

**Shri Ramdeobaba College of Engineering and  
Management (RCOEM), Nagpur**

**Environment Audit Report (2022-23)**



**CONDUCTED BY :**

**SHREYAS QUALITY MANAGEMENT SYSTEM,**

**11, Tulsivihar, Abhyankarnagar, Nagpur-440010 (MS)**

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# Certificate



## Shreyas Quality Management System

(QCI, GOI Approved IQMS, Business Improvement, & Lean Consultancy and ISO 9001 QMS,  
ISO 14001 EMS, ISO 45001 OHSMS & ISO 50001 EnMS Certified Organization)

### ENVIRONMENT AUDIT CERTIFICATE

This Certificate has been awarded to

### Shri Ramdeobaba College of Engineering and Management

Ramdeo Tekdi, Katol Road, Gittikhadan,  
Nagpur-4410013, Maharashtra

in recognition of the organization efforts towards environment  
conservation and sustainable development.

SQMS/CERT/EA/22-23/II/02  
SQMS Certificate No.

10.03.2023  
Expiry Date



11.03.2022  
Date of Issue

-  
Date of Re-Issue

**Dr. R. R. Lakhe(Director)**  
Shreyas Quality Management System

Note: Certificate validity is based on organization compliance on green audit recommendation and continual maintenance of the system and conduction of regular audit.

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## AKNOWLEDGMENT

Green Audit Assessment Team thanks **Shri Ramdeobaba College of Engineering and Management (RCOEM), Nagpur** for assigning this important work of Environmental Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to Principal – Dr. Rajesh Pande & Team members for giving us necessary inputs to carry out this very vital exercise of Environment Audit.

We are also thankful to Department Heads and other staff members who were actively involved while collecting the data and conducting field measurements.



Dr. R. R. Lakhe Director

Shreyas Quality Management System, Nagpur.



## DISCLAIMER

Environment Audit Team has prepared this report for **Shri Ramdeobaba College of Engineering and Management (RCOEM), Nagpur** based on input data submitted by the representatives of College complemented with the best judgment capacity of the expert team. The audit was conducted on the sample basis by visiting the college and interacting with the various stakeholders. Audit was conducted by interviewing the concerned persons, observing on-site implementation and verifying the documents and records.

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.

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Energy Auditor, ISO 14001EMS,45001  
OHSMS,50001 EnMS, 22000FSMS,9001 QMS Auditor



Executive Summary

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the environmentally sustainable practices on the Campus of the institute which will lead for sustainable development.

Shri Ramdeobaba College of Engineering and Management is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends of pollution. Being a premier institution of higher learning, the college has initiated 'The Green Campus' program two years back and has actively promoted the various projects for the environment protection and sustainability.

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Environment Policy adopted by the institution and also following the practices of ISO 14001-2015 EMS. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and Mapping of Biodiversity. With this in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the Environment Policy. It can make a tremendous impact on student health, reducing college operational costs and improvement in the environment. The criteria, methods and recommendations used in the audit were based on the identified risks.

### Vision

Shri Ramdeobaba College of Engineering and Management envisage the institute par excellence, providing world class technical and management education.

### Mission

To impart quality education in the field of Engineering and Management and to foster mutually beneficial relationship with industries to create an intellectually stimulating environment for learning, research and for promoting professional and ethical values.

### Quality Policy

Shri Ramdeobaba College of Engineering and Management is committed to achieve exemplary standards in Engineering and Management Education.

We aim at continuous improvement of all our processes and will strive to provide an environment conducive to the pursuit of knowledge and overall personality development.

We encourage all to adhere to the highest ethical standards and professional integrity and aim to enhance the satisfaction level of all stakeholders.







## INTRODUCTION

Environment Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Environment audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

A Nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. Educational institutions now a days are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the



environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc.. The activities pursued by colleges can also create a variety of adverse environmental impacts. Environmental auditing is a process whereby an organization's environmental performance is tested against its environmental policies and objectives. Environment audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit is conducted to evaluate the actual scenario at the campus. Environment audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Environment auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Environment auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. ISO 14001-2015 Environmental Management Systems (EMS) is very popular in the industrial sector, but the general belief is that EMS is something pertaining to industries only. Other parts of the world have started adopting compatible environmental management systems either voluntarily or for promoting standards by external certification.

### **Goals of Environment audit:**

College has conducted a environment audit with specific goals as:

1. Identification and documentation of green practices followed by college.
2. Identify strength and weakness in green practices.
3. Conduct a survey to know the ground reality about green practices.

4. Analyze and suggest solution for problems identified from audit.
5. Assess facility of different types of waste management.
6. Increase environmental awareness throughout campus.
7. Identify and assess environmental risk.
8. Motivates staff for optimized sustainable use of available resources.
9. The long term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issue before they become problem.

### **Objectives of the Audit:**

The main objective of the Environment audit is to promote the Environment Management and Conservation in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Environment Audit are:

- To examine the current practices which can impact on environment such as of resource utilization, waste management etc.
- To identify and analyze significant environmental issues.
- Setup goal, vision and mission for Green practices in campus.
- Establish and implement Environmental Management in various departments.
- Continuous assessment for betterment in performance in green practices and its evaluation.

To prepare an Environmental Statement Report on green practices followed by different departments, support services and administration building.

