

ENVIRONMENTAL AUDIT REPORT

of

Shri. Datta Prasadik Shikshan Prasarak Mandal's

**Late Rajkamalji Bharti Arts, Commerce and
Smt. Sushilabai R. Bharti Science College,
Arni, Dist-Yavatmal (M.H.) 445103**



Year: 2022-23

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ENVIRONMENTAL AUDIT CERTIFICATE

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

Date: 20/04/2023

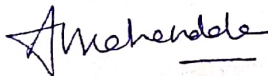
This is to certify that we have conducted Environmental Audit at Late Rajkamalji Bharti Arts, Commerce and Smt. Sushilabai R. Bharti Science College, Arni, in the Year 2022-23.

The Institute has adopted following Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Light Fitting
- Segregation of Waste at Source
- Installation of Bio Composting Pit
- College has Installed septic tanks and it cleans periodically
- Installation of Rain Water Management Project
- Maintenance of Good Internal Road
- Tree Plantation in the Campus
- Creation of awareness by display of Posters on Resource Conservation

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

For Engress Services,

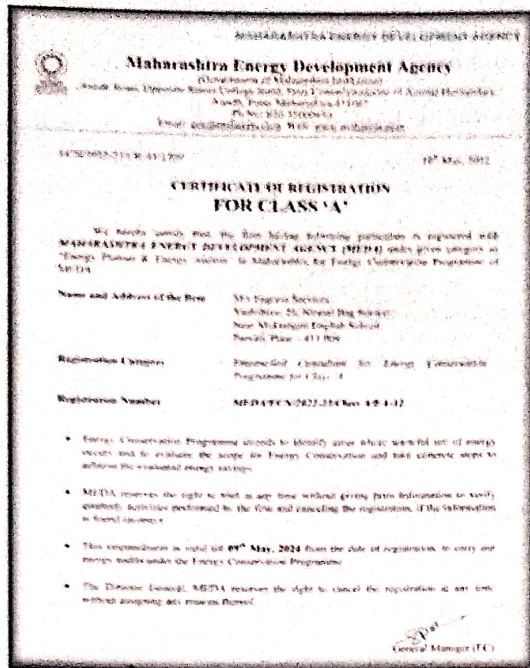


A Y Mehendale,

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REGISTRATION CERTIFICATES



MEDA Registration Certificate



GEM Certified Professional Certificate



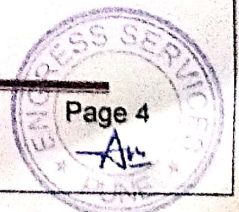
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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Late Rajkamalji Bharti Arts, Commerce and Smt. Sushilabai R. Bharti Science College, Arni for awarding us the assignment of Environmental Audit of their Campus for the Year: 2022-23.

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

EXECUTIVE SUMMARY

1. Late Rajkamalji Bharti Arts, Commerce and Smt. Sushilabai R. Bharti Science College, Arni consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities

2. Pollution due to Institute 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 Consumption	10814	kWh
2	Annual CO ₂ Emissions	9.73	MT

4. Various initiatives taken for Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Bio Composting Pit Installation

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	50	31	42
2	Minimum	35	21	32

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	34.6	46	310	41
2	Minimum	34	42	210	37

7. Waste Management:

7.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

7.2 Vermi Composting Pit:

The Institute has a Vermi Composting Pit, to convert the Leafy Waste into Vermi Compost.

7.3 Liquid Waste Management:

The Institute has installed Septic Tank and it cleans periodically.

7.4 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, for disposal of the Sanitary Waste.

7.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

8. Rain Water Management:

The Institute has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for recharging the land water table and gardening purpose.

9. Environment Friendly Initiatives:

- > Display of Posters on Resource Conservation
- > Tree Plantation drive NSS Cell.

