

GREEN AUDIT REPORT

Audit: March 2019

OF

**SHRI RAMDEOBABA COLLEGE OF
ENGINEERING AND MANAGEMENT, NAGPUR**



CONDUCTED BY :

SHREYAS QUALITY MANAGEMENT SYSTEM, NAGPUR

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This certificate has been awarded to

SHRI RAMDEOBABA COLLEGE OF ENGINEERING AND MANAGEMENT

Ramdeo Tekdi, Katol Rd, Gittikhadan, Nagpur,
Maharashtra 440013

in recognition of the organizations efforts for sustainable
development.

SQMS/CERT/GA/8-19/01
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Director

Shreyas Quality Management System

Note: Certificate validity is based on organizations compliance on green audit recommendations and continual maintenance of the system and conduction of surveillance audit.

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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

Green 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.

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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GREEN AUDIT



Green audit was initiated with the beginning of 1970s with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It exposes the authenticity of the proclamations made by multinational companies, armies and national governments with the concern of health issues as the consequences of environmental pollution. It is the duty of organizations to carry out the Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Some of the incidents like Bhopal Gas Tragedy (Bhopal; 1984), Chernobyl Catastrophe (Ukraine; 1986) and ExxonValdez Oil Spill (Alaska; 1989) have cautioned the industries that setting corporate strategies for environmental security elements have no meaning until they are implemented.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly institute.

Goals of Green Audit

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To make sure that rules and regulations are taken care of

- To avoid the interruptions in environment that are more difficult to handle and their correction requires high cost.
- To suggest the best protocols for adding to sustainable development

Benefits of Green Audit

- It would help to prepare plan to protect the environment.
- Recognize the cost saving methods through waste minimization and management.
- Point out the prevailing and forthcoming impacts on environment.
- Ensures conformity with the applicable laws.
- Empower the organizations to frame a better environmental performance.
- It portrays a good image of an institute which helps building better relationships with the group of interested parties.
- Promotes the alertness for environmental guidelines and duties.

GREEN AUDIT EXECUTIVE SUMMERY REPORT

1. BRIEF ABOUT COLLEGE:

1. Name of the Institute: Shri Ramdeobaba College of Engineering and Management.(RCOEM)
2. No. of Branches:UG-09, PG: MTech-07, MBA, MCA, MBA (Integrated)
3. No. of Students: Intake UG-810, PG-441, Total: 4685
4. No. of Faculty Members:279
5. No. of Non-Teaching Members:159
6. No. of Buildings:12+ 1 Temple+1SubStation
8. Total campus area: 44596.35 m²
9. College building Spread Area: 34011.08 m²

	No. of Students	No. of Teachers	Non-teaching staff
Gents	2872	167	124
Ladies	1813	112	35

- a) Girls common room: 12
- b) Garbage collection bins:198
- c) Labs:76
- d) Class rooms:66
- e) Boys common room:3
- f) First aid/Sick room:1

2. ENVIRONMENTAL POLICY OF THE COLLEGE:-

Shri Ramdeobaba College of Engineering and Management is an environment and quality conscious college. It has taken initiative to protect its own environment with its green campus initiative and keeps pollution free campus. Environment development is its focal area with the educational policies implemented on the campus.

Being environmental conscious administration, the management and the students of the college look after the environment carefully. Every year, during rainy season, tree plantation is carried out and carefully looked after it. RCOEM owns responsibility to preserve the work carried out on the campus related to the environment.

5. 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 Green Campus for 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. Being a premier institution of higher learning, the college has initiated 'The Green Campus' program two years back that actively promote 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 Environmental Policy adopted by the institution. The methodology include: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. 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 applicable regulations, policies and standards. It can make a tremendous impact on student health and learning in the college and the environment. The criteria, methods and recommendations used in the audit were based on the identified risks.

6. GOOD POINTS OBSERVED:

1. College has prepared Green Environmental policy and has taken efforts for sustainable development on the college campus.
2. 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 during Ganesh Visarjan etc.
3. College has installed solar panels and has further plans of its expansion.
4. College has a system of Hazardous waste disposal through authorized agency.
5. College has included environment protection and management an curriculum more particularly in Civil Engineering.
6. College has conducted Environment. Awareness trainings and workshop for faculty and students.
7. College has Vermicomposting facility installed.

7. MAJOR RECOMMENDATIONS:

1. College should go for ISO 14001:2015 certification
2. College should install ETP and STP plants.
3. More number of Energy and flow meters to be installed for monitoring of energy and water consumption building wise/department wise.
4. PUC certificate for all the vehicles entering the campus to be made mandatory and to be checked by security.
5. College should maintain the legal register for the applicable environment related regulations and comply with this as per the requirement.
6. Bio-waste: Composting system to be adopted.

GREEN AUDIT REPORT

1. INTRODUCTION

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose activities can cause risk to the health of inhabitants and the environment. Green audit requirement of NAAC, National Assessment and Accreditation Council which is a self governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

1.1 About the 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.

Vision

Shri Ramdeobaba College of Engineering and Management envisages 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.

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
 - o Chemistry
 - o Humanities
 - o Mathematics
 - o Physics
 - o Physical Education
- Computer Application
- **Engineering**
 - o Civil
 - o Computer Science
 - o Electrical
 - o Electronics
 - o Electronics and Communication
 - o Electronics Design Technology
 - o Industrial
 - o Information Technology
 - o 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

2. OBJECTIVES OF THE STUDY

The main objective of the green 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 Green Audit are:

- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost.
- To bring out a status report on environmental compliance

3. METHODOLOGY

In order to perform green 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 summarise the present status of environment management in the campus:

- Water management
 - i) Raw Water
 - ii) Drinking Water
 - iii) Laboratory Waste Water
 - iv) Sewage Water
 - v) Rain Strom Drain Water
- Energy Conservation
 - i) Petrol
 - ii) Diesel
 - iii) LPG
 - iv) Electricity
 - v) Batteries
 - vi) Solar Energy

- Waste management
 - i) Hazardous Waste
 - ii) Non- Biodegradable Solid Waste
 - iii) Biodegradable Municipal Solid Waste
 - iv) Bio- Medical Waste
 - v) Kitchen Waste
 - vi) E-waste management
- Green area management

4. FOCUS AREA OF STUDY:

- A. Water management
- B. Air Pollution Management
- C. Noise Pollution Management
- D. Energy use & conservation
- E. Waste Management
- F. Green Belt area & Bio-diversity
- G. Environmental Initiative

A. WATER MANAGEMENT

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 affects on the development of the campus as well as on all area of development such as farming, industries, etc. Keeping this view water conservation activity is carried out.

Main source of water is Municipal Water added to this source Ground water is also extracted to full the requirement. At present there are 4 wells out of which with 01 has dug well structure whereas remaining 03 are bore wells. The depth of dug well is 40 feet and BGL observed is 30 feet. The details of Bore well could not be collected as the bore tops are closed and inserted submersible pump. As per the auditee's response to auditor the dug well get dry every year in late summer. The dug well is installed with 03 HP pump and is operated for 02 hours daily. Out of three bore wells two are installed with 03 HP pump and the remaining one with 01 HP pump. all these three pumps are operating for 03 hours per day. The duration of pump operation is measured for electricity consumption but the quantum of water extracted is not measured by the management of the college.