In order to perform Environment audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summarize the present status of environment management in the campus:

#### **• Water management**

- Raw Water
- Drinking Water
- Laboratory Waste Water
- Sewage Water
- Rain Storm Drain Water

- Washroom water
- Water used in Canteen/Mess
- ETP/STP
- Waste water

- **Energy Conservation**

- Petrol
- Diesel
- LPG
- Electricity
- Batteries
- Solar Energy

- **Waste management**

- Hazardous Waste
- Non- Biodegradable Solid Waste
- Biodegradable Municipal Solid Waste
- Bio- Medical Waste
- Kitchen Waste
- E-waste management

- **Green area management**

**Review of the Documentation:**

Environment Policy & ISO14001 Environment Management System requirements.

**Interviews:**

Baseline data for environment audit report preparation was collected by questioning and visiting the places identified (sample basis). Checklist prepared to conduct the environment audit in the university campus is based on the guidelines, rules, acts and formats prepared by Ministry of Environment, Forest and Climate Change & Environment Policy & ISO14001 Environment Management System requirements, Central Pollution Control Board and other statutory organizations. Most of the guidelines and formats are based on broad aspects and some of the issues or formats were not applicable for college campus. Interviews were conducted with the Principal, and also faculties and students.

**Physical Inspection:**

The audit team visited the college to inspect the campus and review Environmental actions.

**Auditors for Environment Audit:**



Sr.No.	Name of Auditor	Designation
1	Mr. Jayant Deshpande	Lead Auditor for ISO 14001 EMS , ISO 18001, ISO 9001 & ISO 50001
2	Sayyad Nasir	ISO 14001 EMS auditor, Sr. Consultant, SQMS, Certified Energy Auditor from Bureau of Energy Efficiency (BEE)
3	Mr. M.M.Naveed	ISO 14001 EMS auditor , ISO 14001 EMS auditor Sr. Consultant, SQMS Nagpur, Environment System Auditor





## About College:

Shri Ramdeobaba College of Engineering and Management (RCOEM) was established in 1984 by Shri Ramdeobaba Sarvajanic Samiti (SRSS), a trust which has been involved in community service for over four decades. More than 30 years of existence has helped RCOEM grow deep roots and establish a strong foundation in technical education. Journey of a student in this institute has always involved comprehensive knowledge building from practical skills, theoretical knowledge to personality development, which has given them a head-start in their career.

We encourage all to adhere to the highest ethical standards and professional integrity and aim to enhance the satisfaction level of all stakeholders. Autonomy RCOEM was granted progressive academic autonomy from the session 2011-12. Various statutory bodies such as Board of Management, Academic Council, Board of Studies, and Finance Committee have been constituted and an industry need-based syllabus has been introduced.

### 1.2. No of Branches(18)

Departments • First Year Engineering

#### • Applied Sciences & Humanities

- Chemistry o Humanities
- Mathematics o Physics
- Physical Education

#### • Computer Application

#### • Engineering

- Civil
- Computer Science
- Electrical
- Electronics
- Electronics and Communication
- Electronics Design Technology
- Industrial o Information Technology
- Mechanical

#### • Management Technology

### 1.3 No of Buildings & its details

1. Admin Block
2. Mgmt Tech Building
3. Civil Engg

4. IT Block
5. Electrical Block
6. Workshop
7. EN Block
8. First Yr. Block
9. MCA Building
10. Boys Hostel
11. Boys Mess & Gym Area
12. Girls Hostel



Name of the Institute: Shri Ramdeobaba College of Engineering and Management.

- No. of Branches:UG-09, PG: MTech-07, MBA, MCA, MBA (Integrated)
- No. of Students: Intake UG-810, PG-441, Total: 4685
- No. of Faculty Members:279
- No. of Non-Teaching Members:159
- No. of Buildings:12+ 1 Temple+1SubStation
- Total campus area: 44596.35 m<sup>2</sup>
- College building Spread Area: 34011.08 m<sup>2</sup>
- Girls common room: 12

	No. of Student	No. of Teachers	Non-teaching staff
<b>Gents</b>	2872	167	124
<b>Ladies</b>	1813	112	35

**Garbage collection bins:198**

- **Lab:76**

- **Class room:66**
- **Boys class room:3**
- **First aid/Sick room:1**

### ENVIRONMENTAL POLICY

Management faculty and staff of Shri Ramdeobaba College of Engineering and Management is committed for carrying out its activity for sustainable development. This we will achieve through the following-

- To Use Solar Energy on College Campus by installing Solar Lamps and Solar water Heaters in Girls and Boys hostels.
- To sensitize the students and staff regarding the use of water properly
- To bring in use the 'Rain Water Harvesting' on the campus.
- To maximize the use of ICT and minimize the use of paper. It will help to go towards 'Paperless Office'.
- To use the solid waste through vermin-compost on the campus and use it as a fertilizer.
- To reduce the 'sound pollution in the campus,
- To protect and nurture the Flora and Fauna on the campus
- To maintain green campus

#### **Good Points:**

1. College has formed the team of faculty and student as REEF which works to maintain biodiversity on the campus and also participates in preventing pollution in society through various drives.
2. College has installed solar panels and increasing upto its maximum capacity.
3. Environmental subject is included in teaching plan.
4. College has a system of e- waste disposal through authorized agency.
5. Tree plantation at college premises and other college premises is taking place and encourages students to plant the trees.
6. College has Vermicomposting facility installed and successfully carrying out the process.
7. College has installed sewage treatment plant for the purification of entire effluent water collected from the college.
8. College has developed an Environmental Policy.