10. Assumption:

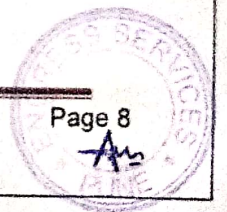
1. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

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

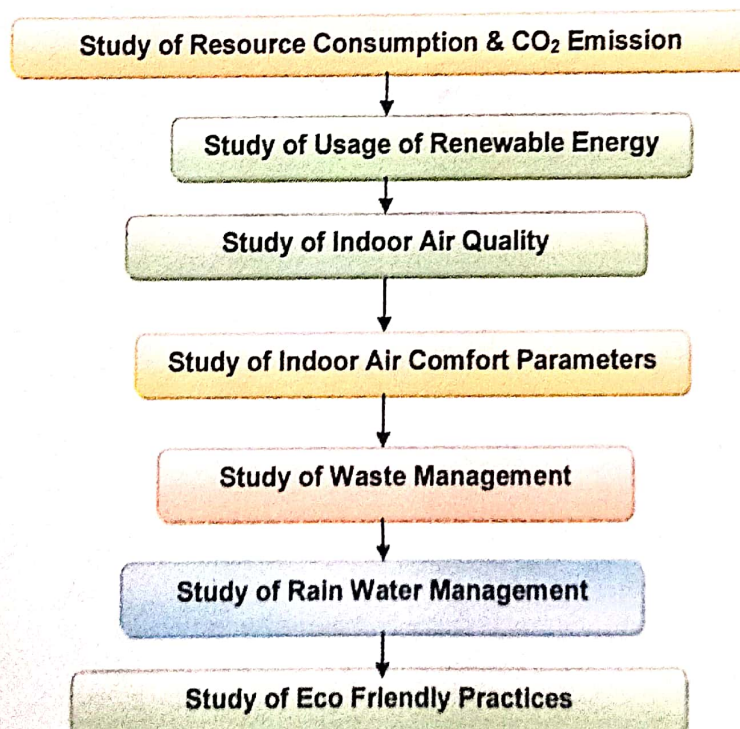
1.2. Environmental Audit: Definition:

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

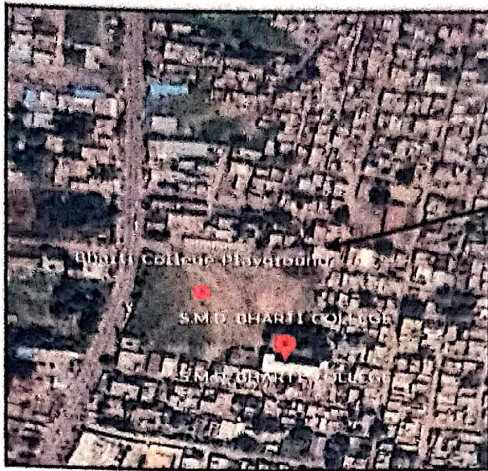
According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

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:



1.5 Institute Location Image:



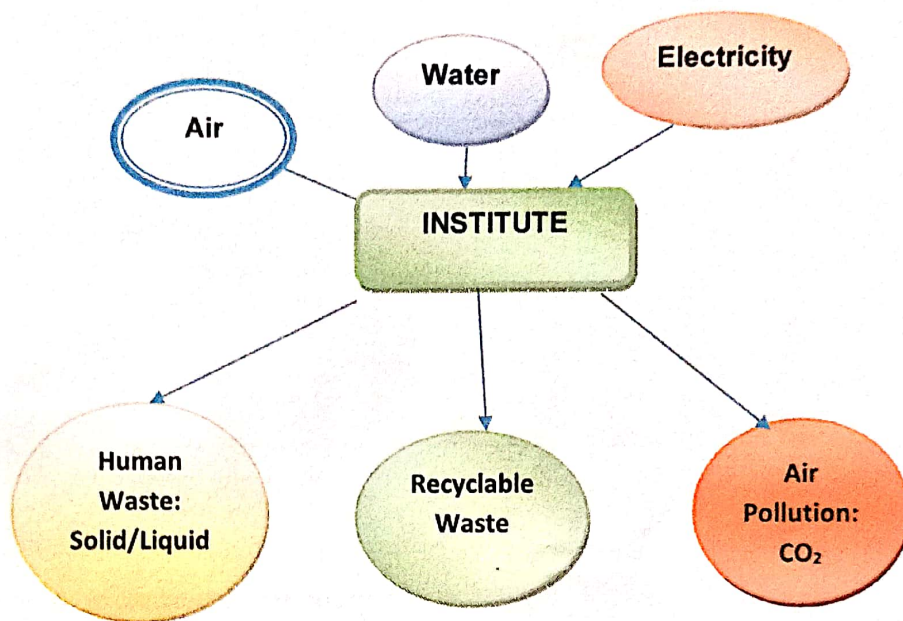
Institute
Campus

CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the Institute System & Environment as under.
Chart No 1: Representation of Institute 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 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 22-23:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-22	191	0.172
2	May-22	101	0.091
3	Jun-22	327	0.294
4	Jul-22	382	0.344
5	Aug-22	412	0.371
6	Sep-22	455	0.410
7	Oct-22	1491	1.342
8	Nov-22	1491	1.342

