4-8.

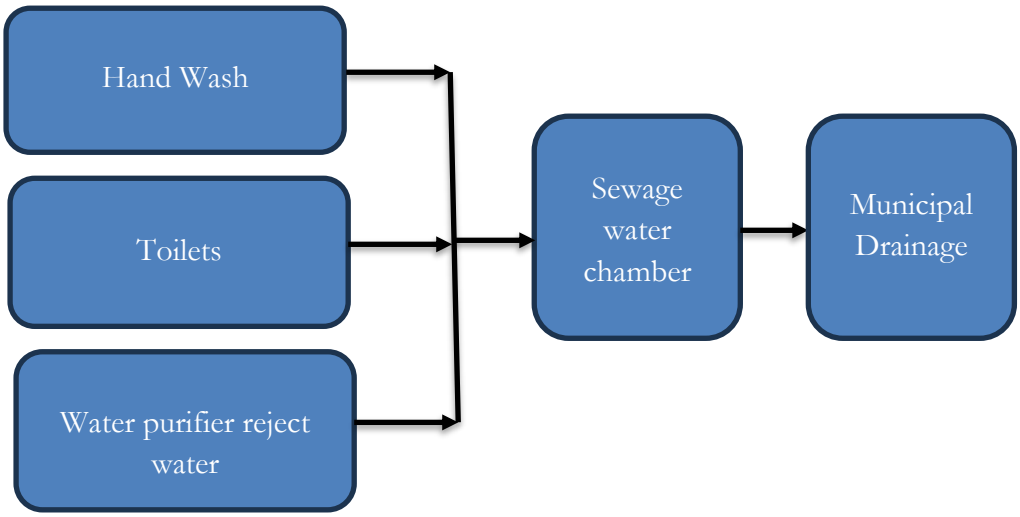


Figure 4-8: Schematic of sewage water system

4.2. Institutional Initiatives for Water Conservation

4.2.1. Rain water harvesting pits

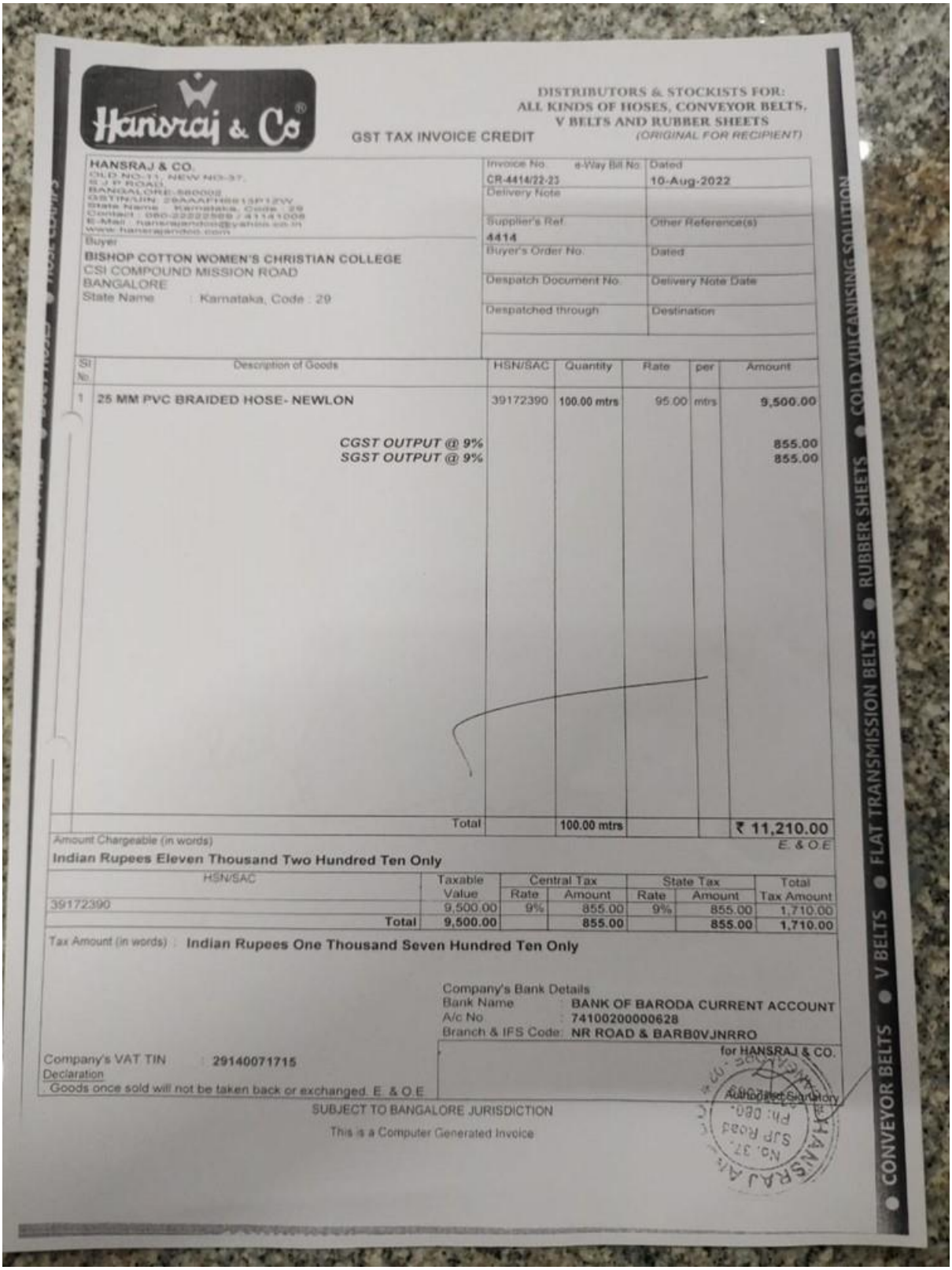
Rainwater harvesting is the simple process or technology used to conserve rainwater by collecting, conveying, purifying and storing of rainwater for later use.

The benefits of rainwater harvesting system are listed below.

- Helps in reducing the water bill.
- Decreases the demand for water.
- Reduces the need of bore well water
- Promotes both water and energy conservation
- Improves the quality and quantity of groundwater
- It is an excellent source of water for landscape irrigation
- The rain water from terrace is brought to ground level using a dedicated pipeline.

The rain water is let in to the rain water storage tanks. There are two numbers of rain water harvesting filters and three numbers of rain water storage tanks. The rain water harvesting system is shown in figure 4-9.

Figure 4-9: Rain water harvesting system



Hansraj & Co

DISTRIBUTORS & STOCKISTS FOR:
ALL KINDS OF HOSES, CONVEYOR BELTS,
V BELTS AND RUBBER SHEETS

GST TAX INVOICE CREDIT (ORIGINAL FOR RECIPIENT)

HANSRAJ & CO.
OLD NO.11, NEW NO.37,
S J P ROAD,
BANGALORE-560002
GSTIN/UIN: 29AAAFH6613P1ZW
State Name : Karnataka, Code : 29
Contact : 080-22222569 / 41141005
E-Mail : hansrajandco@yahoo.co.in
www.hansrajandco.com

Buyer
BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE
CSI COMPOUND MISSION ROAD
BANGALORE
State Name : Karnataka, Code : 29

Invoice No.	e-Way Bill No.	Dated
CR-4414/22-23		10-Aug-2022
Delivery Note		
Supplier's Ref.		Other Reference(s)
4414		
Buyer's Order No.		Dated
Despatch Document No.		Delivery Note Date
Despatched through		Destination

Sl No	Description of Goods	HSN/SAC	Quantity	Rate	per	Amount
1	25 MM PVC BRAIDED HOSE- NEWLON	39172390	100.00 mtrs	95.00	mtrs	9,500.00
	CGST OUTPUT @ 9%					855.00
	SGST OUTPUT @ 9%					855.00
	Total		100.00 mtrs			₹ 11,210.00

E. & O.E

Amount Chargeable (in words)
Indian Rupees Eleven Thousand Two Hundred Ten Only

HSN/SAC	Taxable Value	Central Tax		State Tax		Total Tax Amount
		Rate	Amount	Rate	Amount	
39172390	9,500.00	9%	855.00	9%	855.00	1,710.00
Total	9,500.00		855.00		855.00	1,710.00

Tax Amount (in words) : Indian Rupees One Thousand Seven Hundred Ten Only

Company's Bank Details
Bank Name : BANK OF BARODA CURRENT ACCOUNT
A/c No : 74100200000628
Branch & IFS Code: NR ROAD & BARB0VJNRRO

Company's VAT TIN : 29140071715

Declaration
Goods once sold will not be taken back or exchanged. E. & O.E

for HANSRAJ & CO.
Authorised Signatory

SUBJECT TO BANGALORE JURISDICTION
This is a Computer Generated Invoice

CONVEYOR BELTS • V BELTS • FLAT TRANSMISSION BELTS • RUBBER SHEETS • COLD VULCANISING SOLUTION

Figure 4-10: Plumbing item purchase bill

4.2.3. BWSSB Water flow meter

The BWSSB water flow meter installed in the college is shown in figure 4-11.

Figure 4-11: BWSSB water flow meter

Outcome of Water Flow Meter:

Flow meters helps in

1. water accountability
2. Leakage alerts
3. Water conservation

4.2.4. Open Well Recharge (ground water recharge) Pits

The ground water recharge pits available in the college is shown in figure 4-12.

Figure 4-12: Ground water recharge pit

Advantages of ground water recharge pits are:

- This has lower evaporation loss and quick recharge
- Local materials are used for filters
- Improves the quality of water

4.2.5. Tanks / bunds

The design of tank bunds adds more aesthetics to the campus and greenery around. The bunds help to collect the surface runoff rain water. This will help in increasing the water infiltration. The bunds play key role in preventing soil erosion. The bunds available in the college is shown in figure 4-13.

Figure 4-13: Tank bund in the college premises

This helps to recharge the ground water. Small fishes in these tanks will help to keep the water clean. The rain water harvesting tanks have filters, to filter the water from dust and leaves in the rain water.

4.3. Recommendations

4.3.1. Waste water recycling plant

The waste water sources are washrooms, toilets and labs. The waste water from both blocks is sent to waste water chamber and then to municipal drainage through underground pipe.

Cost effective and advanced water purification technologies are available to recycle and reuse the waste (sewage) water. Integration of recycled water use in the existing system will result in reduced raw water usage. An waste water recycling (Sewage Treatment Plant – STP) plant will treat the waste water to make it fit for safe disposal.