Sources of Water:

- Municipal corporation Water
- Well water
- Bore water
- No. of flow meters attached and their locations.: One near OHT

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

The college stores the water in overhead one tank having storage capacity of 01 Lakh liters and two sump with storing capacity of 2 Lakh & 1.5 Lakh liters of water. Every day the usage of NMC water is 01 Lakh liters whereas the quantum of ground water extracted is not measured. The organization does not have any automatic leak detection system and all the leakages are controlled by manual observation hence leak quantum water is another issue which shall be considered in designing the water conservation scheme. No leakage of water from pipes is observed from pipes by auditor team but leakages in taps were observed in some urinals.

There are 1500 Taps in the college premises from which the water is used for different use. There is no tap maintenance schedule with the maintenance department; the leakage problem will be solved by them only when they get any complaint.

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

The water bill for last 12 months is as given below and it has reduced in Jan'19 and Feb 19.

Water Bill for last 12 Months

March 18	Apr 18	May 18	June 18	July 18	Aug 18	Sept 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19
255884	315797	284636	176325	196736	274810	331464	312497	305241	337264	274429	261046	NA

The source waste water is categorized in two types (i) Laboratory Waste Water which can be said as Effluent and (ii) Domestic Waste Water i.e. Sewage Water.



The effluent produced in this college is about 5000 liters per week per laboratory and there are two such laboratories producing effluent is first year Chemistry Laboratory and the Environment Laboratory in Civil Engineering department. The effluent produced is released to the common drainage without any treatment which is damaging to the environment and have very big concerned with ground water contamination.

The Sewage water mainly comes from Toilets of college, hostel, kitchen and canteen. The sewage is released to sock pit. The college management is not aware of the efficiency of sock pit as they never analyzed the sample water overflowed from sock pit. Construction of Sewage Treatment Plant is in progress.



Major Observations in regard of Water Usages and Conservation Plan

- 1) College Management does not have any water management or water conservation plan.
- 2) At present waste water after treatment is not recycled or reused in any form in the college premises
- 3) Drip irrigation and sprinklers are used for watering the garden. The garden is also watered with water pipe, two times a day for 02 hours each time.
- 4) College does not have any vehicle and hence there is no water usage for vehicle maintenance
- 5) The rain water is drained by storm water drain and released to Nallha outside the boundary of the college at low terrain

Recommendations

Management of College may consider on top priority:-

- 1) To establish and implement the Water Conservation and Management Plan as per Environment Protection Act 1986
- 2) The water Conservation Awareness Program to be conducted on World Water Day on 22nd March every year
- 3) Green Chemistry Methodology in laboratories to be considered viz. solvent extraction from Chemistry and Environment Laboratories of the college
- 4) Display boards for switching off the taps to be put on at appropriate place
- 5) To eliminate the spillage and over usage of water in washbasins, urinals and toiler push taps are highly recommended.

- 6) Automatic Leak detection systems for conservation of water.
- 7) Rain Water Harvesting as per the guidelines of Central Ground Water Board shall be done.
- 8) 80 % of total quantum of ground water extracted shall be recharged to ground either by Artificial Recharge Structures within the college premises
- 9) Water meters to be installed on Dug Well as well as Bore Well water extraction system as per the guideline of CGWA
- 10) Special Internal Water Audit to be conducted quarterly and should be headed by HOD Civil Department
- 11) Reuse of STP Treated water for flushing in toilets is highly recommended instead of using it for irrigation.

B AIR POLLUTION MANAGEMENT

Periodic Awareness Programme for Staff, Students and Society :-

During audit it has been told to auditors team that college has been continuously conducting awareness programmes for staff, students and society for protecting and maintaining environment. The awareness is also done by arranging programmes, rallies on various issues related to environment and health. The college students and faculty members are involved in the activities through NSS/NCC, but audit team could not find any display board for conservation of Environment in the college premises.



College Civil engineering department has High Volume Dust Sampler and Respirable Dust Sampler in their Environment Laboratory but they are not in position to show us the Ambient Air Quality reports for their college area.

Every day there are 3500 Two wheelers and 125 four wheelers are coming in college premises but there is no system observed to check for PUC certificate, Vehicle Exhaust Gas Analysis and Vehicular movement noise and vibration pollution. The air pollution at the time of ignition off and on is more than it is in riding mode.



Recommendations

Management of College may consider on top priority:-

- 1) World Environment Day to be celebrated in college premises every year on 5th June and whole college students and staff shall get involved and take OATH for ENVIRONMENT CONSERVATION not only in college but also in every span of life.
- 2) Environment Division of Civil Engineering Department shall monitor the Ambient Air Quality as per the guidelines of “Air (Prevention and Control of Pollution) Act 1981 , Water Quality as per IS 10500, Waste water from Laboratory and STP as per EPA 1986 in their Environment Laboratory
- 3) Exhaust gases shall be monitored, analyzed and check regularly
- 4) Parking zone of college shall be neat & clean.
- 5) Use of bicycle in campus to be promoted.

C.NOISE POLLUTION MANAGEMENT



A. Silence zones in the college :-

Various display boards have been placed in the library and other places for awareness to maintain silence in the college.

B. Noise control in the college :-

The college adopts no honking policy and prevents use of any honk and noise in campus.

Certain areas like library, class room are declared as Silence zone and noise pollution is kept to minimum on college campus.

C. DG Set

The college had DG set as power backup and used whenever there is power cutoff due to load shading or maintenance of MAHADISCOM. It is observed that acoustication is not done on DG Set for noise pollution reduction. The exhausted gases are not monitored, tested and analyzed to know the pollution load.

Recomendations

Management of College may consider on top priority:-

- 1) Noise Level Monitoring shall be done as per the guideline of "Noise Pollution (Regulation and Control) Rules 2000
- 2) Vehicular exhausts shall be examined regularly in the collage as per Central Motor Vehicle Act 1988
- 3) Vehicular movement shall be restricted by putting boundary limit and beyond that limit bicycles usage shall be promoted to all students and staff

D. ENERGY USE AND CONSERVATION

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

Aim and objective:

- 1) To save conventionally produce electric energy
- 2) Use of non- conventional source of energy
- 3) Use carbon neutral electricity
- 4) Minimization of electric expenses

Observations

Following Energy Sources are used in the college:

- Solar
- Electrical
- Diesel
- Petrol
- LPG

Total Energy consumption for last 3 years 2016-17, 17-18,18-19.

Details	16-17	17-18	18-19
Electrical Consumption	914335 Units	963387 Units	761652 Units

Electricity Expenses for last 12 months 2018-19

Month	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19
Electrical Expenses	85587	103355	110502	48387	70350	84087	87172	89342	47830	42259	34110	44257

Only one at Substation: 11 KV/415V

- Electrical energy consumption per day for institute-
2676 Units/day as per Avg. of Record 2017-18
- % of LED lamps of total lightning of the campus-65.21%
- Institute have policy to procure BEE approved, 5 star Rating energy devices/instruments/utilities.
- Total no. of ACs Spilt Ac: 140, Cassette Ac: 30+ Win. AC2+Tower AC:1+ VRF.AC:5
- Annual maintenance contract is given for ACs.
- List of major consuming equipments/ devices lab instrument in institute are-
AC, water Cooler, Workshop machineries

- Total no. of coolers used in summer-130 Nos.
- No. of generator set :2 of Capacity: 320KVA, 140KVA
- Total running Hr/Year: 45 Hrs(For 2018)

Use of LED bulb is promoted and florescent Tube Lights and CFL are getting replaced, 65.21% of the present bulbs and tubes are replaced to LED. Energy saving fans is also evident and encouraged in use.