9. Arranged training program for the staff of the college on Environment.

As a part of the Green Initiatives the practices followed are:

- 460 kW Roof top PV Solar power plant
- 200 KLD Sewage Treatment Plant
- Rain Water Harvesting to improve the Ground water Table
- Green innovation –Garden waste degradation by Vermicomposting
- Overall lighting through LED Bulbs in campus
- Student participation in environment activities announced by AICTE
- Eco –Club , REEF
- Environment Audit-by ISO 14001 guidelines
- Total No. of plant in Campus= 1200

## Water Management

### A. Water Management:



Water which is precious natural national resource available with fixed quantum. The availability of water is decreasing due to increasing population of nation, as per capita availability of utilizable water is going down. Due to ever rising standard of living of people, industrialization, urbanization, demand of fresh water is increasing day by day. The unabated discharge of industrial effluent in the available water bodies is reducing the quality of these ample sources of water continuously. Hence, the national mission on water conservation was declared by **the Hon. Prime Minister Narendra Modi** as '**Jal Shakti Abhiyan**' and appealed to all citizens to



**collectively** address the problem of water shortage, by conserving every drop of water and suggested for conducting water audit for all sectors of water use. Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing and recycling of water. Water Audit is nothing but an effective measure for minimizing losses, optimizing various uses and thus, enabling considerable conservation of water in irrigation sector, domestic, power and industrial as well. A water audit is a technique or method which makes possible to identify ways of conserving water by determining any inefficiencies in the system of water distribution. The measurement of water losses due to different uses in the system or any utility is essential to implement water conservation measures in such an establishment. This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. A water audit is an on-site survey and assessment to determine the water use and hence improving the efficiency of its use.

Water conservation is a key activity as water availability effects on the development of the campus as well as on all area of development such as farming, industries, etc. Keeping this in view water conservation activity is carried out by the college.

Bore 1	Nr. Gym	150	Depth in Feet From Gr. to Water top Dist.			
Month	Year 2018	Year 2019	Year 2020	Year 2021		
Jan.	86	84	83	81		5
Feb.	91	90	89	88		3
Mar.	93	91	90	89		4
Apr.	105	104	103	100		5
May	107	105	104	102.5		4.5
Jun.	91	89	87	85		6
July	64	62	61	59		5
Aug.	60	59	58	55		5
Sep.	55	53	52	51		4
Oct.	60	59	58	57		3
Nov.	70	68	67	66		4
Dec.	75	74	73	72		3
Total =					51.5	
Average					6.44	Feet
Increase of water lvl					1.96	Meter

Bore 2	Nr. Pitch	150	Depth in Feet From Gr. to Water top Dist.			
Month	Year 2018	Year 2019	Year 2020	Year 2021		
Jan	79	76	74	72		7
Feb.	81	80	79	78		3
Mar.	86	85	83	82		4
Apr.	101	100	99	96		5
May.	99	97	94	92		7
Jun.	73	71	69	67		6
July	59	57	56	54		5
Aug.	54	53	52	49		5
Sep.	49	47	46	45		4
Oct.	54	51	50	48		6
Nov.	64	63	62	60		4
Dec.	69	68	67	66		3
Total =					59	
Average					7.375	Feet
Increase of water lvl					2.25	Meter

Well		45	Depth in Feet From Gr. to Water top Dist.			
Month	Year 2018	Year 2019	Year 2020	Year 2021		
Jan	30	26	24	22		8
Feb.	32	30	29	28		4
Mar.	35	34	31	30		5
Apr.	37	36	34	31		6
May.	42	40	38	36		6
Jun.	30	29	27	25		5
July	17	14	12	10		7
Aug.	10	9	8	5		5
Sep.	8	5	4	4		4
Oct.	10	7	5	5		5
Nov.	15	14	13	13		2
Dec.	20	18	17	18		2
Total =					59	
Average					7.375	Feet
Increase of water lvl					2.25	Meter

Avg. Increase of water lvl 2.15 Meter

Fig: Report for enhancement of Water level in Well No.1 due to rain water harvesting.

The college uses approximate 1500 Taps. It has 4 wells with 1 dug well and 3 bore wells. Main source of water is Municipal water. The present depth of water is 30 feet in well. The college stores the water in overhead tank and sump. There are two sumps storing 2 Lakh & 1.5 Lakh liters of water and overhead tank with 1 L capacity. Every day about 1 Lakh liter of NMC water is pumped. Wastage of water is prevented by closing the valves manually. No leakage of water is detected during the audit. The waste water mainly comes from labs, washrooms & kitchen & waste water is released to soap pit. Construction of STP is in progress. At present waste

water is not used for any other purposes. At present lab water is released in common drainage of qty. 5000 Ltr/week. Treatment of lab water is carried out at present. In order to reduce the amount of water used in college, push taps or timers in urinal is proposed. The details of the pump used for pumping the water in overhead tanks are as follows-

Sr.No/	No. of Pumps	Power	Location
1	4	5HP	Main water tank
2	3	3	MBA, IT &Electrical Dept
3	1	1	Admin. Building



**Fig: Pit for rain water harvesting:**

- Dug well gets dry and has pump of 3HP and is operated 3 days for 2 Hrs. while bore well has 2 pumps of 3 HP and one pump of 1Hp and operated daily for 3 Hrs.
- Rainwater harvesting is done by the college.
- There are no technical data at present to analyze the amount of water lost.
- There are no water fountains.
- Drip irrigation is used to water the plants.
- Garden is watered twice in a day for 2 Hrs. each.
- College can prepare water management plan with new water saving techniques.
- Slogan for water saving are displayed at various places in the college and in hostels buildings.
- Water management is part of the civil engineering curriculum.