At present, raw water is used for toilet flushing, floor cleaning and watering the garden. If STP is established, the treated water can be used for floor cleaning and watering the garden. Also, it can be used in dual piping system for toilet flushing.

4.3.2. Low flow taps

Low flow taps perform better with less water usage when compared to regular taps. These taps compensate the water pressure and give defined water flow rate, therefore less water wastage & more savings on water bills. The advantages of low flow taps are as follows:

- Saves water with optimized flow rate
- Reduced water bill
- Different flow patterns (shower/Foam)
- Annual Savings up-to 10,000 litres/Year/tap

Features of Aerator for taps:

- The aerator is a small attachment that either fits onto the end of the tap or can be inserted inside of the existing spout. These water saving devices will control the amount of water that flows through the tap without affecting the water pressure as they mix the water with air which will save water and money.
- The aerators will separate a single flow of water into many tiny streams which introduces the air in to the water flow. Also, as there is less space for the water to flow through, the water flow is reduced, resulting in water savings.
- As the water pressure is maintained, most people don't notice a difference in the amount of water coming out of an aerated faucet yet benefit from the water efficiency
- Tap aerators are of most use to those with older taps which run on average around 15 litres of water per minute. Adding an aerator to an older tap can reduce this to as little as 6 litres of water per minute.

The biggest water saving benefit is achieved in the bathroom / hand wash / kitchen sinks where we are often turning the taps on and off to wash our hands and for other uses.

Adding an aerator to an older tap can reduce this to as little as 6 litres of water per minute. Sample images of aerated taps are shown in figure 4-11.

Figure 4-14: sample photo of tap with aerator

4.3.3. Regular Water Quality Testing:

Testing water quality on a regular basis is an important part of maintaining a safe and reliable source. The test result allows to properly addressing the specific problems of a water supply. This will help ensure that the water source is being properly protected from potential contamination, and that appropriate treatment is selected and operating properly.

It is important to test the suitability of water quality for its intended use, whether it be livestock watering, chemical spraying, or drinking water. This will assist in making informed decisions about your water and how you use it.

Regular testing is important to:

- Identify existing problems
- Ensure water is suitable for the intended use, especially if used for drinking by humans and animals
- Track changes over time
- Determine the effectiveness of a treatment system

4.3.4. Water conservation opportunities

- Conducting training and awareness programs for new joining students and staff on water conservation
- Conducting Seminars and Workshops for staff and students to create awareness
- Periodic checking of water distribution system

5. ENERGY AUDIT

5.1. Facility Description

Bishop Cotton Women's Christian College receives power supply from the state electricity board (BESCOM - Bangalore Electricity Supply Company) as HT supply. Bishop Cotton Women's Christian College has availed power supply, with connection – RR No. MSS2EH39984 with 1LT2B1 tariff structure.

Transformer

Incoming power supply from BESCOM is received at the transformer yard inside the college premises. The 11 kV rated HT power supply is stepped down to LT 433V, by one number of 250 kVA rated transformer. Transformer unit installed inside college premises is as shown in the figure 5-1.

Figure 5-1: Transformer yard

The name plate details of transformer are given in table 5-1.

S. No.	Description	Units	Details
1	Rated Capacity	kVA	250
2	Rated Voltage Prim/Sec	kV	11/0.433
3	Rated Current Prim/Sec	A	13.12/333.4
4	Type of Cooling	-	ONAN
5	Frequency	Hz	50
6	Impedance	-	4.5%

S. No.	Description	Units	Details
7	Phase	-	3

Table 5-1: Name plate details of transformer

The incoming power supply is received at metering panel. Then, it is distributed to the college. The incoming power supply is controlled using 100 A MCCB. In each floor, centralized control is provided using MCBs.

DG Set

One numbers of DG sets have been installed in the college premises. DG set (Diesel Generator set) is used as standby source of power supply, during power failure from BESCOM. The capacity of DG set is 1x100 kVA and is shown in figure 5-2.

Figure 5-2: Diesel Generator (DG) Set

UPS System:

UPS system is made available for the critical loads like computers, laboratories. A sample photo of the UPS room is shown in figure 5-3.

Figure 5-3: UPS in the college

Details of UPS available in the college is given in table 5-2

S. No.	Description	Capacity, kVA	Quantity
1	Online UPS	20	1
2	Online UPS	10	1

Table 5-2: UPS details

5.2. Institutional Initiatives for Conservation of Energy

5.2.1. Day light integration

During the audit phase classrooms, staff-rooms, computer lab, seminar hall, canteen dining area, and library areas were surveyed for illumination levels and fresh air-circulation.

It was observed most of the rooms are well ventilated and day-light integrated. Sample photos of daylight integrated and ventilated areas are shown in figure 5-4 and 5-5.

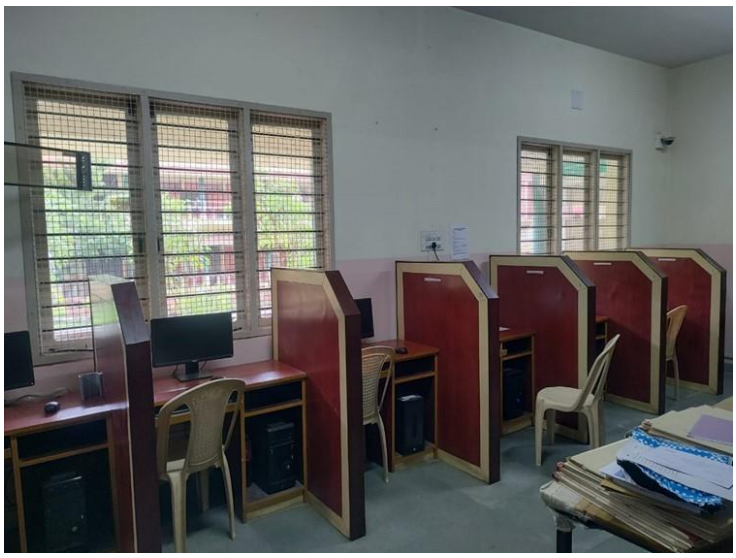


Figure 5-4: Well-ventilated and day-light in Library

Figure 5-5: Well-ventilated and day-light integrated sample photo of classroom

5.2.2. Usage of LED tube lights

In order to save the electricity various measures have been adopted in the college. Usage of energy saving LED fixtures are used within the campus at various locations. Sample photos of LED fixtures used in the class room and library is shown in figure 5-6.

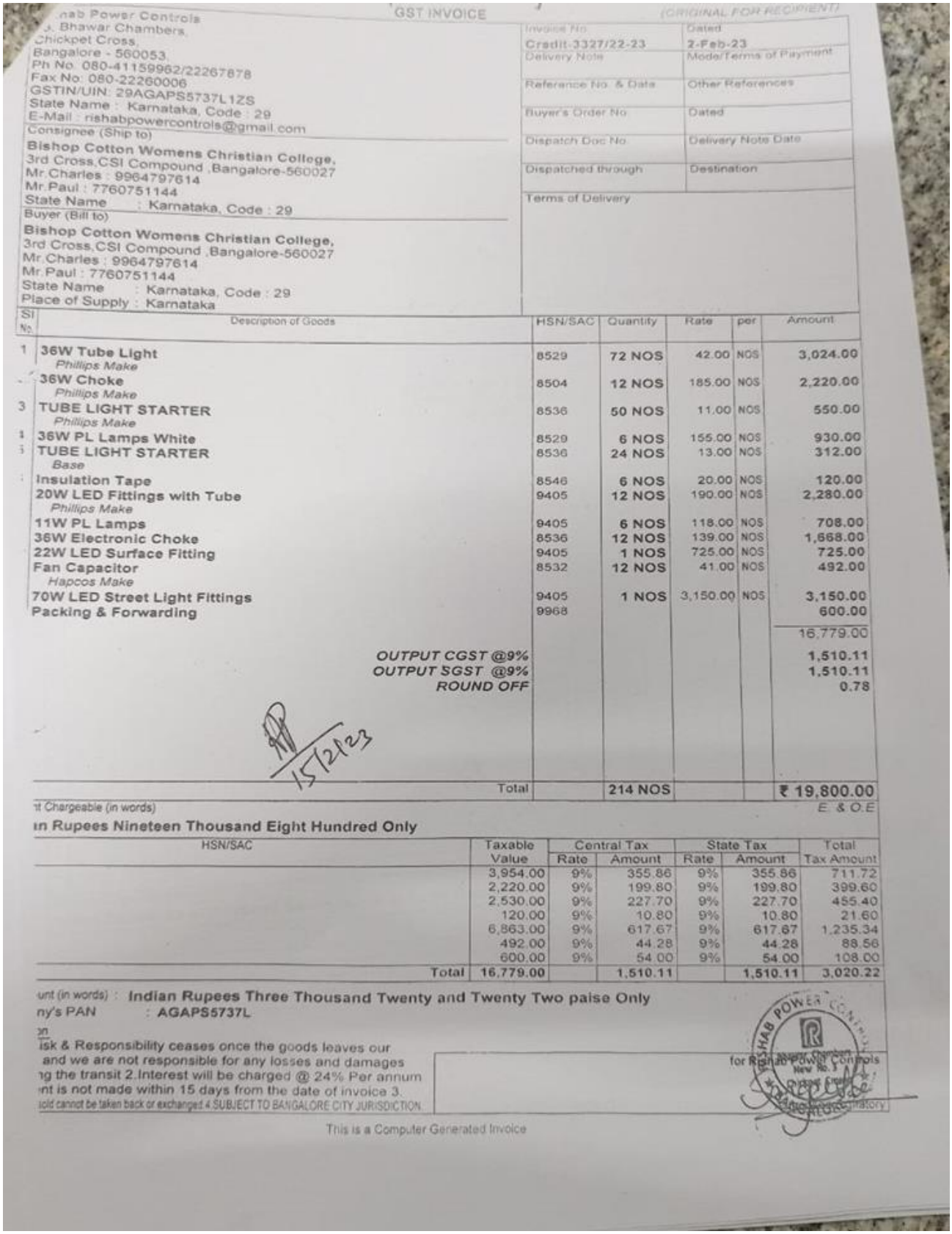
Figure 5-6: Use of LED tube lights

Energy savings due to LED fixtures:

The practice of using LED fixtures is incorporated in the campus to conserve energy. The LED helps to reduce the energy consumption and leads to cost saving. The calculations for annual cost savings due to the usage of LED fixtures and CO_2 mitigations per year are given below in table 5-3. Sample LED purchase bill is shown in figure 5.7.

