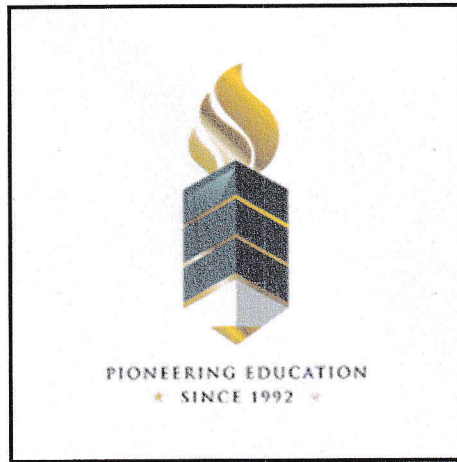


# ENVIRONMENTAL AUDIT REPORT

of

## RAHUL COLLEGE OF EDUCATION

Navghar Raod, Bhayander (East), Thane 401 105

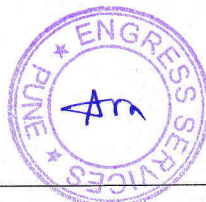


Year: 2022-23

Prepared by:

### ENGRESS SERVICES

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MEDA Registration No: ECN/2022-23/CR-43/1709  
ISO: 9001-2015 Certified (Cert No: 23EQKC13),  
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

## ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/RCOE/22-23/03

Date: 1/7/2023

This is to certify that we have conducted Environmental Audit at Rahul College of Education, Bhayander (East) Thane 401 105, in the Academic year 2022-23.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Segregation of Waste at source
- Implementation of Rain Water Management Project
- Creation of Awareness on 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.

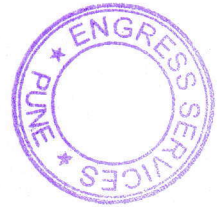
For Engress Services,



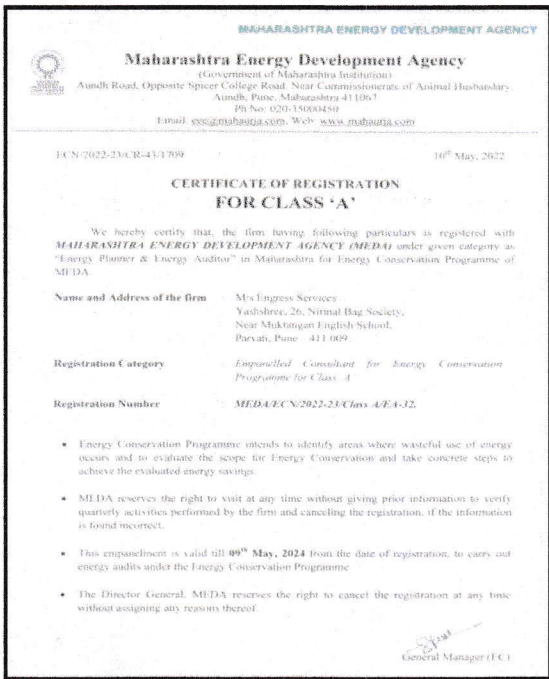
**A Y Mehendale,**

B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192

ASSOCHAM GEM Certified Professional: GEM: 22/788



REGISTRATION CERTIFICATES

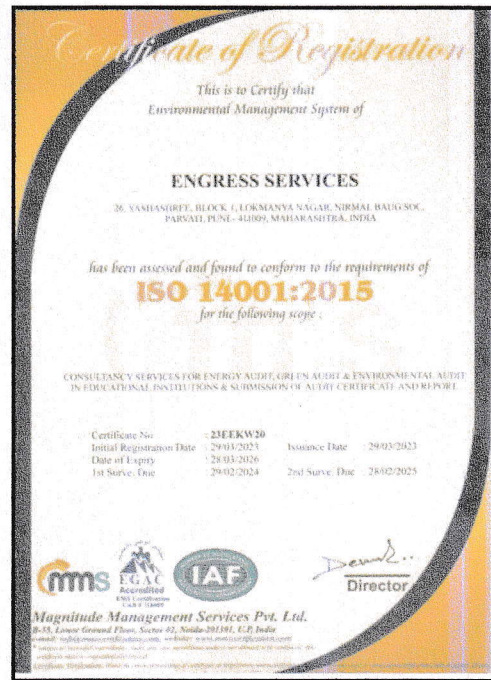


MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE



ISO: 9001-2015 CERTIFICATE



ISO: 14001-2015 CERTIFICATE



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## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of Rahul College of Education, Bhayander (East) Thane 401 105, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2022-23.