ACs used are-

Sr.No	Type	Tot. No.
1	Split AC	140
2	Cassette AC	30
3	Window AC	2
4	Tower AC	1
5	VRF AC	5
	Total	178

Only 6-7 ACs are 5 star rating ACs. Consumption of energy because of ACs is not estimated. No. of Electrical equipment used & electrical Energy Consumed Equipment wise is not estimated.

Sr.No.	Equipment	Quantity
1	Computer	1933
2	Printers	203
3	3D Printer	2
4	Xerox	4
5	Projector	115
6	Water cooler	34
7	Air Cooler	125
8	Generator	2(1:320KVA, 2:140KVA)
9	Geezers in girls & boys hostel	25(Each:3KW capacity)

Other than Electrical Energy consumption details

- No. of LPG Cylinder in canteen:25
- No. of Two Wheeler Vehicle:3500
- No. of Four Wheeler: 125
- No. of Cycle:3
- Pickup vans:4
- Avg. Driving: Two Wheeler15-25 Km

- Avg. Driving : Four Wheelers 20 Km
- Last year Generators run: 45Hrs.
- Total diesel consumption amount Rs.1066358/- for 2017-18

Energy conservation efforts:

- Initiative for use of solar energy:
 - No. of solar panels installed: 1132Nos of Capacity 340KWP(kilo Watt Peak)
 - Amount of energy generated through solar: 116400 Units.
 - Amount of solar energy utilization against total energy requirements/year.
- For year 2018-19: Energy Requirement:761652 Unit
- Solar Energy Used: 117256 Units
- Solar Cookers are used to cook food which get cooked by steam.



Recommendations

a. Management of College may encourage the staff and students:-

- 1) To use Common or public Vehicle instead individual vehicle to conserve fossil fuel
- 2) Maximum Solar energy is recommended to use in mess and canteen

b. Management of College may consider implementing on top priority:-

- 1) Carbon Sequestration study shall be carried out before plantation of Green Belt.
- 2) Energy Consumption for each building should be estimated to design the energy conservation plan.
- 3) Instead of out-sourcing the Annual Maintenance of Electrical Equipment college concern department staff shall take that responsibility
- 4) Energy saving awareness shall be done by displaying the boards at appropriate place

- 5) Encourage natural ventilation and illumination by alteration in the building structures whenever going for new constructions

E. WASTE DISPOSAL AND MANAGEMENT

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.



The sources of solid waste are Kitchen of mess and canteen, laboratories, library, maintenance department, administration department, parking, dust bins and etc.

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.

Observations

A- Solid waste

- 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 usage.
- 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 person whose record is not maintained.
- 8) Book recycling is evident by library.
- 9) Old magazines – from 2010 are evident.
- 10) Waste collected quantity: Average 100Kg -125Kg.
- 11) Waste segregation in various dustbins at place.
- 12) College have vermin-culture composting of 150 Sq.Ft. capacity which is not in technically appropriate and sufficient

B- E-waste

E-waste is given to the authorized vendor M/S.Suritex Pvt. Ltd. Certificate of e-waste mgt Form No.6 is provided. Reg.No. MPCB/ROHG/HSMB/AOTLO/16/EW-333 through MPCB wide letter 28.11.2016 valid 19.02.2021

Waste generated in RCOEM:

1. Plastic Waste: - Poly-ethylene bags and packaging, Containers, Disposables, Bottles etc.
2. Hazardous Waste: - Florescent Tubes and CFL Bulbs, Electrical waste, Laboratory Waste, etc.
3. Wooden Waste: - Damaged Furniture, Wooden Packaging
4. Metal Waste: - Scrap Metal, broken utensils, Damaged machinery from Laboratory
5. Food Waste:- Unused food from Canteen and Mess
6. Non-Biodegradable Waste: - Papers, Plastic Coated Papers,
7. Biodegradable Waste: - Tree Leaves and biomass produced in garden, uncooked vegetable remaining from Kitchen of Mess and Canteen
8. Municipal Solid Waste: - All the waste generated in gardens, collected during sweeping & Housekeeping of the College and Hostel Premises
9. Bio-Medical Waste: - Sanitary Napkins from Ladies Toilets and Ladies common rooms
10. Backup Batteries in Computer Departments and in all the departments where battery Backup is required.
11. E-Waste: - Computer and Electronics Department

Sr. No.	Waste	Quantity Generated/Day
1	Plastic Waste	Avg. 2-3 Kg
2	Hazard Waste	1-2 Ltr
3	Wooden Waste	Avg. 5-7 Kg
4	Metal Waste	Avg.10 Kg
5	Food Waste	Avg.25Kg
6	E-Waste	0.50Kg or 10Tons/Year
7	Batteries	0.10Kg

Recommendations

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

- 1) The solid waste generated in the collage premises to be be collected in scrap Yard (Notified Area) and segregated as per the category of solid waste management and stored in the well labeled area
- 2) 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
- 3) 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
- 4) To avoid wooden waste generation the furniture to be transferred from wooden to metallic in future and todays wooden waste shall be reused in the college through carpentry shop of workshop in mechanical engineering department
- 5) 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
- 6) Unused food waste to be used as cattle feed, as on today some unregistered persons take away these waste, the one who uses it shall come regularly and should be registered with the college concern department and its record shall be maintained
- 7) Non- Biodegradable waste shall be disposed to the registered vender with Maharashtra State Pollution Control Board
- 8) 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

- 9) Municipal Solid Waste to be disposed as per the guidelines “The Municipal Solid Wastes (Management And Handling) Rules, 2000 with its all Amendments
- 10) Bio- Medical Waste is generated in very large amount and this waste to be disposed within 48 hours from the generation as per the guidelines of “The Bio-Medical Waste (Management And Handling) Rules 1998 and its all Amendments
- 11) The replaced or used batteries which could not be recharge as the life get exhausted shall be disposed as per the guidelines of “The Batteries (Management and Handling) Rules, 2001 and all its Amendments
- 12) The E-Waste Produced in the collage to be disposed off as per the guidelines in “E-Waste Management and Handling Rules, 2011 and all its Amendments.
- 13) The records of proper disposal of all the solid wastes to be maintained with its manifests at one central place.

F.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 m² 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 programmes.

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, Copperpod and Sita Ashok.

This Bio-monoversity never fulfils 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.



Types of trees planted which are environment friendly are enlisted below:

Kadu Neem, Pelataform, Amaltash, Karanji Pedaofindia, Saptparni, Chafa, Pipal, Wad, Sagvan, Maharug, Gulmohar, Ashoka, Bakul, Sism, Kachanar.

Recommendations

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

- The Green Belt is to be developed as the guidelines of NGT
- Total 33% area is to be reserved for plantation and around 4368 plants to be planted in the area as per the guidelines of the CPCB
- The Biodiversity is to be maintained while considering the plantation in future
- The selection of trees species to be based on environmental conservation and carbon sequestration value
- Artificial nests and water ponds are recommended to attract different birds in their migrating and breeding season
- Three Tier Aero-dynamic tree plantation along the boundary of the collage in all direction
- Plant survival rate is to be maintained
- Watering schedule to be planned according the season
- Drip irrigation is strongly recommended to conserve the water
- Reuse of the water shall be done instead of use of fresh water
- The car case of the plant is to be maintained to enhance the esthetic value of premises

- Special Tree Plantation shall be celebrated every year on environment day and also competitions for bird species identification and knowing the tree values in terms of medicinal and environment conservation

G.ENVIRONMENTAL AWARENESS INITIATIVE

RCOEM conducts regular trainings to staff and faculty. Use of bicycles, controlled use of paper, plantation target and implementation are some of the initiatives. Display of environment protection banners, posters like save water, save energy at prominent places, waste disposal bins for wet and dry waste disposal are some of the initiatives taken.