S. No.	Description	Unit	Values	Values	Total
1	Rated Wattage of LED lamps installed	W	20	40	-
2	Quantity of LED lamps installed	Nos	128	232	-
3	Rated wattage of lamps used earlier	W	40	80	-
4	Savings per lamp by installation of LED lamps	W	20	40	-
5	Total savings	kW	2.56	9.28	-
6	Working hours per day	hours	4	4	-
7	No. of working days per year	days	200	200	-
8	Annual electricity savings	kWh	2048	7424	9472
9	Average electricity cost	Rs. /kWh	8	8	8
10	Annual cost savings achieved per year	Rs. lakh/year	0.16	0.59	0.75
11	CO_2 mitigations per year	Tons/year	1.62	5.86	7.48

Table 5-3: Cost savings achieved per year due to 20 and 40 W LED tube lights



...nab Power Controls
..., Bhawar Chambers,
Chickpet Cross,
Bangalore - 560053.
Ph No: 080-41159962/22267878
Fax No: 080-22260006
GSTIN/UIN: 29AGAPS5737L1ZS
State Name : Karnataka, Code : 29
E-Mail : rishabpowercontrols@gmail.com

GST INVOICE (ORIGINAL FOR RECIPIENT)

Invoice No.	Dated
Credit-3327/22-23	2-Feb-23
Delivery Note	Mode/Terms of Payment
Reference No. & Date	Other References
Buyer's Order No.	Dated
Dispatch Doc No.	Delivery Note Date
Dispatched through	Destination
Terms of Delivery	

Consignee (Ship to)
Bishop Cotton Womens Christian College,
3rd Cross,CSI Compound ,Bangalore-560027
Mr.Charles : 9964797614
Mr.Paul : 7760751144
State Name : Karnataka, Code : 29

Buyer (Bill to)
Bishop Cotton Womens Christian College,
3rd Cross,CSI Compound ,Bangalore-560027
Mr.Charles : 9964797614
Mr.Paul : 7760751144
State Name : Karnataka, Code : 29
Place of Supply : Karnataka

Sl No.	Description of Goods	HSN/SAC	Quantity	Rate	per	Amount
1	**36W Tube Light** *Phillips Make*	8529	72 NOS	42.00	NOS	3,024.00
2	**36W Choke** *Phillips Make*	8504	12 NOS	185.00	NOS	2,220.00
3	**TUBE LIGHT STARTER** *Phillips Make*	8536	50 NOS	11.00	NOS	550.00
4	**36W PL Lamps White**	8529	6 NOS	155.00	NOS	930.00
5	**TUBE LIGHT STARTER** *Base*	8536	24 NOS	13.00	NOS	312.00
	Insulation Tape	8546	6 NOS	20.00	NOS	120.00
	20W LED Fittings with Tube *Phillips Make*	9405	12 NOS	190.00	NOS	2,280.00
	11W PL Lamps	9405	6 NOS	118.00	NOS	708.00
	36W Electronic Choke	8536	12 NOS	139.00	NOS	1,668.00
	22W LED Surface Fitting	9405	1 NOS	725.00	NOS	725.00
	Fan Capacitor *Hapcos Make*	8532	12 NOS	41.00	NOS	492.00
	70W LED Street Light Fittings	9405	1 NOS	3,150.00	NOS	3,150.00
	Packing & Forwarding	9968				600.00
						16,779.00
	OUTPUT CGST @9%					1,510.11
	OUTPUT SGST @9%					1,510.11
	ROUND OFF					0.78
	Total		214 NOS			₹ 19,800.00

15/2/23

...t Chargeable (in words) E & O.E
...n Rupees Nineteen Thousand Eight Hundred Only

HSN/SAC	Taxable Value	Central Tax Rate	Central Tax Amount	State Tax Rate	State Tax Amount	Total Tax Amount
	3,954.00	9%	355.86	9%	355.86	711.72
	2,220.00	9%	199.80	9%	199.80	399.60
	2,530.00	9%	227.70	9%	227.70	455.40
	120.00	9%	10.80	9%	10.80	21.60
	6,863.00	9%	617.67	9%	617.67	1,235.34
	492.00	9%	44.28	9%	44.28	88.56
	600.00	9%	54.00	9%	54.00	108.00
Total	16,779.00		1,510.11		1,510.11	3,020.22

...unt (in words) : **Indian Rupees Three Thousand Twenty and Twenty Two paise Only**
...ny's PAN : **AGAPS5737L**
...n
...isk & Responsibility ceases once the goods leaves our ... and we are not responsible for any losses and damages ...ng the transit 2.Interest will be charged @ 24% Per annum ...nt is not made within 15 days from the date of invoice 3. ...old cannot be taken back or exchanged 4.SUBJECT TO BANGALORE CITY JURISDICTION.

for Rishab Power Controls

This is a Computer Generated Invoice

Figure 5-7: LED purchase bill

5.2.3. Usage of LED/LCD monitors:

LED/LCD monitors are used instead of all the desktop computers in staff rooms and in computer labs. Sample photos of the computers with LED/LCD monitors are as shown in the figure 5-8.

Figure 5-8: Sample Photo of LED monitors in the computer lab

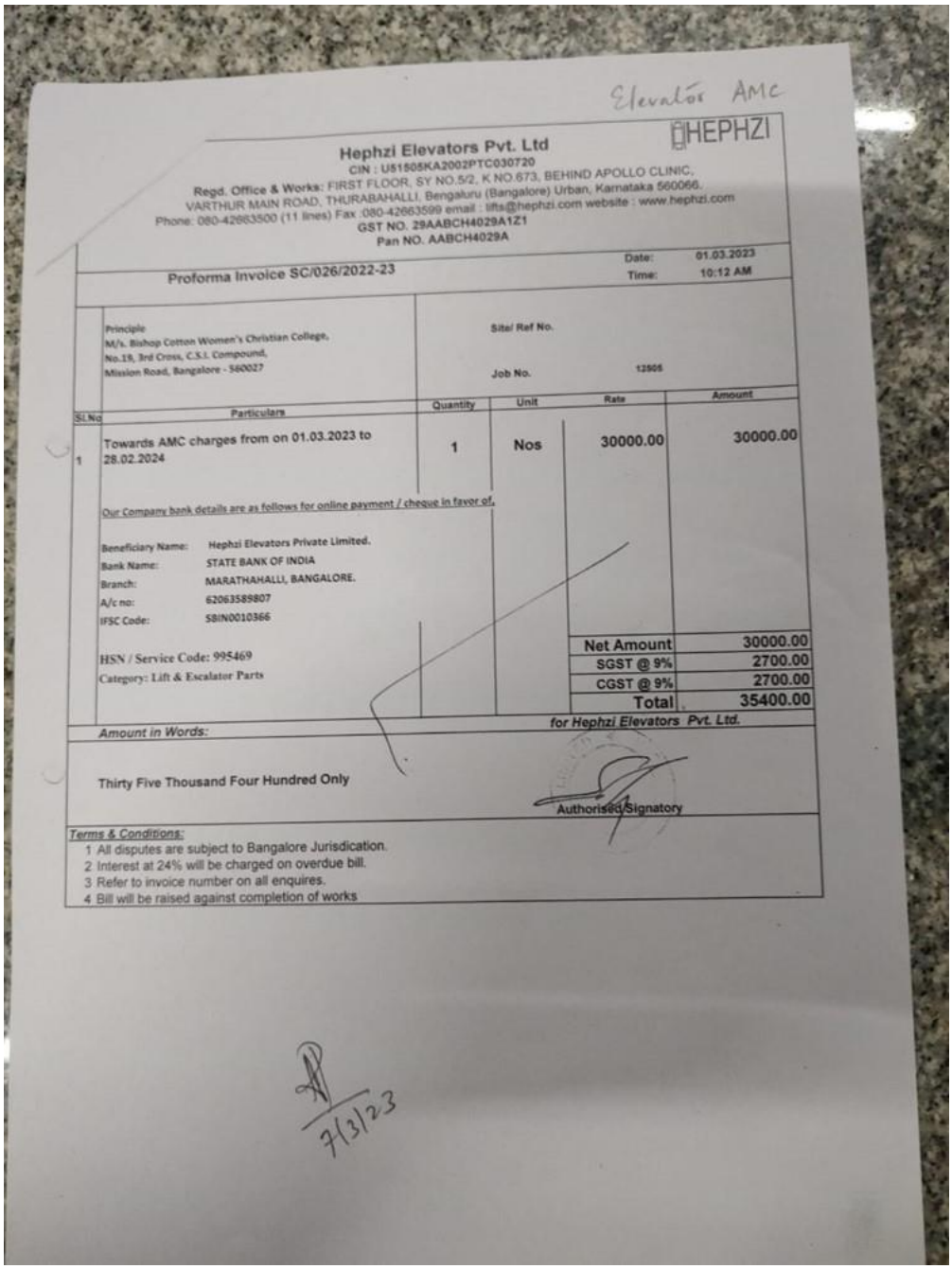
5.2.4. Fencing to avoid unauthorized entry

To restrict unauthorized entry, grill fencing is provided at transformer yard. For DG sets the DG room door is kept closed. The transformer yard and DG room area with grill protection is shown in figure 5-9.

Figure 5-9: Protection to avoid unauthorized entry

5.2.5. Automatic Rescue Device for Lifts

Automatic Rescue Device (ARD) is a device installed in elevator, which helps the elevators to land in the nearest floor and open the lift door during power failure. An ARD is extremely useful for preventing passengers from becoming trapped inside an Elevator during a power failure. ARD is installed for the lift in college premises. Sample image of AMC contract for the lifts are shown in figure 5-10.



