

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Mukhtangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

Certificate No: ES/MARDSC/22-23/01

Date: 10/7/2023

This is to certify that we have conducted Energy Audit at M. A. Rangoonwala College of Dental Sciences and Research Centre, Azam Campus, Camp, Pune 411 001, in the Academic year 2022-23.

The College has adopted following Energy Efficient practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of 125 kWp Roof Top Solar PV Plant

We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient.

For Engress Services,



A Y Mehendale,
B E-Mechanical, M Tech- Energy
BEE Certified Energy Auditor, EA-8192



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GREEN AUDIT CERTIFICATE

Certificate No: ES/MARDSC/22-23/02

Date: 10/7/2023

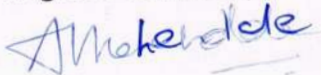
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- Segregation of Waste at source
- Provision of bio Composting Pit, for conversion of Organic Waste
- Implementation of Rain Water Harvesting Project
- Good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Creation of awareness about Water Conservation by Display of Posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,



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B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788



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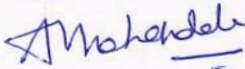
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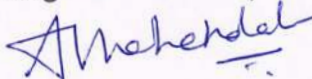
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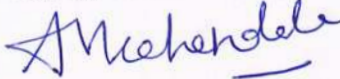
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Phone: 09890444795 Email:engress123@gmail.com

Ref: ES/MARDC/23-24/02

Date: 4/12/2023

To
The Principal,
M A Rangoonwala College of Dental Sciences and Research Centre,
Pune

Subject; Submission of Audit Reports, Invoice No: 2023-24/G-03, and Request for release of Payment.

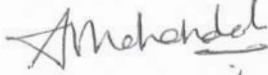
Respected Sir,

We are pleased to submit herewith:

1. Energy Green & Environmental Audit Reports
2. Invoice No: **2023-24/G-03, for Rs. 27000/-**

We herewith request you to kindly release the Payment and oblige.

For Engress Services,



Authorized Signatory



Bank Details: Engress Services:

Name of Account	Engress Services
Bank	SVC Co-Operative Bank Ltd
Branch	Sahakarnagar Branch, Pune
Current Account	112904180000319
IFSC Code	SVCB0000129



PRINCIPAL
M. A. RANGOONWALA COLLEGE OF DENTAL
SCIENCES & RESEARCH CENTRE, PUNE

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Mukhtangan English School, Parvati, Pune 411 009
Phone: 09890444795 Email:engress123@gmail.com


INVOICE

To The Principal, M A Rangoonwala College of Dental Sciences and Research Centre, Pune	Invoice No: 2023-24/G/03 Date: 4/12/2023
--	---

Work Order No	
Our PAN No	AMOPM6853B
Our GST No	27AMOPM6853B1ZT
HSN Code	998331

No	Particulars	Charges per Unit, Rs.	Quantity Nos.	Amount in Rs.
1	Consultancy Service Charges for Energy, Green & Environmental Audit of your College Campus:	22881.40	01	22881.40
2			Add CGST@ 9%	2059.3
3			Add SGST @ 9%	2059.3
4			Total Invoice Amount	27000.00
5	Amount in Words: Rupees Twenty Seven Thousand only.			

For Engress Services,



Authorized Signatory

Bank Details:

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Bank	SVC Co-Operative Bank Ltd
Branch	Sahakarnagar Branch, Pune
Current Account	112904180000319
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SCIENCES & RESEARCH CENTRE, PUNE

3712
DDIPL - CTS 2010



दि मुस्लीम को-ऑपरेटिव्ह बँक लि., पुणे
بنی مسلمہ کوآپریٹو بینک لمیٹڈ، پونہ
The Muslim Co-Operative Bank Ltd., Pune

AZAM CAMPUS BR., PUNE - 411 001.
IFSC : MSLM0000019

"Valid for 3 months from the date of issue"

24 | 11 | 2023
D D M M Y Y Y Y

Pay Engress Services

or Bearer

Rupees रुपये Twenty Seven Thousand Only

अदा करें। ₹ 27,000/-

Current A/c. No.: 001911001000230

AZM/E

For MCES MAR COL OF DENTAL SCI & RESEARCH

[Signature]

PRESIDENT /VICE PRESIDENT / SECRETARY / TREASURER

Please sign abc

712380 411165011 000230 11

[Signature]

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M. A. RANGOONWALA COLLEGE OF DENTAL
SCIENCES & RESEARCH CENTRE, PUNE