REEF Team: Green Initiatives

OVERALL RECOMMENDATIONS

- 1) Lab waste water quantity is not measured and drained to municipal drainage system.
- 2) Solid waste segregation is not done in lab as well as store room before final disposal.
Green chemistry methods- Like solvent extraction are to be practiced.
- 3) Planning of chemical consumption and purchase to be ensured.
- 4) Calibration of instrument in lab to be done.
- 5) Composting of bio degradable waste to be scientifically done.
- 6) Septic tank sewage water analysis is to be done.
- 7) Plan for green belt development to be prepared.
- 8) Drinking water analysis shall be done as per IS 10500.
- 9) Rain water Harvesting (RWH) is to be done technically.
- 10) Reduction of wood policy.
- 11) Department wise electrical load consumption is to be done.
- 12) Energy used by each appliance is to be estimated.
- 13) List of equipment/instrument and their consumption of (energy/water) is to be estimated.
- 14) Awareness for energy and water conservation among students and staff by displaying boards.
- 15) Automatic leak detections in water flowing pipeline
- 16) Water usage reduction techniques to be used.
- 17) No previous for disposal of sanitary napkins. As per the Biomedical waste disposal Act.
- 19) Tree plantation shall be done to maintain biodiversity as well as artificial nesting shall be installed.
- 20) D. G. stack monitoring/Exhaust gas analysis shall be done.
- 21) Awareness among students and staff about green environment shall be done use tools like display boards.

ANNEXURE-I

AWARENESS PROGRAMS CONDUCTED BY COLLEGE AS SOCIAL RESPONSIBILITY

BIODIVERSIT AND ENVIRONMENT AWARENESS PROGRAM:

REEF (Shri Ramdeobaba college Engineers for Environment Forum)

The role of engineers in saving environment and affecting sustainable development is very important because engineers can use creativity, technology and scientific knowledge to solve practical problems for conserving environment.

Keeping this idea in mind RCOEM took a small step forward by establishing REEF (Shri Ramdeobaba college Engineers for Environment Forum) on 25th January 2012 with the motto “Engineers with a mission: towards a sustainable environment”. The idea is to make the future engineers aware of the environment and it's growing problems that can be taken care off. Engineers play a key role in development and once they're ready to strike a balance between environment and development, environment will stand a chance.

REEF for the past 6 years has been conducting several activities aiming to sensitize the budding engineers towards environment.

OBJECTIVES OF REEF

- To create awareness and take up various activities for the conservation of various aspects of environment.
- To establish active association with various organizations working for environmental conservation.
- To take up various activities for underprivileged children and in the process initiate and ingrain the value of environmental conservation.
- To encourage the development and execution of ideas on role of technology for protection of environment

RECRUITMENT

REEF carries out its recruitment drive every year. This year it was conducted on 14th, 15th and 16th September 2017. The interviews were held in room G-3/5 on 14thSeptember 2017, and in Language lab on 15th and 16th September 2017. This year REEF received 307 applications, out of which 49 candidates were selected. Before the interviews, REEFians publicized the event offline and online. Videos, teasers and templates were shared on social media platforms like Facebook, WhatsApp and

Instagram. Posters related to the recruitment were also displayed in the college campus. REEFians also did mouth publicity among engineering, MBA and MCA students

ORIENTATION

The newly selected REEF members (REEFlings) were taken on a nature trail and bird watching session on 17th September 2017 at Gorewada Biodiversity Park. The orientation of new members to environment started with a walk for bird watching. All the REEFlings were divided into pairs. After the bird watching session each pair of REEFlings was asked to introduce each other. They had to also associate their partner to a bird as a process of knowing each other. REEFlings were also introduced to REEF, its objectives, achievements and activities by chief coordinator Atharva Mangrulkar. They were also introduced to the five domains of REEF, their objectives and activities by the respective domain coordinators.

AWARENESS AND CONSERVATION ACTIVITIES

GLOBAL TIGER'S DAY 2017

Global Tiger Day (GTD) is marked on 29th July every year to create awareness about decreasing tiger population and its conservation on a global level. This year REEF focused at encouraging schoolchildren to contribute towards tiger conservation. Past 2 years REEF has been organising an interschool competition on GTD. The competition named as 'How Green Is Your Campus? - Challenges beyond Boundaries' comprised of various activities to inculcate sense of responsibility towards environment and tiger conservation in the young blood. REEF ians approached various schools in the city and amongst them 11 schools participated in the competition. All the activities were divided into two categories-'within boundary' and 'beyond boundary'. Both of the categories had some compulsory and some optional activities. Activities like making a wall art, organising a competition, performing a cultural act, making a digital herbarium, making an awareness video etc. were included under 'within boundary'. And tasks like cleaning campaign, tiger rally, awareness in NMC schools, and research and bird race were included under 'beyond boundary'.

REEF also organized an exhibition, 'Tiger vaganza' on 28th July 2017 in the RCOEM campus. As a part of the competition, schools had to make creative out of waste for the 'Best out of waste' segment. These creative were displayed by the school students in the exhibition. The exhibition also included camera traps for display, wildlife themed tattoo artist, wildlife accessories shop from Pench tiger reserve, wildlife themed delicacies shop and wildlife themed photo booth. On 29th July 2017, the final event of the competition was conducted in MBA auditorium. The winner of the competition turned out to be Centre Point School (Dhaba).

GANESH VISARJAN

Continuing last year's initiative, this year also REEF conducted awareness drive at Police Line Takli Lake, Katol road on 5th September 2017, the last day of the Ganesh Utsav (Visarjan) from 7 am to 7 pm.

During the drive, REEFians convinced the devotees to immerse their idols in one of the four artificial tanks which were installed by NMC and dispose the Nirmalya in the Nirmalya Kalash. This activity was undertaken to help people understand the ill effects caused by PoP (Plaster of Paris) idols. REEFians also explained different methods to differentiate between PoP and clay idols to the devotees.

This year REEFians witnessed 529 immersions out of which REEFians 396 Himanshu were Gundeclay and idols Purvashree and 133 Waldey were PoP about PoP idols during the Visarjan at Police Line Takli idols.

WILDLIFE WEEK

Wildlife week is celebrated all over the country from 2nd to 8th October every year with a view of conserving the flora and fauna of India. For the past two years REEF, the environment club of RCOEM has been actively celebrating the wildlife week with great enthusiasm and zeal.

This year, REEF organized various activities to spread awareness of conserving the wildlife under the theme of IUCN (International Union of Conservation of Nature). An event was organized in college campus on 6th and 7th October for Wildlife week. In the event, wildlife photographs clicked by REEF members in college and during educational tours were exhibited.