Elevator AMC

HEPHZI

Hephzi Elevators Pvt. Ltd
CIN : U51505KA2002PTC030720
Regd. Office & Works: FIRST FLOOR, SY NO.5/2, K NO.673, BEHIND APOLLO CLINIC, VARTHUR MAIN ROAD, THURABAHALLI, Bengaluru (Bangalore) Urban, Karnataka 560066.
Phone: 080-42663500 (11 lines) Fax :080-42663599 email : lifts@hephzi.com website : www.hephzi.com
GST NO. 29AABCH4029A1Z1
Pan NO. AABCH4029A

Proforma Invoice SC/026/2022-23 Date: 01.03.2023 Time: 10:12 AM

Principle
M/s. Bishop Cotton Women's Christian College,
No.19, 3rd Cross, C.S.I. Compound,
Mission Road, Bangalore - 560027

Site/ Ref No.
Job No. 12505

Sl.No	Particulars	Quantity	Unit	Rate	Amount
1	Towards AMC charges from on 01.03.2023 to 28.02.2024	1	Nos	30000.00	30000.00

Our Company bank details are as follows for online payment / cheque in favor of,

Beneficiary Name: Hephzi Elevators Private Limited.
Bank Name: STATE BANK OF INDIA
Branch: MARATHAHALLI, BANGALORE.
A/c no: 62063589807
IFSC Code: SBIN0010366

HSN / Service Code: 995469
Category: Lift & Escalator Parts

Net Amount	30000.00
SGST @ 9%	2700.00
CGST @ 9%	2700.00
Total	35400.00

Amount in Words:
Thirty Five Thousand Four Hundred Only

for Hephzi Elevators Pvt. Ltd.
Authorised Signatory

Terms & Conditions:
1 All disputes are subject to Bangalore Jurisdication.
2 Interest at 24% will be charged on overdue bill.
3 Refer to invoice number on all enquires.
4 Bill will be raised against completion of works

7/3/23

Figure 5-10: AMC for lifts

5.3. Recommendations

5.3.1. Installation of Sensors based energy savings

When leaving a room occupants may forget to turn the lights off. This will end up in increase of energy consumption. In order to conserve the energy, sensor-based energy savings is recommended. Occupancy sensors activate lighting once an occupant is identified. Once the occupant has left, the sensors automatically turn the light off.

The benefit of occupancy sensors is their ability to reduce waste from lights left on in unoccupied space.

5.3.2. Installation of Solar Roof Top PV (SRTPV) system

At present grid power supply and stand-by DG set power supply are the sources of electricity for the college. Installation of SRTPV (Solar Roof Top Photo Voltaic) system will result in renewable energy generation inside the campus and also reduces the electricity bill.

Estimation of SRTPV installation for the campus is given in table 5-4.

S. No.	Description	Unit	Values
1	Rated Capacity of SRTPV system	kWp	100
2	Average units generated per day	kWh /day / kWp	3
3	No. of working days per annum	days	220
4	Annual energy generation from SRTPV	kWh / annum	66,000
5	Average energy cost	Rs./kWh	10.5
6	Annual cost savings due to installation of SRTPV	Rs. Lakh / annum	6.93
7	Investment cost for 100 kWp SRTPV system	Rs. Lakh	75
8	Simple payback period (7 / 6)	Years	10.8
9	CO2 Mitigations per year	Tons/year	56.1

Table 5-4: Estimation of proposed SRTPV system

5.3.3. Replacing existing Conventional Fans by Energy Efficient (EE) Fans:

The existing conventional fans can be replaced with energy efficient fans to reduce the energy consumption. The cost savings, investment cost and payback are given in the table 5-5.

S. No.	Description	Unit	Details
1	Rated Wattage of fan proposed	W	35
2	Quantity of fans lamps to be installed	Nos	40
3	Rated wattage of existing lamps used	W	65
4	Savings per lamp by installation of LED lamps	W	28
5	Total savings	kW	1.12
6	Working hours per day	hours	4
7	No. of working days per year	days	200
8	Annual electricity savings	kWh	896
9	Average electricity cost	Rs./kWh	8
10	Annual cost savings achieved per year	Rs. lakh/year	0.07
11	Investment cost	Rs. lakh/year	1.4
12	Simple Payback Period	Years	19.5
13	CO2 mitigations per year	Tons/year	0.76

Table 5-5: Calculations for replacement of Conventional Fans with EE Fans

5.3.4. Other Recommendations

- Log books, complaints register and maintenance register shall be maintained
- Conducting training and awareness programs on energy conservation

6. WASTE MANAGEMENT AUDIT

6.1. Facility Description

The study involved carrying out various analyses to realistically assess waste generation. There are different types of waste generated in the college and is tabulated in table 6-1.

S. No.	Description	Yes / No	Details
1	E-Waste	Yes	Vendors
2	Hazardous / Chemical Waste	No	NA
3	Solid Waste	Yes	NA
4	Dry Leaves	Yes	Vermicompost / BBMP
5	Food Waste	Yes	BBMP
6	Waste Water	Yes	BWSSB Drainage
7	Glass Waste	No	NA
8	Unused Materials	No	NA
10	Plastic Waste	Yes	BBMP

Table 6-1: Types of Waste Generated in the college

6.1.1. Dry Waste Management

Waste collection bins are placed in the campus for waste collection. Waste from each room (Staff, class rooms, office, restrooms, labs and library) is collected during the regular cleaning activity. The housekeeping staffs cleans and collect the wastes generated inside the campus and dispose it through the BBMP collection vehicle. Waste collection / dust bins are placed in all class rooms, staff rooms and common areas. The picture of waste collection bins is show in figure 6.1.

Figure 6-1: Dust collection bins

The waste collected in the dust bins are aggregated and stored in the main waste storage bin, for disposal to BBMP collection vehicle. The picture of waste storage bin is shown in figure 6.2.

Figure 6-2: Waste storage bins

The dry leaves are collected and treated in the vermicompost pit. The manure from the vermicompost pit is used for the plants in garden. The picture of vermicompost is shown in figure 6.3.

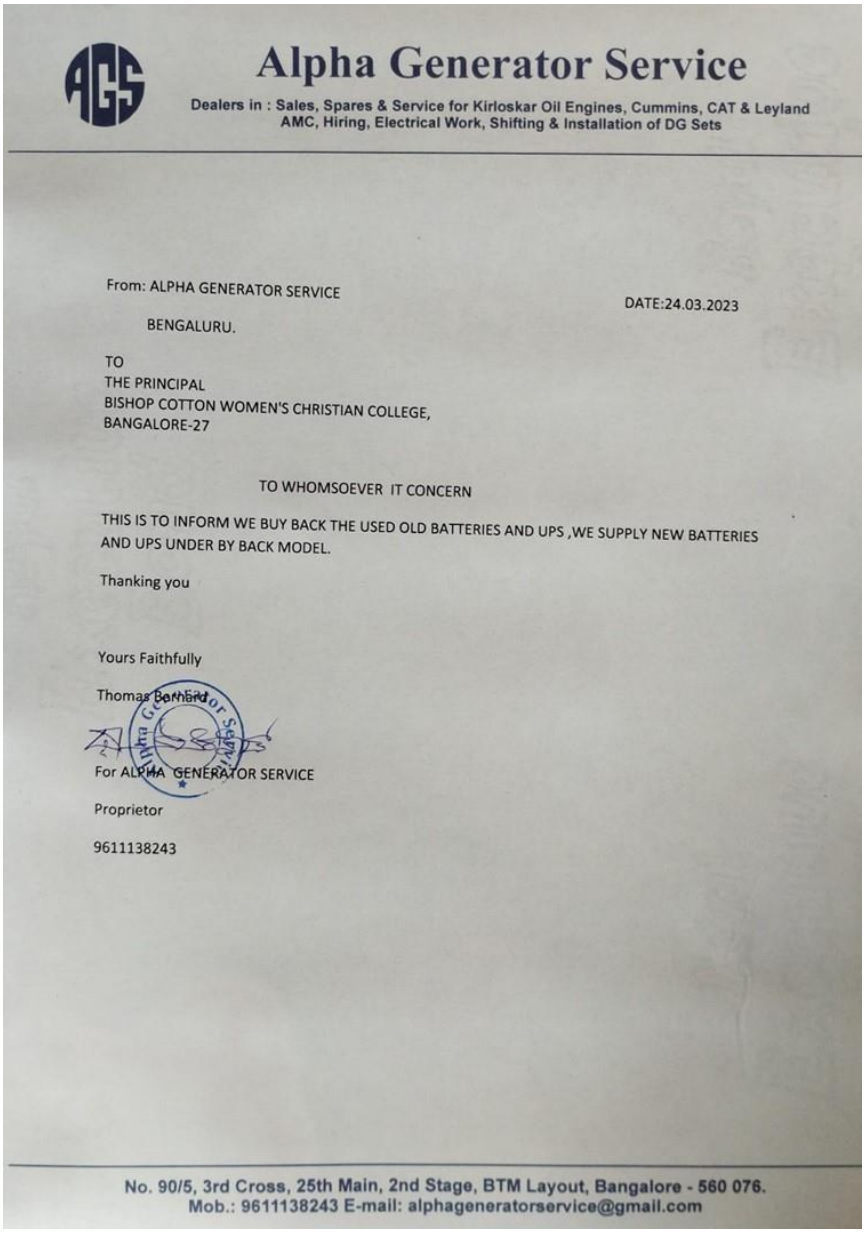
Figure 6-3: Vermicompost

6.1.2. Wet Waste Management

To manage the wet waste in the college (very less in quantity), which is produced from the, remains of the tiffin boxes brought by the students, teachers & non-teaching staff of the college, are collected and dispose through the BBMP collection vehicle.

6.1.3. E- Waste Management

Computer monitor, keyboard, mouse, CPU boxes, inverters and batteries are the E- waste generated in the college. This e-waste is disposed though the buyback model. The copy of MoU for E waste management is show in figure 6.4.



Alpha Generator Service

Dealers in : Sales, Spares & Service for Kirloskar Oil Engines, Cummins, CAT & Leyland
AMC, Hiring, Electrical Work, Shifting & Installation of DG Sets

From: ALPHA GENERATOR SERVICE
BENGALURU.

DATE:24.03.2023

TO
THE PRINCIPAL
BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE,
BANGALORE-27

TO WHOMSOEVER IT CONCERN

THIS IS TO INFORM WE BUY BACK THE USED OLD BATTERIES AND UPS ,WE SUPPLY NEW BATTERIES AND UPS UNDER BY BACK MODEL.

Thanking you

Yours Faithfully

Thomas Bernard

For ALPHA GENERATOR SERVICE

Proprietor

9611138243

No. 90/5, 3rd Cross, 25th Main, 2nd Stage, BTM Layout, Bangalore - 560 076.
Mob.: 9611138243 E-mail: alphageneratorservice@gmail.com

Figure 6-4: MoU for E-waste

6.1.4. Liquid Waste Management

The sources of waste water in the college campus are as follows

- Handwash
- Toilets
- Water purifier reject water

Waste water from the handwash, toilets, and water purifier reject water are connected to the waste water chamber, which is sent out to the BWSSB drainage.