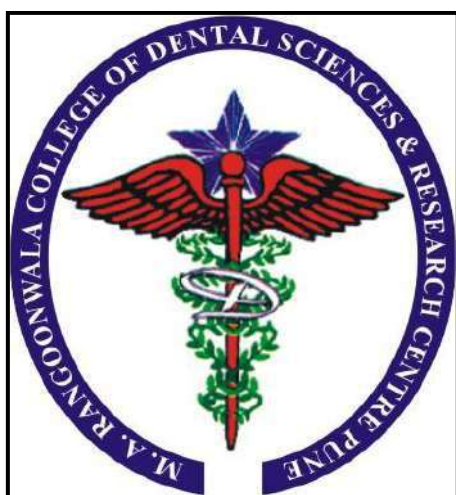


ENVIRONMENTAL AUDIT REPORT

of

M. A. Rangoonwala College of Dental Sciences and Research Centre,

Azam Campus, Camp, Pune 411 001



Year: 2022-23

Prepared by:

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REGISTRATION CERTIFICATES



MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE



ISO: 9001-2015 CERTIFICATE

ISO: 14001-2015 CERTIFICATE

INDEX

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I	Indoor Air Quality, Noise, & Indoor Comfort Standards	20

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of M. A. Rangoonwala College of Dental Sciences and Research Centre, Azam Campus, Camp, Pune 411 001, for awarding us the assignment of Environmental Audit of their Sangamner Campus for the Year: 2022-23.

We are thankful to all the staff members for helping us during the field study.

EXECUTIVE SUMMARY

1. **M. A. Rangoonwala College of Dental Sciences and Research Centre, Azam Campus, Camp, Pune 411 001**, consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment.

2. Pollution due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	430157	kWh
2	Annual CO ₂ Emissions	387.14	MT

4. Renewable Energy & Reduction in CO₂ Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **125 kWp**.
- The Energy generated by Solar PV Plant in 22-23 is **134298 kWh**.
- Reduction in CO₂ Emissions in 22-23 is **120.87 MT**

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	49	30	25
2	Minimum	33	22	33

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	27.2	71	132	45
2	Minimum	27.1	69	102	40

7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Provision of Bio Composting Pit Arrangement
3	Bio Medical Waste	Require your comments
4	E Waste Management	Recommended to dispose of through Authorized Agency

8. Rain Water Harvesting:

The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to recharge the bore well.

9. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Creation of awareness on Water Conservation Display of Posters

10. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

11. References:

- For CO₂ Emissions: www.tatapower.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	: Kilo Gram
MSEDCL	: Maharashtra State Distribution Company Limited
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board
ISHRAE	: The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I INTRODUCTION

1. Important Definitions:

1.1. Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

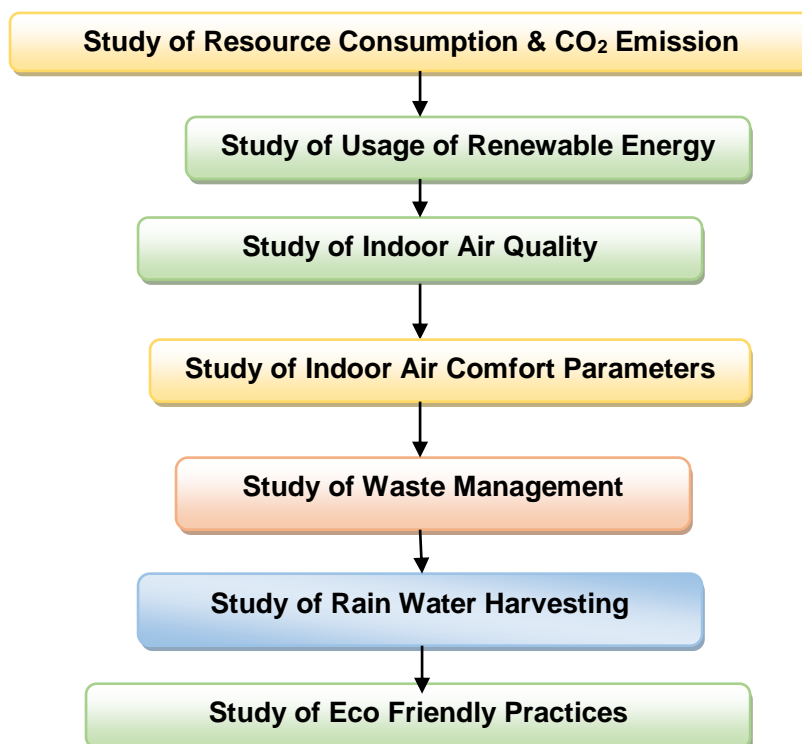
1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"