MAKAR SANKRANTI

During makar sankrant, every year thousands of birds lose their lives or get severely injured because of the sharp nylon thread that is used for kite flying on a large scale in India. This year, an event named as 'When the Birds Cry' was organized at OAT in the college premises on 13th January 2018. The event comprised had Performance by Nautanki, Music club, lecture by a wildlife researcher and conservationist, Mr. Parag Dandge on 'Rescuing in injured bird', an attractive selfie corner which was made by reusing newspaper, old flex and nylon manjha that we found stuck on trees or lying on roads, models of birds that get injured by nylon manjha, paintings made by REEFians, flex was displayed that comprised of the satirical comics, on the issue.

MANJHA REMOVAL AT RAJ BHAVAN

REEF members as an annual activity removed manja from Raj Bhavan which is rich biodiversity hotspot and has more than 174 species of birds. Manja that is entangled on tree is a big hazard to the birds of that area. The effort taken by REEF each year is for ensuring bird conservation.

EARTH HOUR

As part of the initiative by WWF, Earth hour is celebrated each year, world over. REEF has been taking part in this endeavour for the past many years. This year through REEF, RCOEM switched off lights during its working hours, students made and distributed paper bags to generate awareness about ill effects of plastic bags, conducted a survey to understand what the plastic usage behaviour is. REEF also took part in a campaign taken up by WWF in Sita Buldi area of Nagpur where shopkeepers were requested to switch off lights from 8.30 to 9.30 pm.

BALGRAM (COMMUNITY SERVICE)

Ganesh idol making: The resident children of Blagram made the idol of Ganesh with the help of REEF members.

ELECTIONS AND HERBARIUM ACTIVITY:

Another activity was held on 9th November 2017 in which REEFians conducted elections in Balgram to elect monitors for library, cleanliness, and hygiene. Nominated candidates in each category addressed all the kids before the elections took place. This activity was followed by a herbarium activity on 10th November 2017 in which a tree species was allotted to a kid and a REEFling. The pair had to study about different features of the allotted tree and share it with other groups of REEFling and kid.

BIRDING

Bird baths installation: REEF members installed bird baths on 1st April 2017 at various places in the College campus to fulfil the water requirements of thirsty birds. A total of 14 bird baths were installed. These bird baths are taken care of by the gardening staff along with the REEF members.

The college campus is rich in bird biodiversity and thus it's a step to conserve it. A video was also made by REEFian Atharva Mangrulkar regarding the activity and posted on the REEF's Facebook page to spread awareness about the bird baths in College campus, and urged the College students and staff to refill the empty bird baths and also install bird bath at their place to help the birds survive the rising temperatures in the summer season.

Bird rescue: On the morning of 6th April 2017, a baby house swift was found lying on the ground in the Civil Department. Students informed REEF members through a call. After initial assessments, it was found that it had fallen from its nest. The baby swift was cared for and given water while REEFians tried to identify its nest. As soon as the nest was identified, the swift was put back into it by REEFians. On 26th April 2017, two juveniles of Laughing Dove were found to have fallen from their nest in a Lab in Civil Department. REEFians monitored and looked after them until their mother arrived and took

care of them. These are few of the many rescues that REEF has done this year. Owing to high temperatures and lack of water, these cases are common in the College campus during summers.

BoV Templates: Templates on body parts of birds, and their families were posted on Birds of Vidarbha (BoV) every week. For this activity, domain members were divided into groups and each group was allotted 3-4 bird families. These templates help the new birders to improve their identification skills and knowledge about bird's ecology. During the quarter templates about the following families were posted on BoV:

1. Jacanidae
2. Psittacoidea
3. Nectariniidae
4. Pteroclididae
5. Alcedinidae
6. Glareolidae
7. Phalacrocoracidae
8. Leiothrichidae
9. Hirundinidae
10. Rhipiduridae

Lessons Learnt: Birding trips were conducted regularly to various birding hotspots in the city like Mihan, Ambazari, Wena and Gorewada Biodiversity Park. After every birding trip, the members shared their observations, experiences and learning about various bird species, their behavior and biology from that trip on the WhatsApp group.

The following trips were conducted in the quarter:

1. Ambazari Backwaters: Birding trips were conducted to Ambazari backwaters on 2nd April, 14th and 22nd May and 4th June.
2. Gorewada Biodiversity Park: Birding trips were conducted to Gorewada on 4th April and 18th June.

3. A birding trip was conducted to Degma on 12th June 2017. It is a rich birding hotspot. After birding REEFians discussed about the competition to be organised for schools for Global Tiger Day (GTD).

REEFian never misses a track between photography and birding narrated his experience of shooting the nesting of Indian Paradise flycatcher. He shared how difficult it was when he lacked resources and time. The video he shot told the story of the Indian Paradise flycatcher and its struggle to exist. One beautiful incident he narrated was that, the nest that the female Indian Paradise flycatcher was making was at the cross point of two branches of different trees, and when he found these branches were going apart the other day, he tried to tie them with a twig, and this one attempt gave the bird her nest back!

The seminar was attended by 45 REEF members. It was an interactive session and was knowledgeably interesting at the same time which boosted REEFlings interest towards birding. The seminar ended on a happy note and it was appreciated by all.

BIRDING TRIPS:

Birding trips were conducted regularly to various birding hotspots in the city like Ambazari backwaters and Gorewada Biodiversity Park. After every birding trip, the members shared their observations, experiences and learning about various bird species and their behaviour on the WhatsApp group.

The following trips were conducted in the quarter:

1. Ambazari Backwaters: Birding trips were conducted to Ambazari backwaters on 1st Oct, 8th October, 5th and 12th November, 10th and 31st December 2017
2. Gorewada Biodiversity Park: Birding trips were conducted to Gorewada on 15th October, 3rd, 19th and 24th December 2017

ONLINE ACTIVITIES:

1. Online quizzes were conducted by the domain coordinators regularly on the domain's WhatsApp group. These are aimed at improving the knowledge of domain members about bird identification from habitat, call and behaviour:

2. The first bird quiz was conducted on 14th October on the WhatsApp group. The members needed to identify 10 common bird species from the pictures posted on the group.

3. In the second quiz the members had to identify the bird species and its habitat. It was conducted on 22nd October 2017.

4.The fourth quiz was conducted on 29th October 2017 wherein the members had to identify the bird species and match it with its call. Pictures and calls of birds were posted on the group.

5.The fifth quiz was aimed at identifying bird species living near or in water bodies. It was conducted on 12th November 2017.

6.Online discussions were conducted regularly about different species of birds, their behaviour and habitat. On 21st December 2017 an online discussion was conducted on 'Birds as natural indicators'. The importance of different bird species and how they act as natural indicators of changes in the environment were discussed. It was an informative discussion.

PHOTOWALK AT GOREWADA:

During wildlife week, REEFians participated in photo walk organized by Rotary Club of Nagpur in association with FDCM, Nagpur (Forest Development Corporation of Maharashtra) at Gorewada Biodiversity Park.

The photo walk was conducted on 5th October 2017. It started at 6 am at Gorewada Biodiversity Park where participants were allotted 90 minutes to walk in the forest and click photographs. After the photo walk, the participants were asked to mail best 3 photographs clicked by them during the walk. Among all entries panel shortlisted top 10 photographs which will be displayed in forest resorts.

TRANSITION OCTOBER:

An online bird photography competition, 'Transition October Fortnight' was conducted by Birds of Vidarbha (BoV) from 16th to 30th October 2017. Birds of Vidarbha (BoV) is a Facebook forum for bird watchers of Vidarbha region. This competition provided a platform to bird watchers as they shared bird photographs clicked by them in October 2015, 2016 or 2017 with the hashtag transition October fortnight'.