6.1.5. Bio- Waste Management

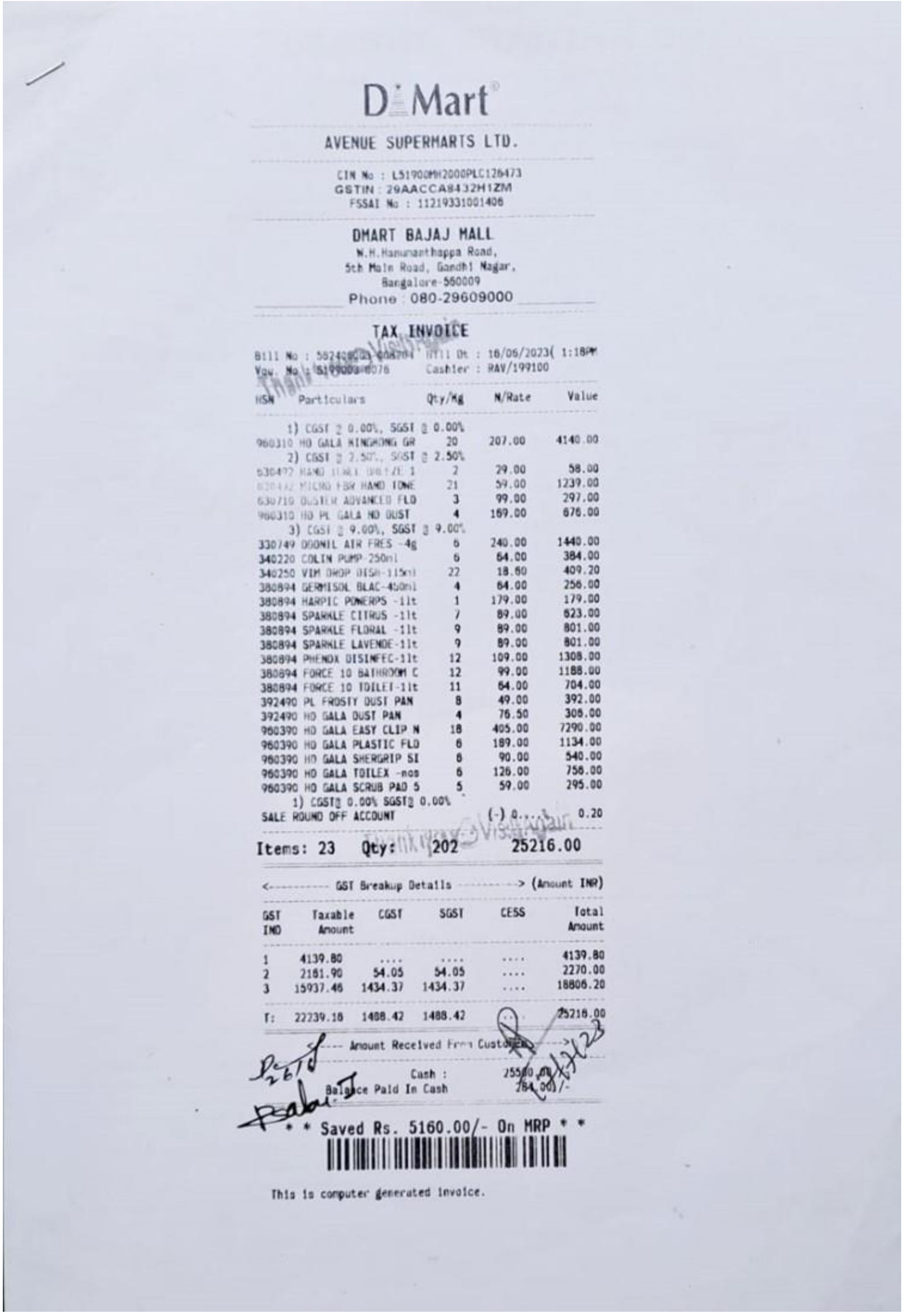
As part of maintaining hygienic environment for the girls, the management has provided the sanitary napkin dispenser and incinerator in all the girl's toilet. The pictures of the same are given in figure 6-5.

Figure 6-5: Napkin Dispenser and Incinerator for Bio – waste management

6.2. Institutional Initiatives for Waste management

6.2.1. Regular Cleaning of the campus

The college campus is cleaned regularly. Sample photos of the house keeping items purchase bills are shown in figure 6-6 and 6.7.



D Mart

AVENUE SUPERMARTS LTD.

CIN No : L51900MH2000PLC126473
GSTIN : 29AACCA8432H1ZM
FSSAI No : 11219331001406

DMART BAJAJ MALL
W.H.Hanumanthappa Road,
5th Main Road, Gandhi Nagar,
Bangalore-560009
Phone : 080-29609000

TAX INVOICE

Bill No : [illegible] Bill Dt : 16/06/2023(1:18PM
Vou. No : [illegible] Cashier : RAV/199100

HSN	Particulars	Qty/Kg	N/Rate	Value
	1) CGST @ 0.00%, SGST @ 0.00%			
960310	HD GALA KINGKONG GR	20	207.00	4140.00
	2) CGST @ 2.50%, SGST @ 2.50%			
630472	HAND [illegible] 1	2	29.00	58.00
[illegible]	MICRO FBR HAND TOWE	21	59.00	1239.00
630710	DUSTER ADVANCED FLD	3	99.00	297.00
960310	HD PL GALA NO DUST	4	169.00	676.00
	3) CGST @ 9.00%, SGST @ 9.00%			
330749	ODONIL AIR FRES -4g	6	240.00	1440.00
340220	COLIN PUMP-250ml	6	64.00	384.00
340250	VIM DROP DISH-115ml	22	18.60	409.20
380894	GERMISOL BLAC-450ml	4	64.00	256.00
380894	HARPIC POWERPS -1lt	1	179.00	179.00
380894	SPARKLE CITRUS -1lt	7	89.00	623.00
380894	SPARKLE FLORAL -1lt	9	89.00	801.00
380894	SPARKLE LAVENDE-1lt	9	89.00	801.00
380894	PHENOX DISINFEC-1lt	12	109.00	1308.00
380894	FORCE 10 BATHROOM C	12	99.00	1188.00
380894	FORCE 10 TOILET-1lt	11	64.00	704.00
392490	PL FROSTY DUST PAN	8	49.00	392.00
392490	HD GALA DUST PAN	4	76.50	306.00
960390	HD GALA EASY CLIP N	18	405.00	7290.00
960390	HD GALA PLASTIC FLD	6	189.00	1134.00
960390	HD GALA SHERGRIP SI	6	90.00	540.00
960390	HD GALA TOILEX -nos	6	126.00	756.00
960390	HD GALA SCRUB PAD 5	5	59.00	295.00
	1) CGST@ 0.00% SGST@ 0.00%			
	SALE ROUND OFF ACCOUNT		(-) 0...	0.20

Items: 23 Qty: 202 25216.00

<------ GST Breakup Details ------> (Amount INR)

GST IND	Taxable Amount	CGST	SGST	CESS	Total Amount
1	4139.80	....	....	....	4139.80
2	2161.90	54.05	54.05	....	2270.00
3	15937.46	1434.37	1434.37	....	18806.20
T:	22239.16	1488.42	1488.42		25216.00

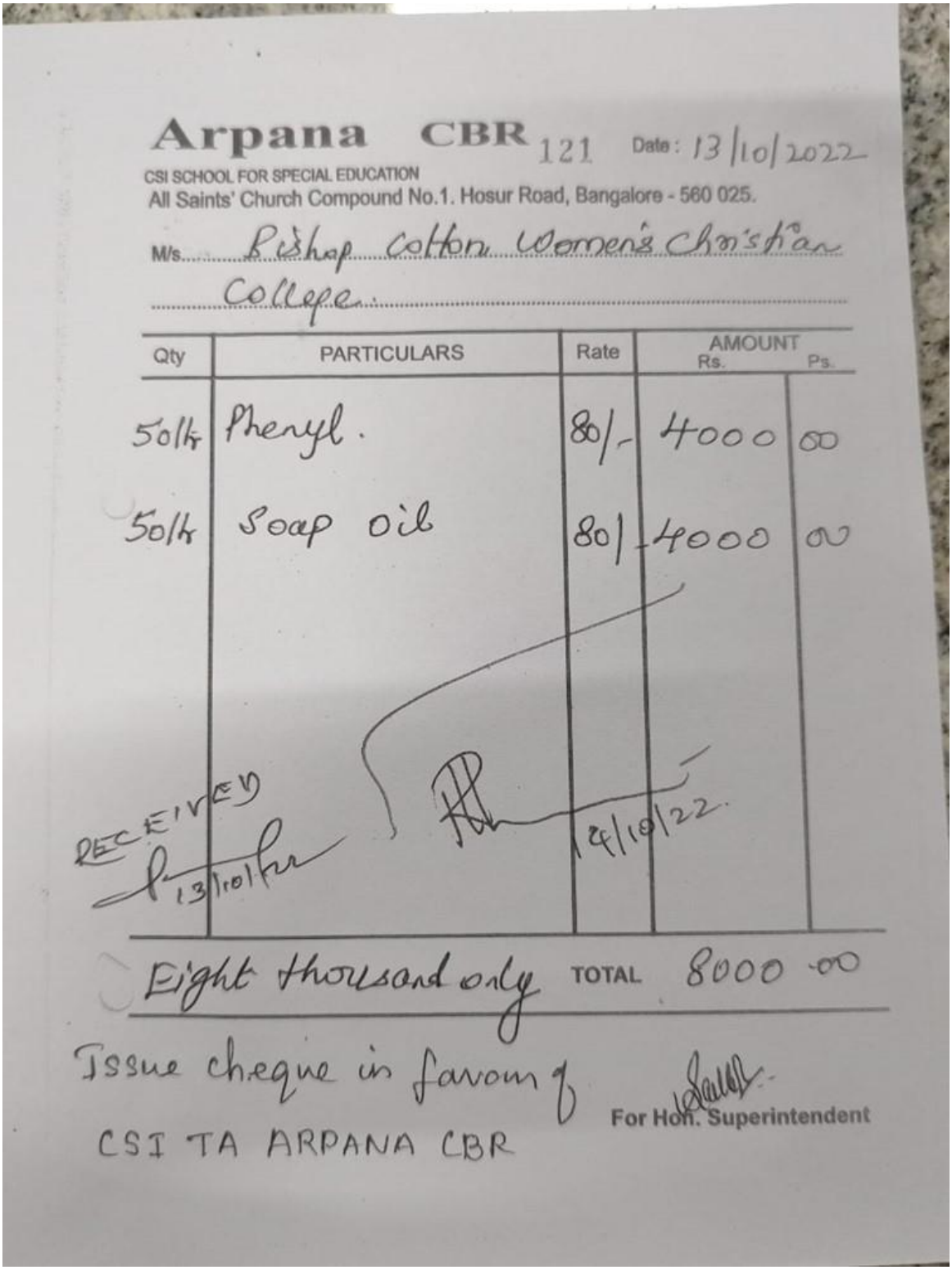
<---- Amount Received From Customer ---->

Cash : 25500.00
Balance Paid In Cash 284.00/-

* * Saved Rs. 5160.00/- On MRP * *

This is computer generated invoice.