1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.4 Audit Procedural Steps:



1.5 College Location Image:



College
Campus

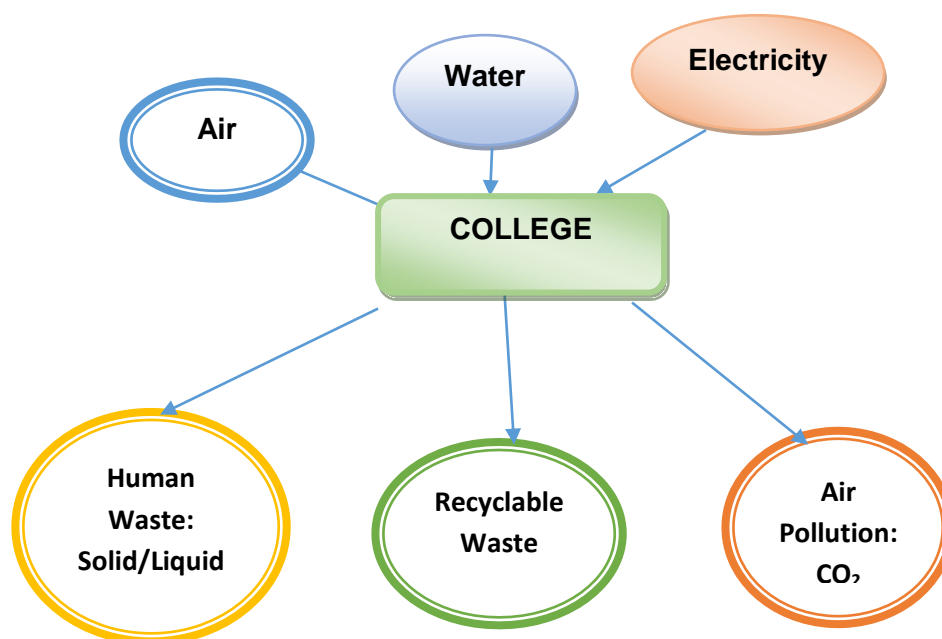
CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The College consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

Chart No 1: Representation of College as System & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

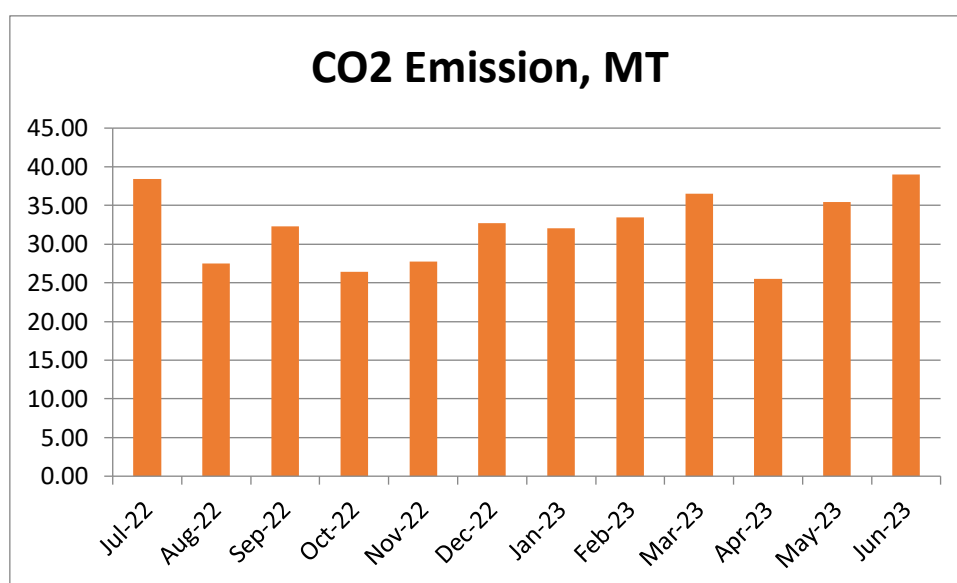
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Table No 1: Study of Purchase of Energy & CO₂ Emissions: 22-23:

No	Month	Energy Purchased, kWh=1	Energy generated, kWh=2	Energy Exported, kWh=3	Net Energy Consumed, kWh=1+2-3	CO ₂ Emission, MT
1	Jul-22	42693	9381	168	51906	38.42
2	Aug-22	30560	11706	5473	36793	27.50
3	Sep-22	35883	10938	1631	45190	32.29
4	Oct-22	29353	12576	5115	36814	26.42
5	Nov-22	30836	10843	777	40902	27.75
6	Dec-22	36315	9827	368	45774	32.68

7	Jan-23	35653	8359	341	43671	32.09
8	Feb-23	37148	7539	123	44564	33.43
9	Mar-23	40579	11908	2802	49685	36.52
10	Apr-23	28383	15015	875	42523	25.54
11	May-23	39375	16151	350	55176	35.44
12	Jun-23	43379	10055	0	53434	39.04
13	Total	430157	134298	18023	546432	387.14
14	Maximum	43379	16151	5473	55176	39.04
15	Minimum	28383	7539	0	36793	25.54
16	Average	35846.42	11191.5	1501.92	45536	32.26

Chart No 2: Month wise CO₂ Emissions:



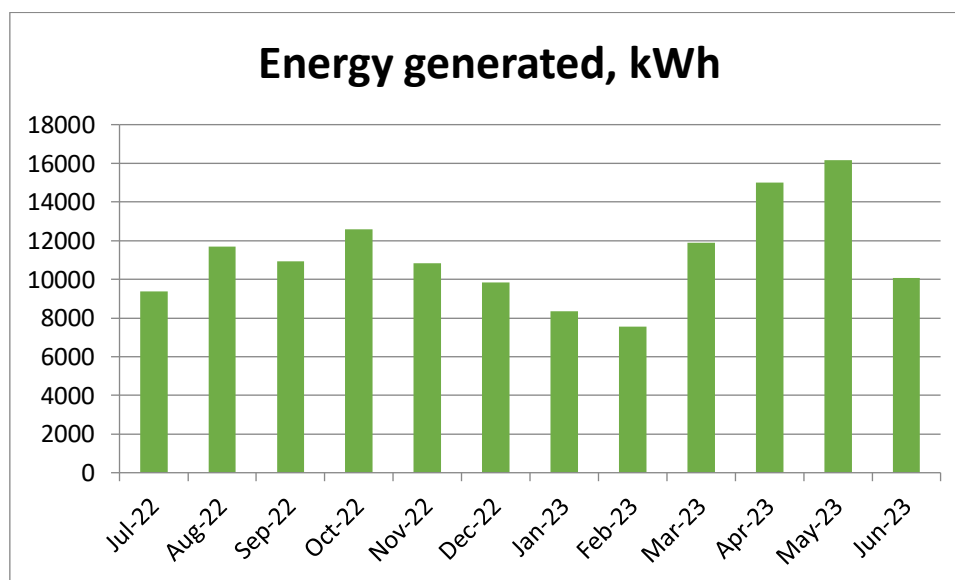
CHAPTER III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **125 kWp**
In the following Table, we present the reduction in CO₂ emissions due to Solar Energy:

Table No 2: Computation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	125	kWp
2	Energy Generated in 22-23	4	4 kWh/kWp
3	1 kWh of Electrical Energy saves	0.9	Kg/kWh
4	Qty of CO ₂ Saved by Solar PV Plant = (2)*(3) /1000	120.87	MT of CO ₂

Chart No 2: Month wise Solar Energy Generation:



Photograph of Roof Top Solar PV Plant:



CHAPTER IV STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10 micron

Table No 3: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Accounts Section	36	22	26
2	Class Room	46	28	32
3	P G Clinic	49	30	33
4	U G Clinic	40	24	31
5	Library	33	20	25
6	Reading Room-1	40	24	27
	Maximum	49	30	25
	Minimum	33	22	33

CHAPTER V

STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 4: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Accounts Section	27.1	70	139	44.3
2	Class Room	27.2	69	105	42
3	P G Clinic	27.1	69	102	41.9
4	U G Clinic	27.1	70	106	44.2
5	Library	27.2	71	112	43.9
6	Reading Room-1	27.2	69	139	42
	Maximum	27.2	71	132	45
	Minimum	27.1	69	102	40