SALIM ALI BIRD COUNT:

REEFians participated in 'Salim Ali bird count' organised by BNHS (Bombay Natural History Society) and IBCN (Indian Bird Conservation Network) on 12th November 2017. On this day, two teams of REEFians did bird watching at Ambazari backwaters from 7 to 11.30 am and spotted more than 50 bird species including warblers, flycatchers and waders. Special sightings were Red-headed bunting, Siberian Stonechat, Sykes warbler, sulphur-bellied warbler, Tickell's blue flycatcher, Ultramarine flycatcher, Red-breasted flycatcher and Pied bushchat.

MELGHAT BIRD RACE:

REEFians participated in 'The amazing Melghat Bird Race' organized by Melghat Tiger Conservation Foundation on 16th and 17th December 2017. For the bird race, 5 teams were shortlisted out of which 2 teams were of REEF.

REEFians had an amazing experience exploring the wilderness of Melghat Tiger Reserve and learning about its birdlife. Special sightings during the bird race included Forest Owlet, Bar-winged Flycatcher shrike, Indian Nuthatch, Velvet-fronted Nuthatch and Tickell's thrush.

CAMPUS BIODIVERSITY

CAMPUS MONITORING: REEFians monitor the greenery in the college campus once in a week. They have been divided into seven groups for this purpose. The college campus has also been divided into seven patches. Each group is allotted a patch to monitor. They do bird watching for an hour in the morning and evening, once in a week to record the bird species found in the campus. They also monitor the condition of trees and plants found in their patch. Each group submits an online response Google form for the respective patch so as to record the monitoring activity. REEF is planning to make a Biodiversity Register of the College and this monitoring activity helps record the bird and tree diversity present in the campus.

TREE NUMBERING:

REEFians numbered the trees as a part of making the Campus Biodiversity Register that would help us know the status, count, diversity, ongoing changes and factors responsible for the change of the campus green cover. It was the first step that REEF took towards making the biodiversity register of the college campus. The college campus has been divided into 7 different patches. The identification of the trees was done with the help of PDF guide of trees. More than 1000 trees were numbered which included Neem, Common white frangipani, Mango, Guava, Sweet orange, Gulmohar, Copperpod, Yellow bells, Teak, Banyan, Ashok etc. REEF members, in the process learned the bark, leaf patterns and shapes, inflorescence of various new species of plants. In the process REEFians gained knowledge about tree identification.

SEASON WATCH:

To track the climate changes, REEFians started Season Watch i.e. collecting information about the climate changes before it becomes hard to respond to the change. The environmental issues are result of such changes. As the climate changes, its effect is seen on plants too. To track the changes supported by proof and data, Season watch was started.

SOCIAL OUTREACH

Instagram account: Regular Posts were made on REEF's Instagram account created on 2nd February 2017. The objective behind it was to reach out to more people and spread awareness about various environmental issues. It has also helped in creating awareness about REEF and its activities as an environment club so as to encourage masses in doing their bit towards conserving nature and protecting our environment. The posts made on Instagram included past activities, college level events, photographs captured during birding sessions, etc.

Facebook Page: Following were posted on REEF's facebook page to spread general awareness about various environmental issues and festivals:

1. Video about 'Genetic Pollution' on 2nd April
2. Templates about noise pollution and Ram Navami festival on 4th April
3. Templates on World Migratory Bird Day on 10th May
4. Templates on World Biodiversity Day on 22nd May
5. Templates on World Environment Day on 5th June
6. Templates on World Oceans Day on 8th June
7. Templates on Global Wind Day on 15th June

ANNEXURE-II

LIST OF BIRDS SPOTTED IN & AROUND RCOEM

1 Ashy Prinia	53 Red Wattled Lapwing
2 Asian Koel	54 Red-rumped Swallow
3 Asian Pied Starling	55 Red-Throated Flycatcher
4 Barn Owl	56 Red Avadavat (Red Munia)
5 Baya Weaver bird	57 Rock Blue Pigeon
6 Black Drongo	58 Rose ringed Parakeet
7 Black Kite	59 Rosy Starling
8 Black Redstart	60 Rufous Treepie
9 Black Shouldered kite	61 Scaly-breasted Munia
10 Blyth's Reed Warbler	62 Shikra
11 Brahminy Starling	63 Small Minivet
12 Brown Rock Chat	64 Spotted owlet
13 Cattle Egret	65 Verditer Flycatcher
14 Chestnut Starling	66 White Throated Fantail
15 Common Hoopoe	67 White Browed Wagtail
16 Common Iora	68 White-throated Kingfisher
17 Common Kestrel	69 Wire-tailed Swallow
18 Common Myna	70 Yellow eyed babbler
19 Common Rosefinch	71 Yellow Wagtail
20 Common Tailor bird	72 Yellow-footed Green Pigeon
21 Coppersmith Barbet	73 Indian Scops Owl
22 Dusky Crag Martin	74 Common Chiffchaf
23 Golden Oriole	75 Common Kingfisher
24 Greater Coucal (crow pheasant)	76 Red naped Ibis (in flight)
25 Green Bee-eaters	77 Common Hawk Cuckoo
26 Greenish Warbler	78 Grey Bellied Cuckoo
27 Grey Wagtail	79 Indian Peafowl
28 House Crow	80 Grey Francolin
29 House Sparrow	81 Paddy Field Pipit
30 House Swift	82 Rufous tailed Lark
31 Indian Grey Hornbill	83 Indian Cormorant (in flight)
32 Indian Pond Heron	84 Spotted Dove
33 Indian Robin	85 Yellow Crowned Woodpecker
34 Indian Roller	86 Common Woodshrike
35 Indian Silverbill	87 Brown Shrike
36 Indian Spotted Eagle	88 Bay-Backed Shrike
37 Jungle Babbler	89 Ashy Drongo
38 Laughing Dove	90 Black Naped Monarch
39 Lesser Goldenback	91 Rufuous Treepie
40 Little Egret	92 Cinnerious Tit
41 Long tailed Shrike	93 Black-lored Tit
42 Orange-Headed Thrush	94 Ashy-Crowned Sparrow Lark
43 Oriental Magpie Robin	95 White Browed Bulbul
44 Oriental white eye	96 Red Breasted Flycatcher
45 Pied cuckoo	97 Zitting Cisticola
46 Pied Kingfisher	98 Booted Warbler
47 Plain Prinia	99 Syke's Warbler
48 Plum headed parakeets	100 Sulphur Bellied Warbler
49 Purple Heron	101 Lesser Whitethroat
50 Purple rumped sunbird	102 Ultramarine Flycatcher
51 Purple Sunbird	103 Tickell's Blue Flycatcher
52 Red vented Bulbul	104 Grey-Headed Canary Flycatcher

ANNEXURE III

RCOEM: ENERGY SAVING UTILITY DATA

1.Details of connected load

Name of the block	Tube lights 60W each	Fans 60W each	Water coolers 300W each	AC 2500W each	Computers 200W each	Total CL
Administration	175	75	3	75	120	
G Block	100	45	3	2	25	
B block	100	60	3	8	50	
K Block	80	65	3	1	20	
EE/IE/ME Block	150	90	4	10	60	
MCA Block	65	25	2	6	25	
CS/IT/EC Block	200	125	3	15	200	
Hostel A	100	75	5		2	
Hostel B	100	75	5		2	
Girls Hostel	80	55	5		2	
Total Qty	1150	690	36	117	506	
Load in Watt	69000W	41400W	10800W	292500W	101200W	514.9KW
Water Pumps						20KW
Street Lights						10KW
MBA Block						65KW
Total Connected Load						609KW Say610KW