Figure 6-6: House keeping items purchase bill



Arpana CBR 121 Date: 13/10/2022

CSI SCHOOL FOR SPECIAL EDUCATION
All Saints' Church Compound No.1. Hosur Road, Bangalore - 560 025.

M/s. Bishop cotton Women's Christian College.

Qty	PARTICULARS	Rate	AMOUNT Rs.	Ps.
50lt	Pheryl.	80/-	4000	00
50lt	Soap oil	80/-	4000	00

RECEIVED 13/10/22

14/10/22.

Eight thousand only TOTAL 8000 -00

Issue cheque in favour of CSI TA ARPANA CBR

For Hon. Superintendent

Figure 6-7: House keeping items purchase bill

6.3. Recommendations

6.3.1. Conducting waste management (collection) drives & awareness programs

Keeping the environment clean is not a one-man job, it is the responsibility of every person inside the society/campus. Hence, it is necessary to create awareness programs and waste management drives often and often for the institutions to keep the environment clean, green and hygiene.

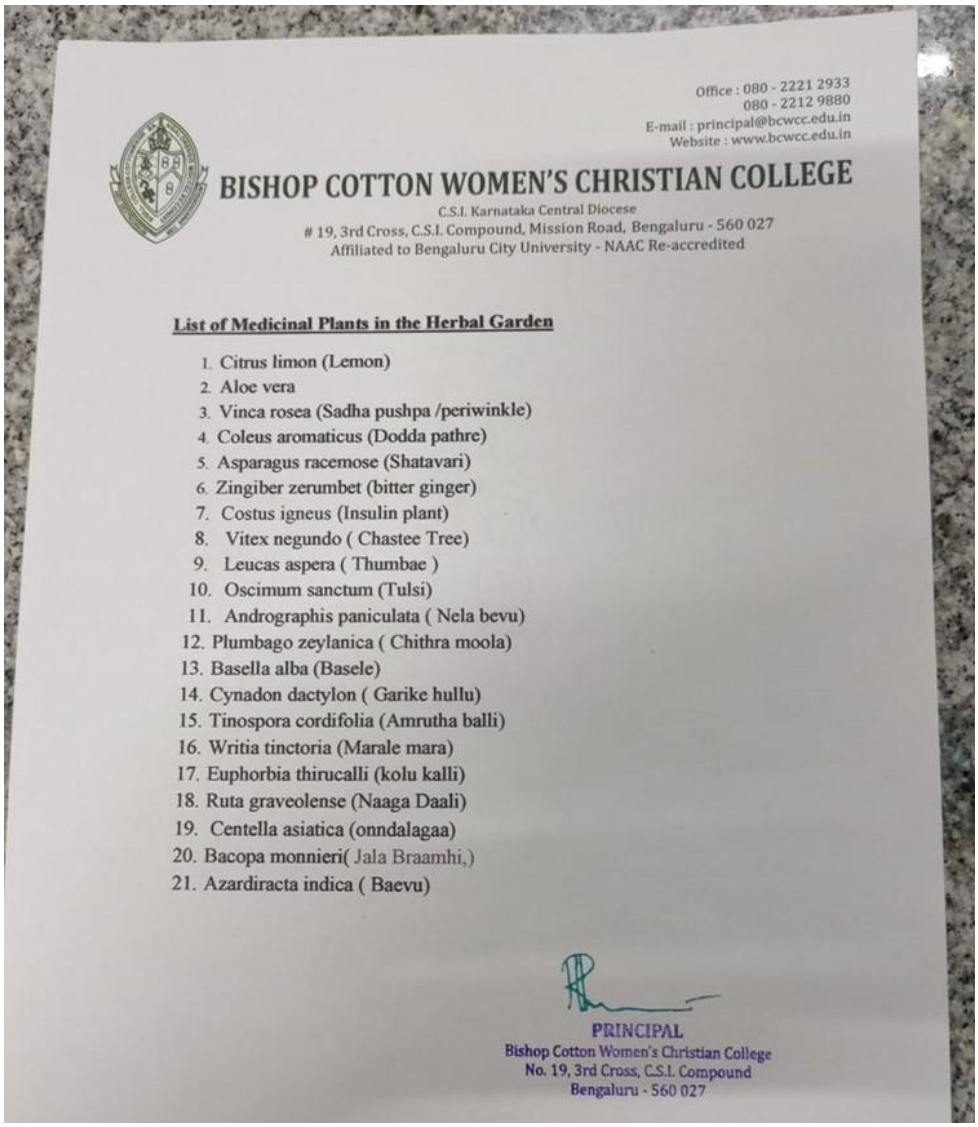
7. GREEN CAMPUS MANAGEMENT AUDIT

7.1. Facility Description

The college maintains clean and green plantations within the college premises. The maintenance team takes care of the environment and ensures to keep the surroundings clean. They maintain all the plantations by employing the cleanliness and watering regularly. The rain water stored in sumps are used for watering the plants. About 90+ species of plantations were maintained inside the college premises.

7.1.1. Plantations and Lawn

The list of medicinal plants in the herbal garden is given in the figure 7-1.



Office : 080 - 2221 2933
080 - 2212 9880
E-mail : principal@bcwcc.edu.in
Website : www.bcwcc.edu.in

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE
C.S.I. Karnataka Central Diocese
19, 3rd Cross, C.S.I. Compound, Mission Road, Bengaluru - 560 027
Affiliated to Bengaluru City University - NAAC Re-accredited

List of Medicinal Plants in the Herbal Garden

1. Citrus limon (Lemon)
2. Aloe vera
3. Vinca rosea (Sadha pushpa /periwinkle)
4. Coleus aromaticus (Dodda pathre)
5. Asparagus racemose (Shatavari)
6. Zingiber zerumbet (bitter ginger)
7. Costus igneus (Insulin plant)
8. Vitex negundo (Chastee Tree)
9. Leucas aspera (Thumbae)
10. Oscimum sanctum (Tulsi)
11. Andrographis paniculata (Nela bevu)
12. Plumbago zeylanica (Chithra moola)
13. Basella alba (Basele)
14. Cynadon dactylon (Garike hullu)
15. Tinospora cordifolia (Amrutha balli)
16. Writia tinctoria (Marale mara)
17. Euphorbia thirucalli (kolu kalli)
18. Ruta graveolense (Naaga Daali)
19. Centella asiatica (onndalagaa)
20. Bacopa monnieri(Jala Braamhi,)
21. Azardiracta indica (Baevu)

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 7-1: List of medicinal plants in herbal garden

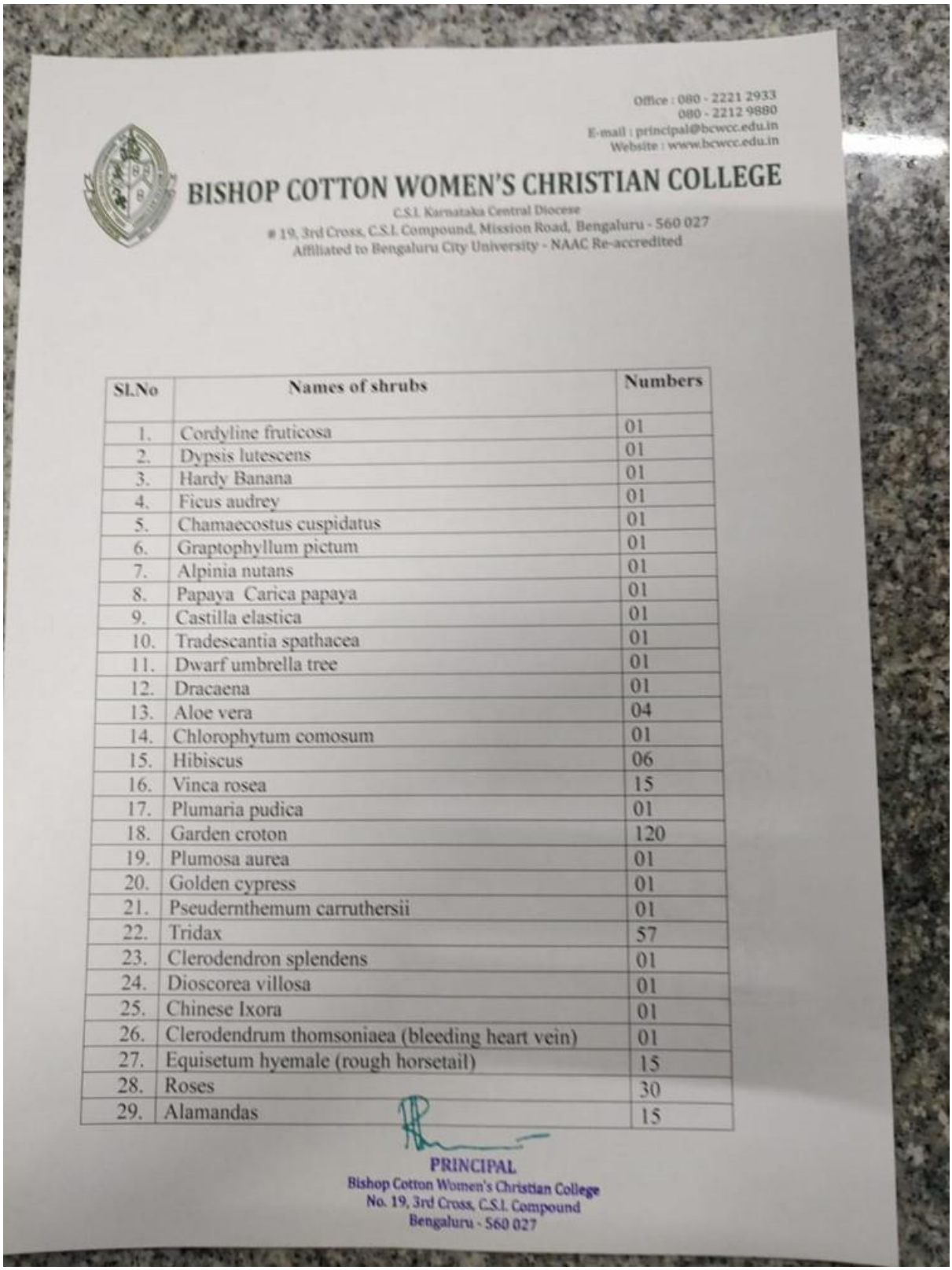
Sample photos of the greenery and plantations of the campus are shown in the figure 7-2.