### Sources of Water

-Municipal corporation Water

-Well water

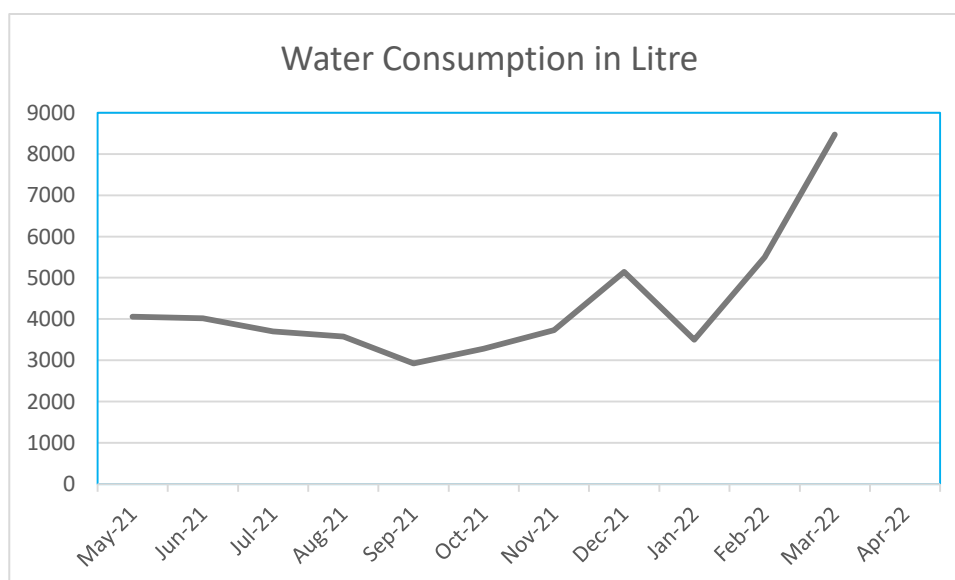
-Bore water

-No. of flow meters attached and their locations.: One near OHT

Location/ Area	Avg. total consumption of water per day
1.College	68330
2. Gardening	41000
3. Labs	27330
4. Hostel	95665
5. Utilities/uses	13665
6. Canteen	27330

### Water Bill for the last 12 Months (litre)

May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22
4058	4020	3699	3579	2925	3279	3734	5141	3496	5497	8471	-



**Remarks:** From May 21 onwards partial lock down for eight month and from Mar 22 Regular off line classes started



It is observed that a number of factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology to determine the requirement of water. As per the standards provided by WHO Regional office for South East Asia Schools require 2 liters per student; 10-15 liters per student if water-flushed toilets, Administration requires 50 liters per person per day, Staff and for sanitation purposes it depends on technology

Water usage can be defined as water used for all activities which are carried out on campus from different water sources. This includes usage in all residential halls, academic buildings, on campus and on grounds. Wastewater is referred as the water which is transported off the campus. The wastewater includes sewerage, residence, hall water used in cooking, showering, clothes washing as well as wastewater from chemical and biological laboratories which ultimately going down in sink or drainage system.

### **Good Points:**

In college campus water conservation is done at two levels:

1. Rain Water Harvesting
2. Reuse of Waste Water

### **RAIN WATER HARVESTING:**

Rain water harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). One method of rainwater harvesting is rooftop harvesting. With rooftop harvesting, most any surface — tiles, metal sheets, plastics, but not grass or palm leaf — can be used to intercept the flow of rainwater and provide a household with high-quality drinking water and year-round storage. Other uses include water for gardens, livestock, and irrigation, etc. The tanks also served as natural aquifers and helped recharge groundwater.

There were two recharge pits for rain water harvesting. Due to geographical reason as there were rocks beneath the college premises it is difficult to build the more water recharge pits in the college.

College has installed one ETP for treating the college effluent and drainage the good water in drain.

The sources waste water are categorized in two types:

- I. Laboratory Waste Water which can be said as Effluent and
- II. Domestic Waste Water i.e. Sewage Water.

III. Save Water poster displayed around water cooler installed.

The effluent produced in this college is about 5000 liters per week per laboratory and there are two such laboratories producing effluent. One, first year Chemistry Laboratory and second, the Environment Laboratory in Civil Engineering department. The effluent produced in chemistry department is released after treating and neutralization into the common drainage.

The Sewage water mainly comes from washrooms of college, hostel, kitchen and canteen. The sewage is released in ETP for treating the effluent and drainage the good water in drain.

#### **Recommendations:**

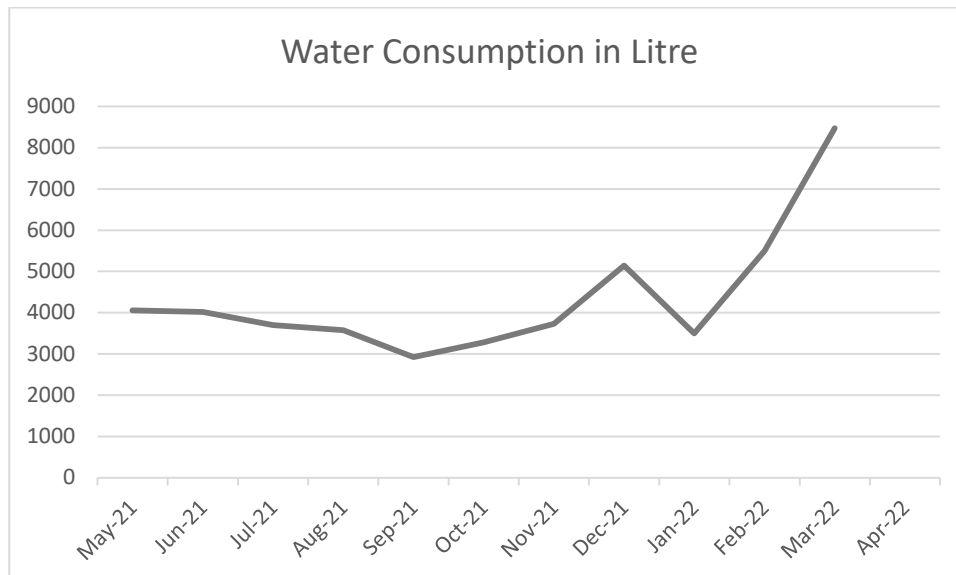
The team of Auditors appreciates the College administration for the good practices in conserving water such as regular plumbing services, regulating the water flow from top and some of the flushes are switched to water efficient flushes. There is willingness to explore the option of Waste Water Treatment thus the (plant based) recycled water can be utilized for the toilet flushing and gardening if it is implemented successfully. It is not possible to estimate the exact quantity of water used by different departments. However the highest consumption of water is most likely happening in toilets, hostels, canteen, and in chemical lab in view of the escalation of water scarcity in the region team recommend basic steps be carried out to optimize the water utilization at the college level, which will also contribute to reducing the related expense:

- I. Flow meter to be installed at bore-well and well also to monitor the quantity of water used from the source.
- II. Auto sprinkling system to be installed with proper alarm system for irrigation purpose
- III. Putting up notices in all washrooms and near all water coolers about the need for saving water, and simple tips like ensuring all the taps are properly closed, leakages are immediately brought to the notice of the management, respective floor cleaning staff could be given the responsibility to keep a check on every floor if any taps are open or leaking.
- IV. Awareness amongst employees and students and faculty for water saving to be enhanced. It was observed that after cleaning of hands students not closing the tap properly leading to water lost.

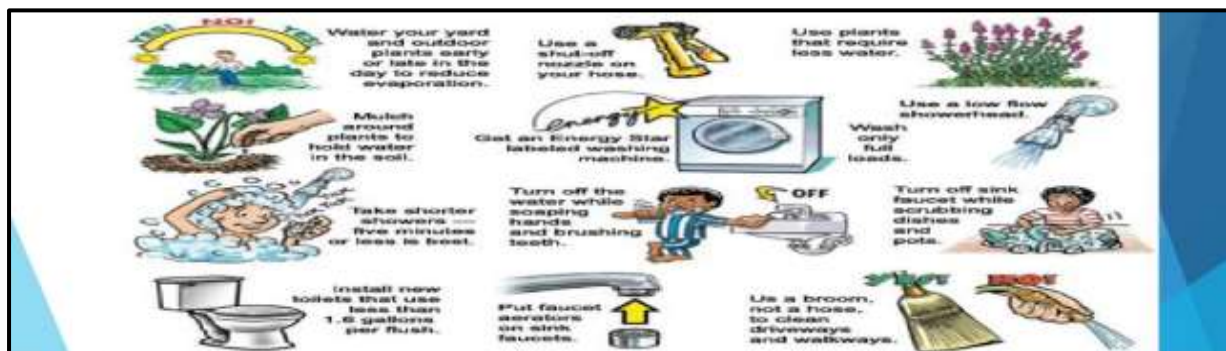
- V. Pipes, overhead tanks, cooler and plumbing system should be maintained properly to reduce leakages and wastages of water.
- VI. Water coming out from Air conditioned to be stored and can be used as distilled water after laboratory checks.
- VII. To eliminate the spillage and over usage of water in washbasins, urinals and toiler push taps are highly recommended.
- VIII. Training to the cleaners in economical use of water for cleaning purposes and a system in place for immediate response when issues of water leakage are observed so that water losses are prevented.
- IX. Minimize wastage of water and use of electricity during water filtration process, if used, such as RO filtration (Drinking Water) process and ensure that the equipment's used for such usage are regularly serviced and the wastage of water is not below the industry average for such equipment's used in similar capacity.
- X. Cleaning schedule of water purifier to be made and followed and displayed on every water purifier.
- XI. Water consumption of the college building wise to be monitored and graphs/table to be prepared.
- XII. Water to be tested from various sources including the potable water purifiers and in canteen.
- XIII. Maintenance of water purifier to be done including replacement of filters.
- XIV. Step by step include the water meter or flow meter to each and every building and monitor the water consumption record.

#### **Water Bill for the last 12 Months (litre)**

May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
21	21	21	21	21	21	21	21	22	22	22	22
<b>4058</b>	<b>4020</b>	<b>3699</b>	<b>3579</b>	<b>2925</b>	<b>3279</b>	<b>3734</b>	<b>5141</b>	<b>3496</b>	<b>5497</b>	<b>8471</b>	<b>-</b>



**Remarks:** From May 21 onwards partial lock down for eight month and from Mar 22 Regular off line classes started



**GREEN BELT AREA & BIO-DIVERSITY:**

The Green Belt Area is meant for conservation of nature and esthetic value of the college premises, the total area of the plot is 44596.35 m2 . As per the requirement of National Green Tribunal the green belt shall be developed as per the guide lines of

Central Pollution Control Board. The area of Green Belt in this College ought to be 14716.8 m<sup>2</sup> i.e. 33% of the total plot area. The Green Area in the college includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards This also helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programme.



The area is immensely diverse with a variety of tree species performing a variety of functions, Sprawling lawn/ garden. Most of these tree species are planted in different periods of time through various plantation Programmes organized by the authority and have become an integral part of the college. The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colours. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees, enormous variety of flowering plant, give them a monument – like quality. They also remind us the glorious history of our



institution in particular. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust and storms This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards This also helps in ensuring that Environmental Policy is enacted, enforced and reviewed using various environmental awareness Programmes. Last year college has planted more than 1000 trees in and around the college and at different college premises situated in Katol Road, Dorli.