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



## EXECUTIVE SUMMARY

1. **Rahul College of Education, Bhayander**, consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment..

### 2. Pollution due to College Activities:

- **Air pollution:** Mainly CO<sub>2</sub> on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste, Recyclable Waste
- **Liquid Waste:** Human Liquid Waste

### 3. Present Energy Consumption & CO<sub>2</sub> Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumed	24324	kWh
2	Annual CO <sub>2</sub> Emissions	21.89	MT

### 4. Usage of Renewable Energy:

- The College has yet to install Roof Top Solar PV Plant

### 5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	85	51	62
2	Minimum	71	44	52

### 6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	29.2	42	159	45
2	Minimum	29.1	41	106	41.6

### 7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source

### 8. Rain Water Management:

The College has installed Pipes from the terrace and the Rain water falling on the terrace is collected through Pipes and is used to increase the underground Water Table.

### 9. Environment Friendly Initiatives:

- Creation of awareness on Water Conservation Display of Posters

### 10. Assumption:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

### 11. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Various Indoor Air Parameters: [www.ishrae.com](http://www.ishrae.com)
- For AQI Standards: [www.cpcb.com](http://www.cpcb.com)

## **ABBREVIATIONS**

Kg	:	Kilo Gram
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



## 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 complied 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:



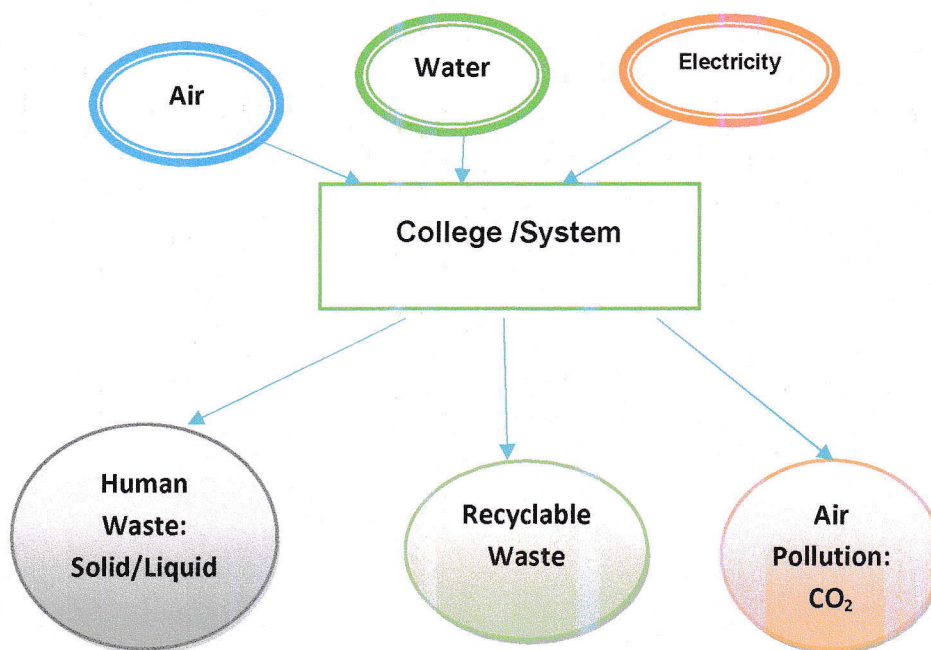
## CHAPTER-II STUDY OF CONSUMPTION OF RECOURCES & CO<sub>2</sub> EMISSION

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 in System & Environment Pattern:



Now we compute the Generation of CO<sub>2</sub> on account of consumption of Electrical Energy. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy are as under