Figure 7-2: Sample photos of plantations

Figure 7-3: Sample photos of landscaping

Figure 7-4: Sample photos of Herbal Plants

The list of shrubs in the college is given in the figure 7-5.



Office : 080 - 2221 2933
080 - 2212 9880
E-mail : principal@bcwcc.edu.in
Website : www.bcwcc.edu.in

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE

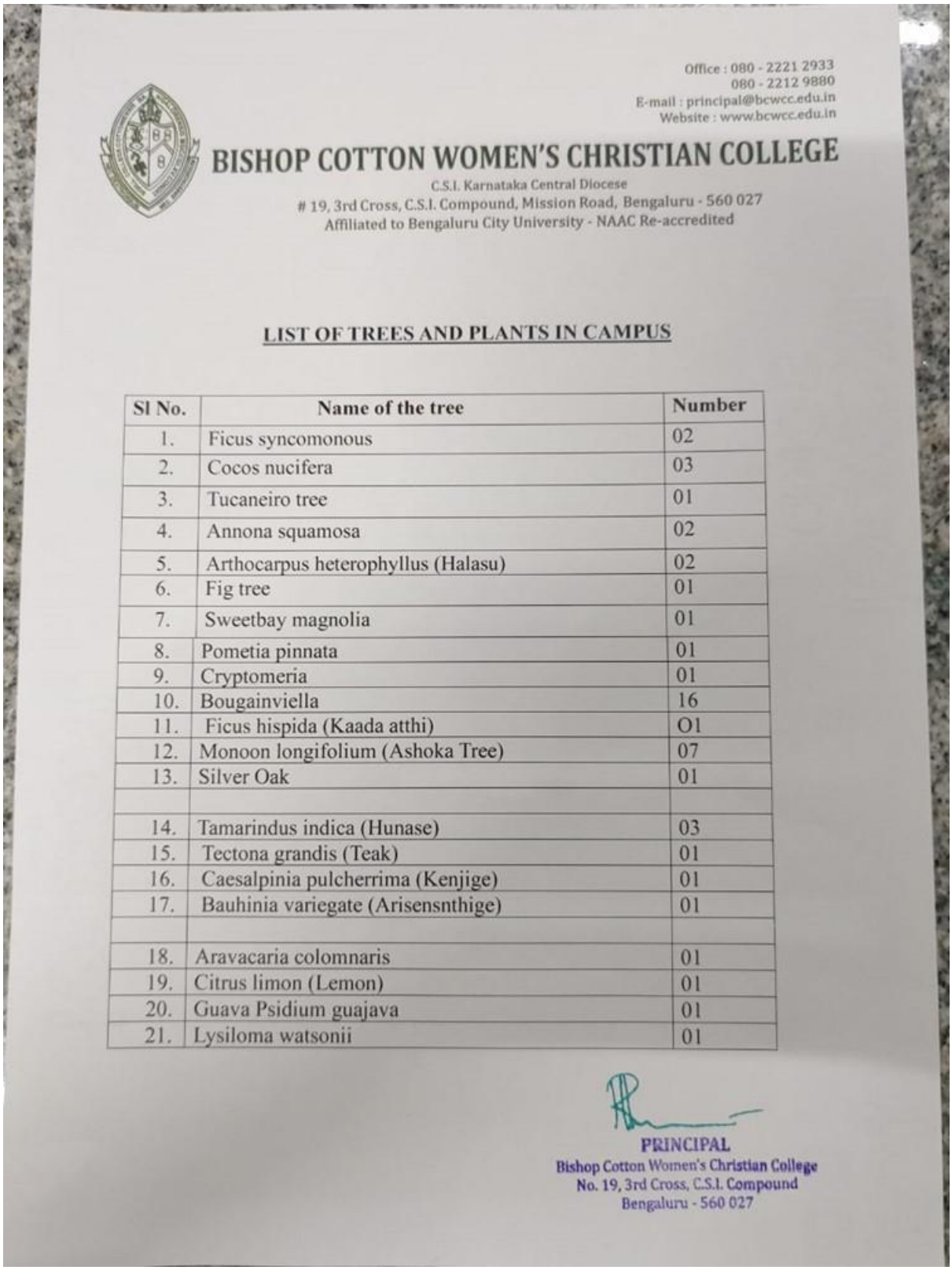
C.S.I. Karnataka Central Diocese
19, 3rd Cross, C.S.I. Compound, Mission Road, Bengaluru - 560 027
Affiliated to Bengaluru City University - NAAC Re-accredited

Sl.No	Names of shrubs	Numbers
1.	Cordyline fruticosa	01
2.	Dypsis lutescens	01
3.	Hardy Banana	01
4.	Ficus audrey	01
5.	Chamaecostus cuspidatus	01
6.	Graptophyllum pictum	01
7.	Alpinia nutans	01
8.	Papaya Carica papaya	01
9.	Castilla elastica	01
10.	Tradescantia spathacea	01
11.	Dwarf umbrella tree	01
12.	Dracaena	01
13.	Aloe vera	04
14.	Chlorophytum comosum	01
15.	Hibiscus	06
16.	Vinca rosea	15
17.	Plumaria pudica	01
18.	Garden croton	120
19.	Plumosa aurea	01
20.	Golden cypress	01
21.	Pseudernthemum carruthersii	01
22.	Tridax	57
23.	Clerodendron splendens	01
24.	Dioscorea villosa	01
25.	Chinese Ixora	01
26.	Clerodendrum thomsoniaea (bleeding heart vein)	01
27.	Equisetum hyemale (rough horsetail)	15
28.	Roses	30
29.	Alamandas	15

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 7-5: List of shrubs

The list of trees in the college is given in the figure 7-6.



Office : 080 - 2221 2933
080 - 2212 9880
E-mail : principal@bcwcc.edu.in
Website : www.bcwcc.edu.in

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE

C.S.I. Karnataka Central Diocese
19, 3rd Cross, C.S.I. Compound, Mission Road, Bengaluru - 560 027
Affiliated to Bengaluru City University - NAAC Re-accredited

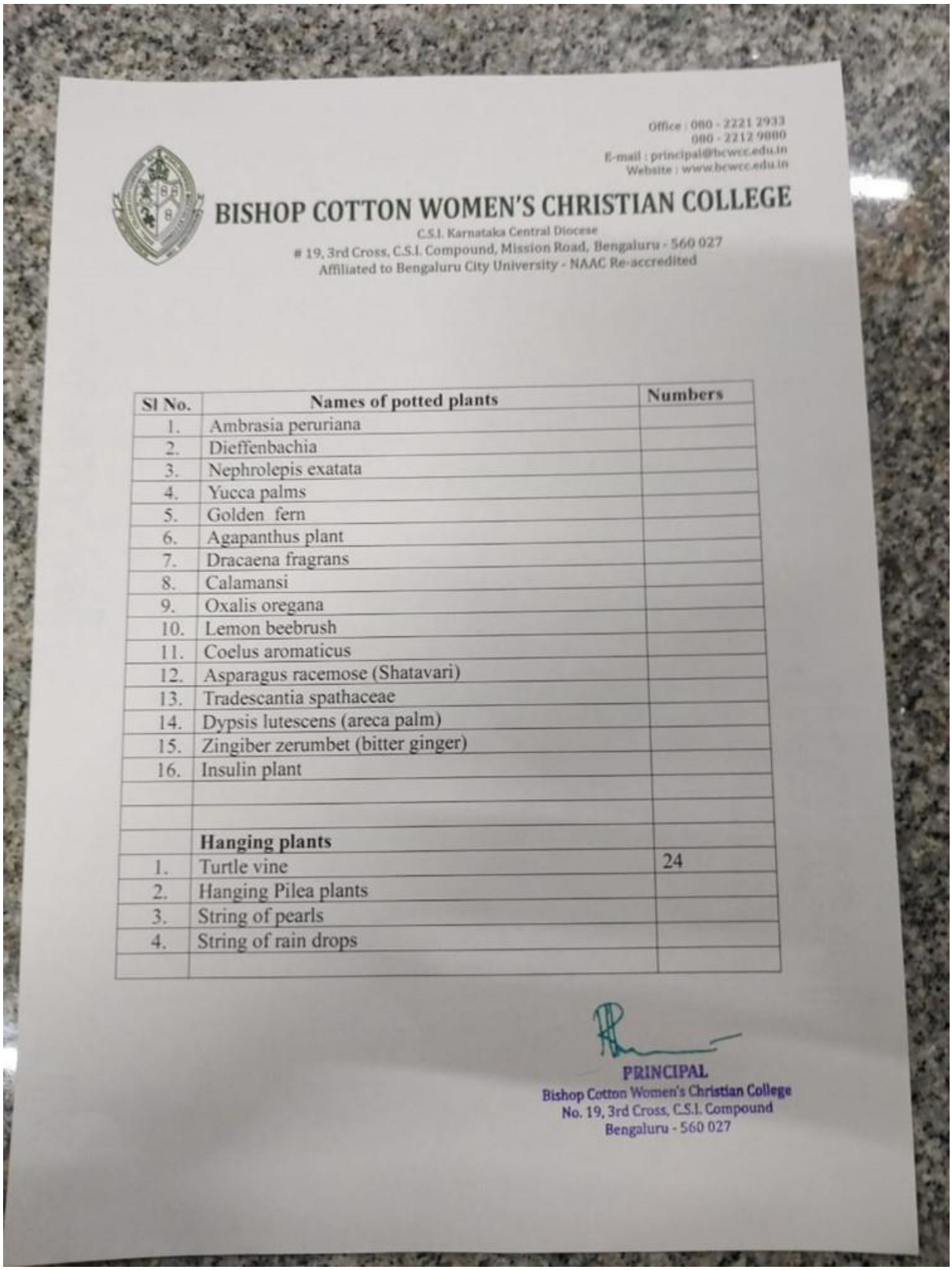
LIST OF TREES AND PLANTS IN CAMPUS

Sl No.	Name of the tree	Number
1.	Ficus syncomonous	02
2.	Cocos nucifera	03
3.	Tucaneiro tree	01
4.	Annona squamosa	02
5.	Arthocarpus heterophyllus (Halasu)	02
6.	Fig tree	01
7.	Sweetbay magnolia	01
8.	Pometia pinnata	01
9.	Cryptomeria	01
10.	Bougainviella	16
11.	Ficus hispida (Kaada atthi)	O1
12.	Monoon longifolium (Ashoka Tree)	07
13.	Silver Oak	01
14.	Tamarindus indica (Hunase)	03
15.	Tectona grandis (Teak)	01
16.	Caesalpinia pulcherrima (Kenjige)	01
17.	Bauhinia variegate (Arisensnthige)	01
18.	Aravacaria colomnaris	01
19.	Citrus limon (Lemon)	01
20.	Guava Psidium guajava	01
21.	Lysiloma watsonii	01

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 7-6: List of trees

The list of potted plants in the college is given in the figure 7-7.