### **Observations**

Campus is located in the vicinity of approximately 80 types (species) trees. Various tree plantation programs are being organized during the month of July and August at college campus and surrounding villages through NSS unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. The plantation program includes various types of indigenous species of ornamental and medicinal. Instead of maintaining biodiversity the similar species planted is observed for example "NEEM". The dominant species in green belt are Neem, Pongam Tree, Amaltash, Copepod and Sita Ashok. This Bio-diversity never fulfills the aim of green belt development.

- Total land area available for plantation.Apprx.10,000Sq.Ft
- Total land area covered by plantation.5250 Sq.Ft.
- No. of trees planted in campus.725





### Recommendations:

The Management of College may consider on top priority that:-

- More and more plantation with set objectives to be carried out.
- The Biodiversity is to be maintained while considering the plantation in future. their migrating and breeding season
- Plant survival rate is to be maintained and monitored.
- Watering schedule to be planned according the season with dripped irrigation.
- Drip irrigation is strongly recommended to conserve the water.
- Reuse of the water shall be done instead of use of fresh water



### **Air Quality & Noise Quality Monitoring:**

Since air quality plays a vital role for good health. Air Quality monitoring instrument is used to monitor quarterly the criteria pollutants. The most important air quality parameters, which are measured, are NO<sub>2</sub>, SO<sub>2</sub> & PM<sub>10</sub>. The other criteria pollutants such as Ozone, Carbon Monoxide and Lead are not measured because there are no nearby Industries located near the institute, which are emitting these pollutants. Noise equally plays a vital role in the environment, hence noise measurement are also done at the institute quarterly.



### **Waste Management (Of College):**



This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus. The different solid wastes collected as mentioned above.

For Plastic and waste generated in the college there is a provision to dispose the same with waste collection vehicle of corporation on daily basis under the swatch

Bharat Abhyaan. The wastage from the canteen needs to be used in the composting purpose rather than disposing it through other sources.

Also college encourages their staff and students for using the plastic bags of more than 50 micron or use clothes bags or paper bags makes with the waste paper through awareness training.

### **Solid waste:**

The collecting, treating, and disposing of solid material that is discarded because it has served its purpose or is no longer useful. Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease—that is, diseases spread by rodents and insects. The tasks of solid-waste management present complex technical challenges. They also pose a wide variety of administrative, economic, and social problems that must be managed and solved.

The sources of solid waste include residential, commercial, institutional, and industrial activities. Certain types of wastes that cause immediate danger to exposed individuals or environments are classified as hazardous; these are discussed in the article hazardous-waste management. All nonhazardous solid waste from a community that requires collection and transport to a processing or disposal site is called refuse or municipal solid waste (MSW). Refuse includes garbage and rubbish. Garbage is mostly decomposable food waste; rubbish is mostly dry material such as glass, paper, cloth, or wood. Garbage is highly putrescible or decomposable, whereas rubbish is not. Trash is rubbish that includes bulky items such as old refrigerators, couches, or large tree stumps. Trash requires special collection and handling.

Construction and demolition (C&D) waste (or debris) is a significant component of total solid waste, although it is not considered to be part of the MSW stream. However, because C&D waste is inert and nonhazardous, it is usually disposed of in municipal sanitary landfills

Another type of solid waste, perhaps the fastest-growing component in many developed countries, is electronic waste, or e-waste, which includes discarded computer equipment, televisions, telephones, and a variety of other electronic devices. Concern over this type of waste is escalating. Lead, mercury, and cadmium are among the materials of concern in electronic devices, and governmental policies may be required to regulate their recycling and disposal.





Once collected, municipal solid waste may be treated in order to reduce the total volume and weight of material that requires final disposal. Treatment changes the form of the waste and makes it easier to handle. It can also serve to recover certain materials, as well as heat energy, for recycling or reuse.

### **-Type of waste generated**

#### **-1. Plastic Waste:**

The plastic are strongly restricted to bring in the college or if brings the same, its thickness shall be more than 50 micron as per the government rules and regulations. Otherwise in the State of Maharashtra ‘Plastic is Ban’.

#### **-2. Hazardous Waste;**

The chemical hazard which is being generated in the chemical lab is now collected in drum (identified), and neutralized the same before it is being drained to effluent treatment plant. Now days due to Covid-19 pandemic, online classes are carried out. Therefore the amount of chemical waste generation is almost nil. The other hazardous waste is Florescent Tubes and CFL Bulbs, Electrical waste, Laboratory Waste, etc. The disposal plan needs to be prepared.

#### **3. Wooden Waste:**

##### **-Damaged Furniture, Wooden Packaging**

The wooden policy is being followed. The new purchases in the form of solid wood are not carried out, instead particles boards are used. College has appointed carpenter permanently for repair of old furniture. They used old chair and tables to build and repaired the new chair and tables instead buying any new wood from the market. All the chair and tables, cupboard is now from metal, PVC material with



recyclable material.

**4. Metal Waste:** Scrap Metal, broken utensils, and damaged machinery from Laboratory. Metals if possible reused and scrape out to respective scarp dealer.

**5. Non-Biodegradable Waste:** - Papers, Plastic Coated Papers etc. The college has framed policies for handling and disposal for these wastes.

**6. Food Waste:**

The only area from where the food waste is generated is canteen, and hostel mess. The canteens has well displayed importance of avoiding the food waste poster in the canteen. Also if it is noticed that the food is wasted by any person/girls, then the same may be brought to their notice. The food waste generated in the canteen is being transferred to Gaushaala.

**7. Biodegradable Waste:** - Tree Leaves and biomass produced in garden, uncooked vegetable remaining from Kitchen of Mess and Canteen.