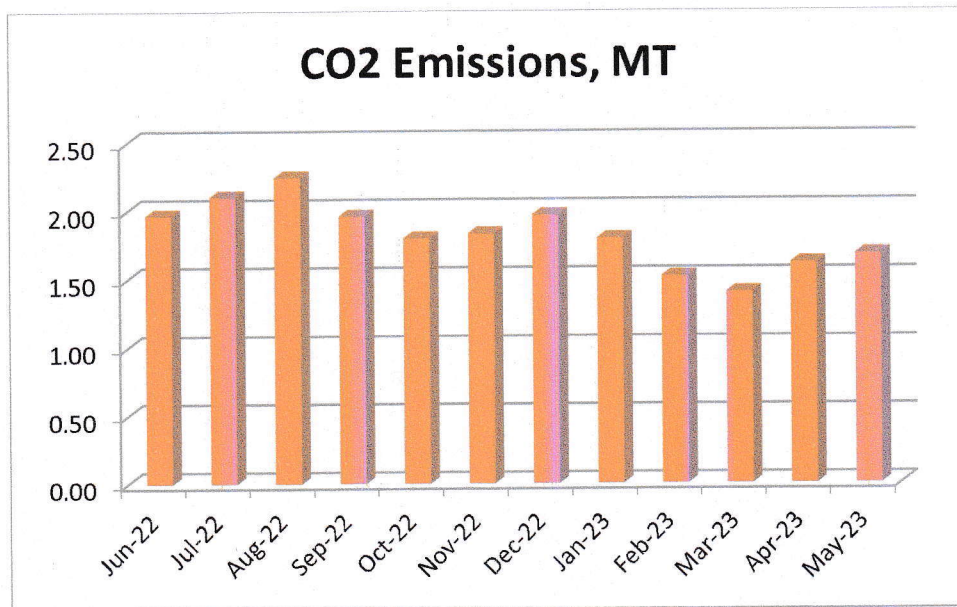
- 1 Unit (kWh) of Electrical Energy releases **0.9 Kg of CO<sub>2</sub>** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO<sub>2</sub> Emissions: 22-23:

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Jun-22	2185	1.97
2	Jul-22	2337	2.10
3	Aug-22	2496	2.25
4	Sep-22	2178	1.96
5	Oct-22	1998	1.80
6	Nov-22	2036	1.83
7	Dec-22	2187	1.97
8	Jan-23	1997	1.80

9	Feb-23	1687	1.52
10	Mar-23	1559	1.40
11	Apr-23	1796	1.62
12	May-23	1868	1.68
13	Total	24324	21.89
14	Maximum	2496	2.25
15	Minimum	1559	1.40
16	Average	2027.00	1.82

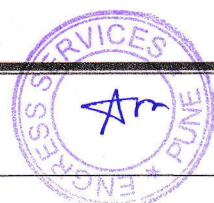
Chart No 2: Month wise CO<sub>2</sub> Emissions:



### **CHAPTER III**

## **STUDY OF USAGE OF RENEWABLE ENERGY**

The College has yet to install 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 2: Indoor Air Quality Parameters:**

No	Location	AQI	PM-2.5	PM-10
1	Office	80	50	61
2	Class Room	79	49	59
3	Lab	71	44	52
4	Seminar Hall	85	51	62
5	Library	83	49	60
	Maximum	<b>85</b>	<b>51</b>	<b>62</b>
	Minimum	<b>71</b>	<b>44</b>	<b>52</b>

## **CHAPTER V**

### **STUDY OF INDOOR COMFORT CONDITION**

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 7: Study of Indoor Comfort Parameters:**

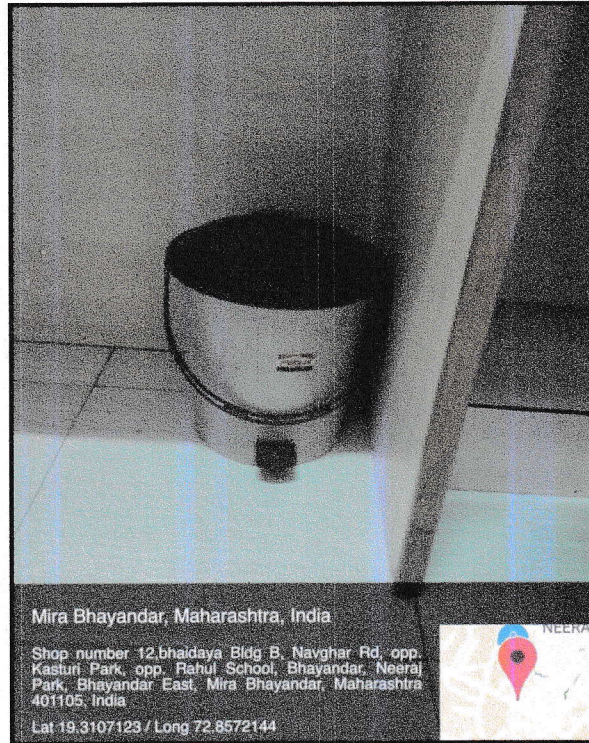
No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Office	29.1	41	124	41.6
2	Class Room	29.1	41	106	45
3	Lab	29	42	127	44.6
4	Seminar Hall	29.1	41	159	44.8
5	Library	29.2	42	142	44.9
	Maximum	<b>29.2</b>	<b>42</b>	<b>159</b>	<b>45</b>
	Minimum	<b>29.1</b>	<b>41</b>	<b>106</b>	<b>41.6</b>

## CHAPTER VI STUDY OF WASTE MANAGEMENT

### 6.1 Segregation of Waste at Source:

The Dry and Wet waste is segregated at the source. Waste collection Bins are kept at various points.