Office : 080 - 2221 2933
080 - 2212 9880
E-mail : principal@bcwcc.edu.in
Website : www.bcwcc.edu.in

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE

C.S.I. Karnataka Central Diocese
19, 3rd Cross, C.S.I. Compound, Mission Road, Bengaluru - 560 027
Affiliated to Bengaluru City University - NAAC Re-accredited

Sl No.	Names of potted plants	Numbers
1.	Ambrasia peruriana	
2.	Dieffenbachia	
3.	Nephrolepis exatata	
4.	Yucca palms	
5.	Golden fern	
6.	Agapanthus plant	
7.	Dracaena fragrans	
8.	Calamansi	
9.	Oxalis oregana	
10.	Lemon beebrush	
11.	Coelus aromaticus	
12.	Asparagus racemose (Shatavari)	
13.	Tradescantia spathaceae	
14.	Dypsis lutescens (areca palm)	
15.	Zingiber zerumbet (bitter ginger)	
16.	Insulin plant	
	Hanging plants	
1.	Turtle vine	24
2.	Hanging Pilea plants	
3.	String of pearls	
4.	String of rain drops	

PRINCIPAL
Bishop Cotton Women's Christian College
No. 19, 3rd Cross, C.S.I. Compound
Bengaluru - 560 027

Figure 7-7: List of potted plants

7.2. Institutional Initiatives for Green Campus Management

7.2.1. Regular maintenance of greeneries

The greeneries within the campus are maintained properly with dedicated garden maintenance staff. They proper maintenance like weeding, lawn care and watering etc.,

The maintenance team do periodic checks and maintain the plantations. Many initiatives are taken by the management to inculcate the eco-friendly culture among the student community. The green campus provides the facilities such as rain water harvesting and well grown plantations all around the campus.

7.3. Recommendations

- Encouraging students to recommend creative ideas for making campus more greenery.
- Awareness programs and trainings for the new joining students.
- Conducting Seminars and Workshops regularly to make the campus green.
- Conducting competition among departments to promote student's ideas in sustainability initiatives

8. ENVIRONMENT AUDIT (CARBON FOOTPRINT ANALYSIS)

8.1. Facility Description

The carbon footprint is "the total amount of greenhouse gas (GHG) emissions caused by an organization, event or product". Global warming and climate change are the foremost environmental challenges facing the world today. It is our responsibility to minimize the consumption of energy and hence reduce the emissions of greenhouse gases.

To analysis the carbon footprint, transportation details of students and staff are collected as below:

1. Whether college provides transport facility for staff and students (Yes/No)? No
2. Number (or Percentage) of Staff using public transport: 35
3. Number (or Percentage) of Staff using Bike and car: 60
4. Number (or Percentage) of Staff coming by walk: 5
5. Number (or Percentage) of students using public transport: 60
6. Number (or Percentage) of students using Bike: 35
7. Number (or Percentage) of students using Electric vehicle and Bicycles: 5

8.2. Institutional Initiatives for Environment Conservation

Management has taken steps to create awareness among students and staff regarding environment conservation.

8.2.1. Use of Electric vehicle

Some of the students are coming to college by Electric bikes. During audit pictures has been taken and shown in the figure 8-1 and figure 8-2.

Figure 8-1: Electric bikes

8.2.2. Usage of LED tube lights

In order to save the electricity various measures have been adopted in the college. Usage of energy saving LED fixtures are used within the campus at various locations. Sample photos of LED fixtures used in the class room and library is shown in figure 8.2.

Figure 8-2: Use of LED tube lights

Energy savings due to LED fixtures:

The practice of using LED fixtures is incorporated in the campus to conserve energy. The LED helps to reduce the energy consumption and leads to cost saving. The calculations for annual cost savings due to the usage of LED fixtures and CO_2 mitigations per year are given below in table 8-1.

S. No.	Description	Unit	Values	Values	Total
1	Rated Wattage of LED lamps installed	W	20	40	-
2	Quantity of LED lamps installed	Nos	128	232	-
3	Rated wattage of lamps used earlier	W	40	80	-
4	Savings per lamp by installation of LED lamps	W	20	40	-
5	Total savings	kW	2.56	9.28	-
6	Working hours per day	hours	4	4	-
7	No. of working days per year	days	200	200	-
8	Annual electricity savings	kWh	2048	7424	9472
9	Average electricity cost	Rs. /kWh	8	8	8
10	Annual cost savings achieved per year	Rs. lakh/year	0.16	0.59	0.75
11	CO_2 mitigations per year	Tons/year	1.62	5.86	7.48

Table 8-1: Cost savings achieved per year due to 18 W LED tube lights

8.2.3. Rain water harvesting pits

Rainwater harvesting is the simple process or technology used to conserve rainwater by collecting, conveying, purifying and storing of rainwater for later use.

The benefits of rainwater harvesting system are listed below.

- Helps in reducing the water bill.
- Decreases the demand for water.
- Reduces the need of bore well water
- Promotes both water and energy conservation
- Improves the quality and quantity of groundwater
- It is an excellent source of water for landscape irrigation
- The rain water from terrace is brought to ground level using a dedicated pipeline.

The rain water is let in to the rain water storage tanks. There are two numbers of rain water harvesting filters and three numbers of rain water storage tanks. The rain water harvesting system is shown in figure 8-3.

Figure 8-3: Rain water harvesting system

8.2.4. Other Environment conservation practices implemented

- Regular plantation of saplings is done to maintain greenery and to induce carbon neutrality.
- Paper cups and eco-friendly products are used in college canteen to minimize the use of plastic made products.
- Awareness campaigns on plastic ban
- Use of LED tube lights, lamps for lighting system
- Use of LED/LCD monitors for the computers to reduce energy consumption
- All the classrooms are day light integrated.

8.3. Recommendations

During the study, there was continuous interaction between the audit team and staff members to ensure that the suggestions made are realistic, practical and implementable.

- Recommend students and staff to use public transport system
- Recommend students and staff to use bicycle
- Recommend staff and students to use electric vehicles
- To replace Conventional Fans and EE Fans
- Usage of Aerators for all the taps to reduce water consumption

9. ANNEXURES

9.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

9.1.1. General information of the college:

General information of the college needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Internal Quality Audit Team: 2020 – 2021

Table 9-1 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 9-1: Internal Quality Audit team

2. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 9-2.

S. No.	Description	Details	
1.	Name of the College and address:		
1.a	Head office address :		
2.	Telephone/Fax No		
3.	Co-ordinating officer:	Name:	
		Mob:	
		Email:	
4.	Year of Establishment:		
5.	Hostel (Available/Not Available)		
6.	No. of Working days/year		

S. No.	Description	Details
7.	Brief description of Campus	

Table 9-2: General information of the college

3. College Infrastructure

Infrastructure details of the college were gathered from table 9-3.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 9-3: Detail Infrastructure of the college

4. Details of Student clubs
5. Details of cells that support students
6. Tentative Schedule of a working day:
   a. No. of working days per year:
   b. List of holidays:
7. Total area of the campus
8. Details of List of Departments and Courses (Faculty wise)

The total number of departments, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 9-4

S. No.	Description	Details
1	Department	

2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 9-4: Details of the departments

9. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 9-5

S. No.	Teaching Staff		Non-teaching Staff		Support Staff (Security, House Keeping)	
	Male	Female	Male	Female	Male	Female

Table 9-5: Details of the Staff

10. Number of Students

Number of students is collected from table 9-6.

S. No.	Boys	Girls
1		

Table 9-6: Details of the Students

11. Additional infrastructure details have been collected from table 9-7.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	

6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	
12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 9-7: Details of the departments

9.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 9-8.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	

S. No.	Description	Details
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	
26	Number of units and amount of water harvested	
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 9-8: Water management details

2. STP information

STP details are collected from table 9-9

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 9-9: Details of STP

3. RO Plant information

RO Plant details are obtained from table 9-10

S. No.	Location	Quantity	Capacity
1.			
2.			
3.			

Table 9-10: Details of RO Plant

9.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 9-11.

S. No.	Type	Units		Value	Cost in Rs.
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			

4	Others resources (Please specify)		
5	Total connected load	kW	
6	Contract demand	kVA	
7	Maximum demand recorded	kVA	
8	Average power factor		
9	Energy charges	Rs./kWh	
10	Demand charges	Rs./kVA	
	*** Attach Electricity Bill Copy of last 2 years**		

Table 9-11: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 9-12.

S. No.	**Building No./ Name**	**Solar water Heater**			**Solar PV System**		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 9-12: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 9-13.

S. No.	**Description**	**Details**	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	

S. No.	Description	Details	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is Yes)	Nos.	
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in college buildings.		

Table 9-13: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

9.1.4. Waste management details:

C. Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 9-14.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 9-14: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 9-15.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 9-15: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 9-16.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	College				

Table 9-16: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 9-17

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 9-17: Waste Disposal methods

9.1.5. Green campus management details:

1. Total number of plants and trees

D. The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 9-18

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the college –	
5	Total number of medicinal plants /trees on the campus	
6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	
8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	

10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 9-18: List of plantation details

2. List of plants/ trees

E. List of plants/ trees with their scientific names obtained from table 9-19.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 9-19: List of plants/trees in campus

9.1.6. Carbon footprint management details:

F. The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 9-20.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 9-20: Details of Carbon footprint management

9.1.7. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 9-21.

S. No	Description	Details
1	Photos of student's NSS activities	
2	Photos of Safety policy	
3	Photos of the training program on the use of fire extinguishers	
4	Photos of environmental policies adopted by college	
5	Photos of MoUs for Waste management	

6	Photos of any other policies adopted by college		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 9-21: List of photos