Waste	Quantity Generated/Day
<b>1. Plastic Waste</b>	Avg. 1-5 Kg
<b>2. Hazard Waste</b>	1-5Ltr
<b>3. Wodden Waste</b>	Avg. 5-10 Kg
<b>4. Metal Waste</b>	Avg. 10 Kg
<b>5. Food Waste</b>	Avg. 25Kg
<b>6. E-Waste</b>	0.50Kg or 10Tons/Year
<b>7. Batteries</b>	0.10Kg

**E-waste:**

E-waste is given to the authorized vendor M/S. Suritex Pvt. Ltd. Certificate of e-waste management agency. The organization is registered with MPCB to collect e-waste and for its recycling.

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic

components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

E-waste generated in the campus is very less in quantity. The cartridges of laser printers are refilled outside the college campus. Administration conducts the awareness programmes regarding E-waste Management with the help of various departments. The E- waste and defective item from computer laboratory is being stored properly. The institution has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

**Aim and objective:**

- E-waste is the future coming environmental problem will create hazards to our environment, it is non-degradable waste can pollute water, soil and air.
- With keeping this view we are aware students and all staff about hazards effect of the e- waste on the health of man and ecosystem destruction, Waste material mainly metal, insulating materials present in the e-waste like CD, scrap mobile like devices, computer waste like monitor, CPU, mouse, Key board, cable and unused pen drive etc. are coated and deposited in scientific method.

Recommendations:

**Activity:**

- With keeping view to minimize the pollution created through the e-waste, we have carried out the scientific disposal of e-waste by two ways
- Collection of e- wastes in e- waste box and sale it to concerned firm for its disposal.
- Reuse of the component of unused electronic devices in laboratory viz. Physics.
- Recycle or safely dispose of white goods, computers and electrical appliances.
- Use reusable resources and containers and avoid unnecessary packaging where possible.
- Always purchase recycled resources where these are both suitable and

**Observation:**

- 1) Types of waste-paper, plastic, waste books, e-waste etc.
- 2) Data for each type for last 3 years is required to be documented.
- 3) Paper consumption-collected at separate stores at hostel.

- 4) Re use of paper – system is evident. Paper recycling is done by both side usages.
- 5) Garbage - segregated into wet and dry, monitored by security.
- 6) Garbage – plastic black bags are sent to external agency named 'Email Scrap Centre'.
- 7) Canteen wet garbage is given to external vendor.(Laxmikant Rajmane)
- 8) Book recycling is evident by library.
- 9) Old magazines–from2010areevident.
- 10) Waste collected quantity: Average 100Kg -125Kg.
- 11) Waste segregation in various dustbins at place
- 12) College have vermiculture composting of 150 Sq. Ft. capacity

### **Recommendations:**

The management of college can consider the following recommendations on top priority:-

E waste generated all computers & accessories Analysis to be done for failure of non-repairable equipment for mal operation, Quality, Improper voltage source, UPS etc to be checked to ensure reduction in E waste

The solid waste generated in the collage premises to be collected in scrap Yard (Notified Area) and segregated as per the category of solid waste management and stored in the well labelled area.

Plastic waste to be given to either recycler vender registered with Maharashtra State Pollution Control Board as per "The Plastics Manufacture, sale and Usage Rules, 1999 and all its Amendments.

Hazardous Waste to be disposed by identified disposal pathway within 90 days from its generation as per the guidelines of "Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules 2008 with all the Amendments.

To avoid wooden waste generation the furniture to be transferred from wooden to metallic in future and today's wooden waste shall be reused in the college through carpentry shop of workshop in mechanical engineering department.(% wise transfer from wooden to metal to be calculated).

Metal Waste to be reused in the college and workshop department shall be engaged for it, if they prove that the waste cannot be reused will be sale out to the venders who will recycle and reuse the same.

Non- Biodegradable waste shall be disposed to the registered vender with Maharashtra State Pollution Control Board

Biodegradable waste to be compost in the college premises in technical manner, it is observed that the vermin culture pans are present in the college but in technical institute it is expected that the composting shall be done in perfect technical manner.

Municipal Solid Waste to be disposed as per the guidelines “The Municipal Solid Wastes (Management and Handling) Rules, 2000 with its all Amendments.

List of batteries to be prepared department wise. The replaced or used batteries which could not be recharged as the life get exhausted shall be disposed as per the guidelines of “The Batteries (Management and Handling) Rules, 2001 and all its Amendments



#### Carbon Foot Print:

A carbon footprint is a measure of how much someone is contributing to the gases that contribute to global climate change. More scientifically, it is the amount of anthropogenic carbon dioxide (CO<sub>2</sub>) emissions (those resulting from or produced by human beings) attributable to an individual or a household or an organisation, generally resulting from their direct or indirect use of energy. Although we talk

about a 'carbon footprint', it would be more accurate to talk about a 'carbon dioxide footprint'. A carbon footprint is normally calculated in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) but occasionally footprints are calculated in tonnes of carbon equivalent (tC). You will need to multiply by 44 and divide by 12 to convert from tonnes of carbon to tonnes of CO<sub>2</sub> equivalent. In this unit we may talk interchangeably about carbon emissions, carbon dioxide emissions and CO<sub>2</sub> emissions.