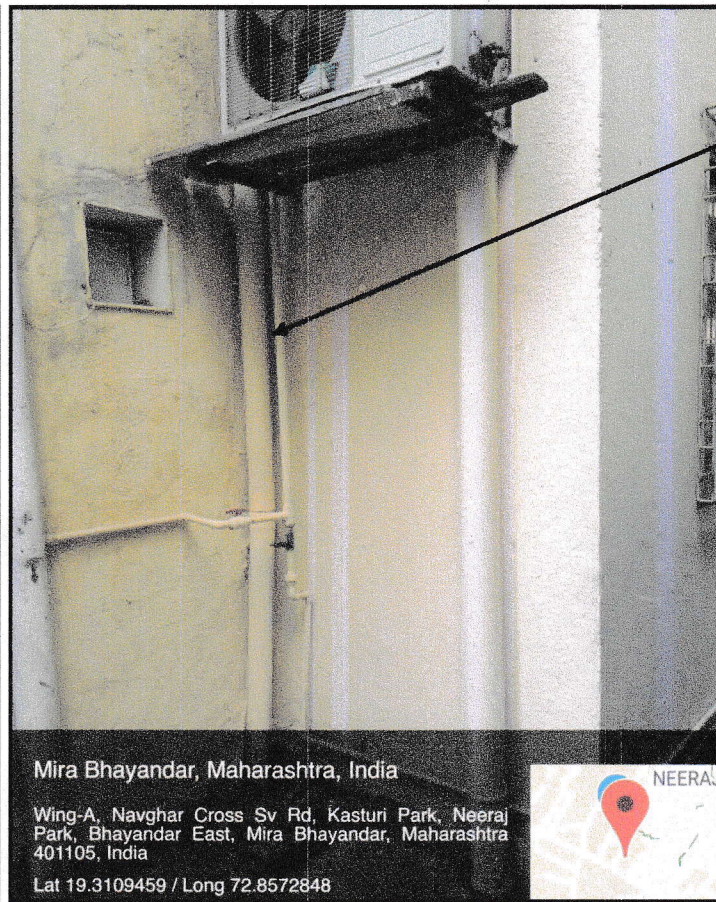
#### Photograph of Waste Collection Bin:



## CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The Rain water falling on terrace is collected through Pipe and is stored in an underground Water Tank and used for domestic purpose.

Photograph of Rain Water Collecting Pipe:



Rain Water  
Carrying Pipe

Mira Bhayandar, Maharashtra, India

Wing-A, Navghar Cross Sv Rd, Kasturi Park, Neeraj Park, Bhayandar East, Mira Bhayandar, Maharashtra 401105, India

Lat 19.3109459 / Long 72.8572848



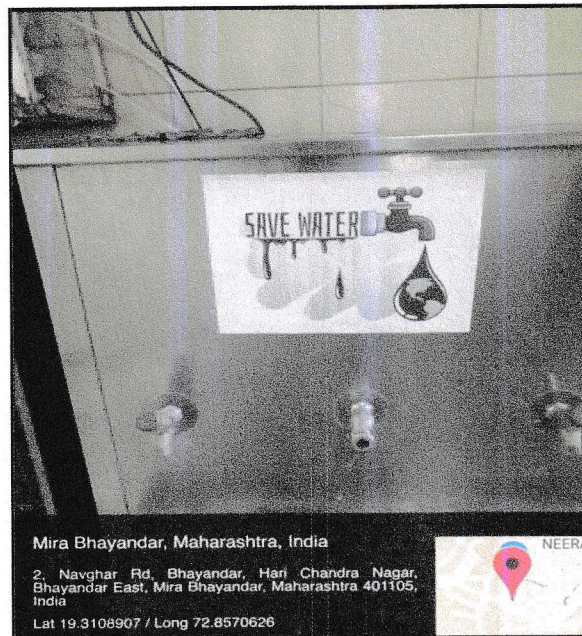


## CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

### 8.1 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:  
AIR QUALITY, NOISE & INDOOR COMFORT STANDARDS:**

**1. Category Wise Air Quality Index Values & Concentration of PM-2.5 & PM-10:**

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

**3. Thermal Comfort Conditions: For Non-conditioned Buildings:**

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