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

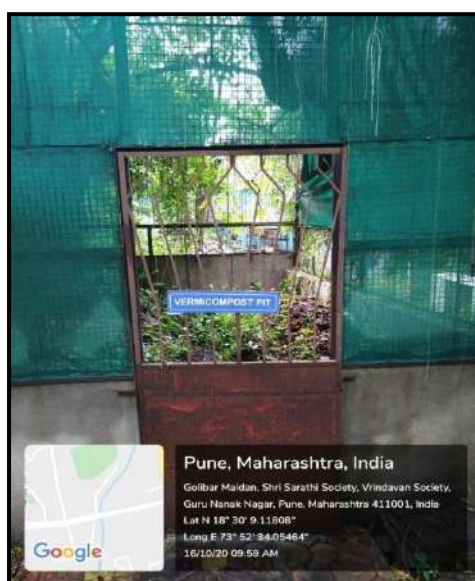
Photograph of Waste Collection Bin:



6.2 Organic Waste Management:

The Parent Society has made provision of a Bio Composting pit for conversion of Organic Waste into Bio compost.

Photograph of Bio Composting Pit Arrangement:



**6.3 Bio Medical Waste Management:
Need your comments**

6.4 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency/Need your comments.

CHAPTER-VII STUDY OF RAIN WATER HARVESTING

The College has installed Pipes from the terrace and the Rain water falling on the terrace is used to recharge the bore well.

Photograph of Rain Water Carrying Pipe & Sand Filter Unit:

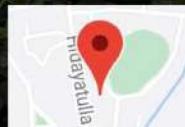


Rain Water
Carrying pipe and
Filter Unit

Pune, Maharashtra, India

2390B, Hidayatulla Rd, Katad Khana, Pune,
Maharashtra 411001, India

Lat 18.5034965 / Long 73.8752826

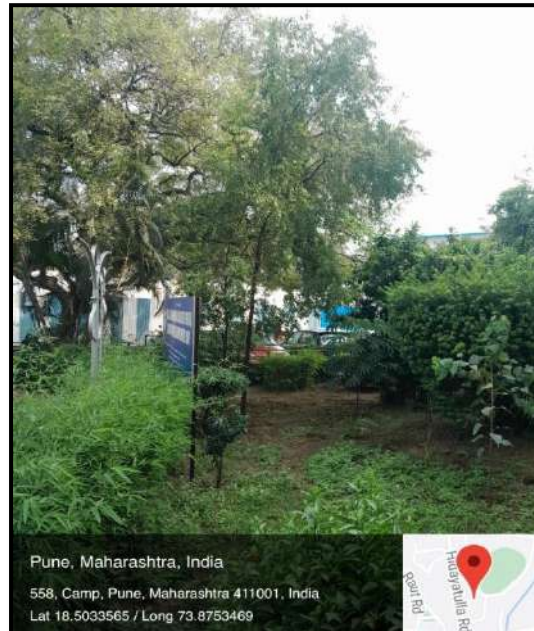


CHAPTER-VIII STUDY OF ECO FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has Tree Plantation in the campus.

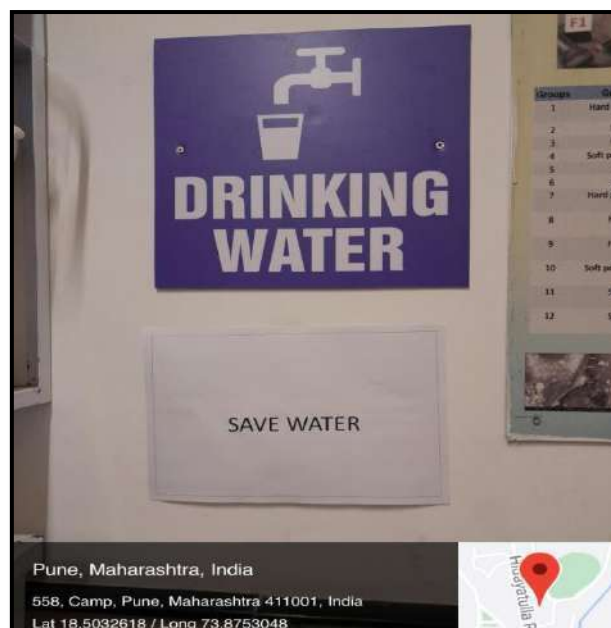
Photograph of Tree plantation:



8.2 Creation of Awareness about Water Conservation:

The College has displayed posters emphasizing on importance of Water Conservation.

Photograph of Poster on Water Conservation:



ANNEXURE-I: VARIOUS AIR QUALITY, NOISE & COMFORT STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%