Carbon footprints may also include other gases that contribute to global climate change – the so called 'greenhouse gases' (GHGs). The most common of these is methane (CH<sub>4</sub>), but they also include nitrous oxide, hydro fluorocarbons, per fluorocarbons and sulphur hexafluoride (SF<sub>6</sub>). These other gases tend to be produced from agriculture or industrial processes. Most are much more powerful contributors to global warming than CO<sub>2</sub>. Water vapour (H<sub>2</sub>O) is also a significant contributor to global warming but, as its concentration varies little with time, it is not considered to be an anthropogenic greenhouse gas, except from aircraft vapour trail. However, the largest contributor to global warming is carbon dioxide itself, which is produced from burning fossil fuels such as coal, oil or gas. As well as the direct use of fossil fuels, people's carbon footprints normally include the use of electricity (where CO<sub>2</sub> is emitted at the power station) and as a result of collective travel, such as on trains, buses and aircraft.

#### Carbon Di-Oxide Emission

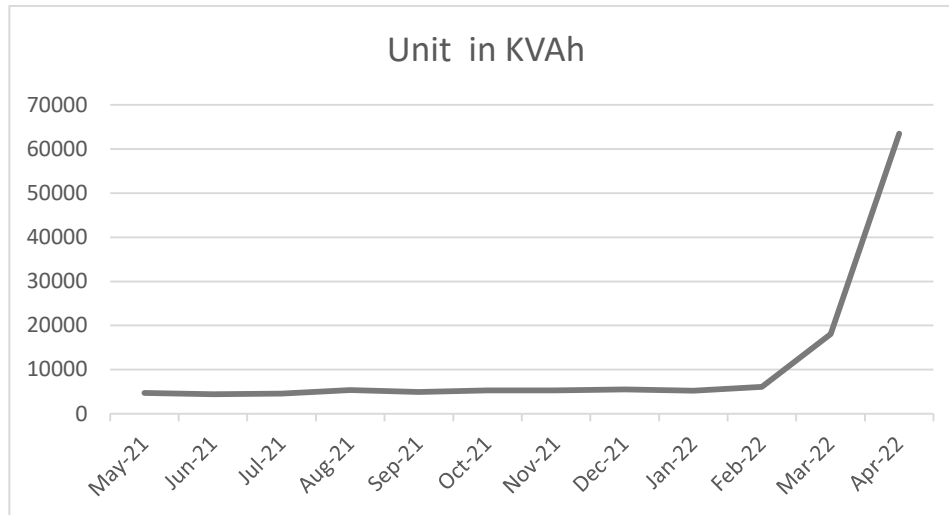
In this Chapter we compute the CO<sub>2</sub> emissions. For consumption of 1 Unit (1 kWh) of Electricity, the CO<sub>2</sub> emitted is 0.8 Kg. OR the Emission is 0.8 Kg/kWh. In the following Table we present the total units consumed and CO<sub>2</sub> emitted as under:

<b>Sr. No.</b>	<b>Month</b>	<b>kVAh</b>	<b>CO<sub>2</sub> Emitted in kg</b>
1	May 21	16823	3755
2	Jun 21	10740	3536
3	Jul 21	8025	3686
4	Aug 21	3797	4302
5	Sept 21	4972	3949
6	Oct 21	5811	4266
7	Nov 21	6726	4252
8	Dec 21	7388	4403



9	Jan 22	6774	4204
10	Feb 22	6665	4904
11	Mar 22	5561	14458

**Remarks:** From May 21 onwards partial lock down for eight month and from Mar 22 Regular off line classes started so CO2 emission increased in Mar 22 and Apr 22



**Recommendation:**

1. College to identify all its activities.
2. Calculate the carbon foot print.



**OVERALL RECOMMENDATIONS:**

1. Summarization of all the recommendations made earlier which is not complied yet and process of compliance to be started.
2. Process of cleaning of potable water tanks and drinking water coolers to be displayed along with cleaning schedule and also identification to be provided

to all the water coolers.

3. Water meter to be installed at different water sources and plan for providing the same to different buildings particularly at hostels.
4. Environmental policy to be displayed at prominent locations.
5. Environmental objectives to be set in measurable form and to be displayed at prominent location.
6. Environmental data to be displayed at prominent place. These are
  - a. No of plantation done last year.
  - b. Electricity produced through renewable energy source (Solar).
  - c. Save electricity bill last year etc.
  - d. Air quality index
7. Process of E waste to be defined and displayed (for all the E-Waste generated in the college).
8. Room used for storing E-waste to be identified.
9. Air quality to be checked for SO<sub>x</sub>, NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> etc. on regular basis (Yearly)
10. Monitoring of noise level to be done with defined frequency.
11. Ensure that all the vehicles entering into the college has Valid PUC.
12. Awareness for energy and water conservation among students and staff by displaying boards.
13. D. G. stack monitoring/Exhaust gas analysis shall be done.
14. Water percolating after sprinkling activity may be utilized for roof Gardening
15. Use of EV vehicles in campus for movement of Delicate instruments, Staff Visitors, Guest to save fuel energy hence reduction in carbon Foot Print
16. STP plant efficiency to be calculated monthly : Total water recycled during the month in KL Divided By energy consumed during the month This will help in energy saving
17. Bench Marks ,Key performance indicators to be fixed for all Green parameters after fixing base line Like Tree Plantation, Fuel consumption, Water & electricity ,paper consumption, Air Noise pollution
18. In order to have proper energy conservation Energy Meters are to be provided at each Departments , this will help to achieve energy balance & reduce energy losses
19. E waste disposal procedure to be prepared & displayed

20. E waste generated all computers & accessories Analysis to be done For failure of repairable equipment For mal operation, Quality, Improper voltage source, UPS etc to be checked to ensure reduction in E waste.
21. Trainings related to Aspect Impact analysis, Environmental legal requirements, awareness trainings etc. should be planned on annual basis for faculty and students of the college. Records of these trainings should be maintained.
22. Institution can go for ISO14001:2015 EMS certification.

\*\*\*\*\* END OF REPORT\*\*\*\*\*