Sanctioned Contract Demand:-	350KVA
Additional Contract Demand:-	125KVA
Total Contract Demand:-	475KVA

2.Existing Environment Working Sheet

Heat Dessipation					Comments
Sr. No.	Particulars	Qty	BTU/HR	Total BTU	
					Heat Dessipated by PCs is considered equivalent to that of dell optilex 3080 MT - 1338 BTU/Hour
1	Heat Dessipation by PCs/HR	10	1338	13380	Heat Dessipated by Servers is considered equivalent to that of dell Poweredge T110 -1300 BTU/Hour to match current servers. 3080 MT - 1338 BTU/Hour
2	Heat Dessipation by Servers/HR	3	1300	3900	
	Total Heat			17280	

3.Air Conditioner and Heat Dissipation

	Particulars		Per Hour	
1	Total Heat Dissipated	BTU/HR	17280	
2	AC Tonnage to cool the heat	Tons	1.44	One Ton of Refrigerent cooling is 3.5168525KW

4.Power Consumption (running load)

Sr.No.	Particulars	Qty	Power consumption in KW	Total power consumption/ Hour	Power Consumption per day (Units)	Power Consumption per year (Units)	Electricity Unit Rate in INR	Total cost per year
1	PCs as servers	10	0.1	1	24	8760	8.41	73,671.60
2	Servers	3	0.6	1.8	43.2	15,768.00	8.41	1,32,608.88
3	Power Consumption of AC	1	5.06	5.06	121.54	44,362	8.41	3,73,092.70
			Total Power Consumption Per Year					5,79,373.18

5.Solar Generation Approx. Benefit Sheet

Sr. No.	Month & Year	Solar Units Generated	Solar Expert Units	Approx. Amt.of saving in Elect.Bill
1	Nov-17	4615	10	42,000.00
2	Dec-17	9530	210	86,727.00
3	Jan-18	9824	105	99,618.00
4	Feb-18	9195	25	93,244.00
5	Mar-18	10708	110	1,08,586.00
6	Apr-18	11492	0	1,16,191.00
7	May-18	9698	5	98,051.00
8	Jun-18	9139	150	95,049.00
9	Jul-18	5756	10	60,165.00
10	Aug-18	6935	5	72,126.00
11	Sep-18	4094	90	44,952.00
12	Oct-18	3400	10	37,332.00
13	Nov-18	9678	783	1,05,010.00
14	Dec-18	23530	540	103023.5
15	Jan-19	26640	10930	421075.63
16	Feb-19	21234	6788	233530
				18,16,680.00

6.Overall Lighting Through LED BulBS in Campus

Sr. No.	Particulars Of equipment	Rating	Quantity	Total Wattage	In KW
1	Lighting of T5 LED Tube Lights	22 Watts	764	29,796.00	29.7
2	LED Tube Light (2Feet Length)	10 Watts	60	600.00	0.6
3	LED Flood Lights in High Mast	150 Watts	52	7,800.00	7.8
4	Street Lights LED Floods in Campus (Diff. watts)	100+60+50+10 Watts	39	2,730.00	2.7
5	LED Down Lighter	15 Watt	150	2,250.00	2.2
6	L Down LighterED	9 Watts	70	630.00	0.6
7	LED Down Lighter (2*2)	36 Watts	40	1,440.00	1.4
	Total upto Dated 20/12/2018				45KW

7.Electrical Energy Bill Details

Sr. No.	Month	Units Consumed	Amount in Rs.	Renewable Energy Generated Units	Solar Export Units	Month	Units Consumed	Amount in Rs.	Renewable Energy Generated Units	Solar Export Units
1	17-Jan	63710	6,90,587.00			18-Jan	55,725.00	6,01,650.00	9,824.00	105
2	17-Feb	67670	7,27,669.00			18-Feb	55,015.00	5,94,930.00	9,195.00	25
3	17-Mar	95010	9,89,067.00			18-Mar	85,587.00	8,78,560.00	10,708.00	110
4	17-Apr	117025	11,40,449.00			18-Apr	1,03,355.00	10,05,060.00	11,492.00	0
5	17-May	107440	12,37,615.00			18-May	1,10,502.50	11,86,690.00	9,698.00	5
6	17-Jun	61590	7,09,246.00			18-Jun	48,387.50	5,46,990.00	9,139.00	150
7	17-Jul	81660	7,97,526.00			18-Jul	70,350.00	7,26,720.00	5,756.00	10
8	17-Aug	97525	10,02,103.00			18-Aug	84,087.00	8,68,720.00	6,935.00	5
9	17-Sep	103810	10,26,051.00			18-Sep	87,172.00	19,30,360.00	4,094.00	90
10	17-Oct	88620	8,04,250.00			18-Oct	89,342.00	21,54,820.00	3,400.00	10
11	17-Nov	64945	6,52,440.00	4,616.00	10	18-Nov	47,830.00	14,65,310.00	9,678.00	783
12	17-Dec	44445	4,72,780.00	9,539.00	210	18-Dec	42,259.00	14,78,330.00	9,190.00	540

Total units consumed from Jan -17 - Dec 17	9,93,450 KWH	Total units consumed from Jan - 18 - Dec 18	8,37,353 KWH
Average for Jan- 17 - Dec - 17	82,787 KWH	Average for Jan- 18- Dec - 18	76,123 KWH
Total Renewable energy generated	14,146 KWH	Total Renewable energy generated	89, 919 KWH
Total Renewable energy Export to Grid	220 KWH	Total Renewable energy Export to Grid	1293 KWH

Worked on Experienced Basis :Solar Collector dish (Mess) Generator 5-6 load pressure(used for boiling purpose) included to cook approx. 350-300/day and year aim to reduced 2000 kg of LPG consumption.(consolidated in month before)

ANNEXURE IV

GREEN AUDIT EVIDENCES

OPENING MEETING



ENERGY SOURCES: SUBSTATION TRANSFORMER





ENERGY SAVING/LIGHTING

GREEN : GENERATOR





SOLAR ENERGY
SOLAR PANELS



SOLAR PANNEL LIGHTING



SOLAR SYSTEM FOR KITCHEN



Mess, Lonand, BUPESINAGAR, Nagpur, Maharashtra 440013, India

Type	DMS
Latitude	21°10'40" N
Longitude	79°3'46" E
Degree	21.17770466
Longitude	79.06271038

27-Mar-2019 11:24 AM



Mess, Lonand, BUPESINAGAR, Nagpur, Maharashtra 440013, India

Type	DMS
Latitude	21°10'40" N
Longitude	79°3'46" E
Degree	21.17775644
Longitude	79.0627066

27-Mar-2019 11:26 AM

GREEN INNOVATION & ENVIRONMENT INITIATIVE COMPOST



USE OF CYCLE IN CAMPUS



GREEN AREA PARKING



GREEN BED AREA & PLANTATION







BIO-DIVERSITY CAMPAIGN





BIRD WATCHING AND PROVISION OF BIRD SAVING



CANTEEN : FUME HOOD



SHOT ON REDMI NOTES PRO
MI DUAL CAMERA



ENVIRONMENT CONSERVATION AWARENESS

REEF TEAM



DISPLAYS



CLEANLINESS & HYGEIN



CLOSING MEETING



ANNEXURE V

AUDITORS DETAILS



DR.N.S. RAMAN

N.S. Raman is Senior Principal Scientist and Deputy Director at National Environmental Engineering Research Institute (NEERI), Nagpur, India. He holds a B.E. degree from The University of Mysore (Rank Holder) and an M. Tech. degree in environmental engineering from The Indian Institute of Technology (I.I.T), Powai, Mumbai. He received a Doctorate (Ph. D.) in Environmental Engineering (Specialisation Environmental Audit) from The Indian Institute of Technology (I.I.T), Roorkee. Currently, his Research activities focus on the fields of environmental auditing (EA), Natural Resources Accounting, Environmental Impact Assessment (EIA), ISO 14001, Environmental Economics, Municipal Solid Waste Management and Eco-Auditing. Dr. Raman is a certified lead auditor by Marsden International (based in the United Kingdom) after successful completion of advanced ISO 14000 lead-auditor training accredited by the Environmental Auditors Registration Association. He has developed Key Performance Indicators in urban Governance for environmental audit framework. He has published over 90 research papers in national and international journals and is the recipient of several awards (including "best paper" awards) at international seminars and workshops. He is recognized as a PhD supervisor for environmental engineering in the Faculty of Engineering and Technology, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur; North Maharashtra University, Jalgaon; Gondwana University, Gadchiroli and R.K. University, Rajkot, In 2006, he authored the Handbook on Indian Environmental Standards in collaboration with Dr. Sukumar Devotta, director of NEERI. Further, he has authored two books on Environmental Impact Assessment (EIA) in 2014 and in 2016. Dr. Raman is listed in the Asia edition of International Biographical Foundation and the World Who's Who of Men and Women of Distinction in recognition of his distinguished leadership in environmental engineering. He received The Bharatha Rathna Sir M. Vishveswaraiah National Parisara Rathna Award in recognition of his work in the field of environmental engineering. Recently "Best Scientist of the year 2017" award has been conferred upon him by ASDF-SIAA on April 08, 2017.



MILIND JOSHI

Director, Surya Envirotech

Key Qualifications

- Environmental Impact and Risk Assessment Project Management such as Project Commissioning, Execution, Human Resource Management and Report Preparation, presentation and discussions with Public, State/Central Govt. regulatory agencies and legal/financial institutions
- Risk Assessment in Process Industries
- HazOP Studies and Safety Audits
- Social Impact Assessment
- Corporate Social Responsibility
- Resettlement and Rehabilitation Action Plan for Project Affected Persons
- Environmental Issues related to industrial, mining, water resources, port development and Infrastructure Projects
- Environmental Monitoring Work Place Monitoring
- ETP Performance Evaluation Environmental Impact Assessment
- Industrial Solid and Hazardous waste Disposal
- Design, Manufacturing, Commencing and Performance Evaluation for Water Treatment Equipments like R.O., D.M., E.T.P., STP and Air Pollution Control equipments
- Environmental Management System ISO EMS 14001-2004
- Quality Management System ISO QMS 9001-2008
- Occupational Health and Safety Audits OHSAS 18001-2007
- Energy Management System ISO EnMS 50001-2011

Professional Qualification

- **Certified Lead Auditor** for
 - I. ISO 50001:2013 (Energy Management System)
 - II. ISO 45001-2018 (Occupational Health & Safety Management System)
 - III. ISO 14001-2015 (Environment Management System)
 - IV. ISO 9001-2015 (Quality Management System)
- **Internal Auditor**
 - I. IS/IEC/ISO 17025:2005 (Laboratory Management System)
- **Chartered Chemical Engineer**

- Pursuing **PhD** in Chemical Engineering (Risk Assessment and Industrial Safety Techniques in Modern Process Industries) Under able Guidance of Prof. Dr. S. D. Dawande (Director Incharge, LIT, Nagpur)
- **Advance Post Graduate Diploma in Industrial Safety** Organized by Maharashtra State Board for Technical Examination.
- **M. S.W.** (Community Development) R. T. M. Nagpur University, Nagpur
- **M. Tech** (Chemical Engineering) with specialization in Environmental Engineering from Laxminarayana Institute of Technology, Nagpur University, Nagpur
- **B. Tech** (Chemical Engineering) from Laxminarayana Institute of Technology, Nagpur University, Nagpur

Work Experience :Mr. Milind Joshi holds more than 20 years extensive experience in Environmental conservation and occupational Health & Safety in process industries & has provided consultancy to more than 200 organization from manufacturing and process industries. He has conducted trainings on Industrial Safety and Environmental Conservation for sustainable Development. He is active member of various professional associations such as Vigyan Bharti, Institution of Engineers.

Publications

- Devarkar V. D., Nichat V. V., & Joshi M. P. 2018. **Baseline Impact Assessment Studies on Flora & Fauna around Goa Industrial Development Corporation (GIDC), Goa Zone.** *Plantae Scientia – An International Research Journal in Botany* (May; 9-17)
- Milind P. Joshi, Pankaj K. Pande & Puja V. Mungantiwar, 2017. **Noise Level at Coal Based Thermal Power Plant.** *IJEDR*, Vol. 5, Issue 3:966-976 (ISSN: 2321-9939)
- Devarkar V. D. & Joshi M. P. 2011. **Phytosociological Studies of Bodhghat Area Dist. Dantewada with Reference to Importance Value Index (IVI).** *Bionano Frontier (Special Issue-NCRNAIIAT)* January, (22- 23) : 53-57 (ISSN 2229-3469)
- Devarkar V. D. & Joshi M. P. 2011. **Study of Change in Air Quality at the Merck Ltd., Goa (India) Due to expansion of Pharmaceutical Unit.** *Bioscience Discovery.* January, 2(1):21-28 (ISSN 0974-0678)
- The paper presented & published on the topic **“Production of Biogas from Municipal Solid Waste by Two Phase Anaerobic Process- A Case Study”** on Aug. 2002 in the conference on Alternative Fuel Organized by Indian Institute Of Engineers.
- The essay is published on the topic **“CFC Eats The Ozone Layer”** in the magazine published by UNO OUR PLANET in 1997 issue.
- Book (Guide) **“Physical & Organic Chemistry & Material of Construction”** for II year diploma in Chemical Engg. is published by VBD publication, Nagpur
- Book (Guide) **“Instrumentation & Process Control”** for III year diploma in Chemical Engg. is published by VBD publication, Nagpur



M M NAVEED

M M Naveed is presently working as a Senior consultant for Laboratory Quality Management System, ISO9001-2015QMS, 14001-2015 EMS , Food Management System, FAMI-QS with Shreyas Quality Management System, Nagpur. He is post graduate in Microbiology and Lead Auditor for ISO 22000, Food Safety Management System,ISO50001 ENMS and Auditor for ISO 9001-2015,14001-2015 EMS,45001-2018 OHSAS. He has total working experience of 20 years at various capacities in various organizations and has also worked as a Quality Control Incharge in Kingdom of Saudi Arabia. He has provided training and consultancy related to laboratory quality management system, measurement uncertainty, Integrated management system to various organizations.

*****END OF THE REPORT*****