9	Dec-22	1491	1.342
10	Jan-23	1491	1.342
11	Feb-23	1491	1.342
12	Mar-23	1491	1.342
13	Total	10814	9.733
14	Maximum	1491	1.342
15	Minimum	101	0.091
16	Average	901.167	0.811

Chart No 2: Month wise CO₂Emissions:

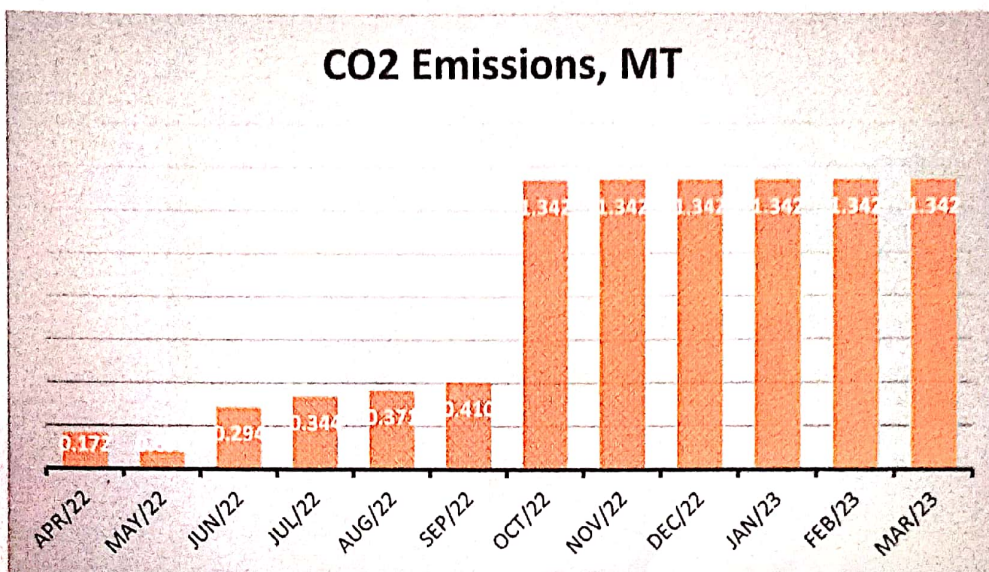
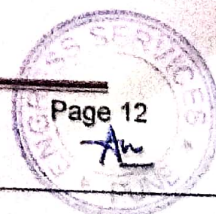


Table No 6: Important Parameters:

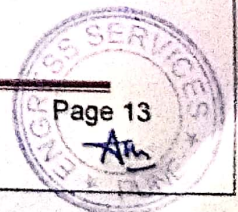
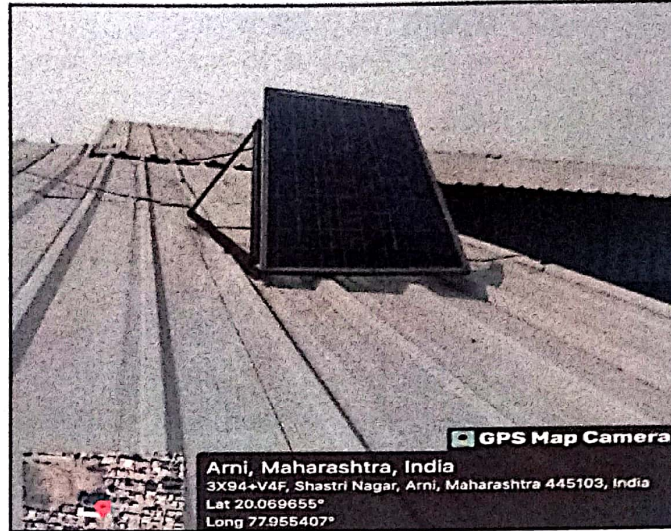
No	Parameter/ Value	Net Energy Consumption (kWh)	CO2 Emissions MT
1	Total	10814	9.733
2	Maximum	1491	1.342
3	Minimum	101	0.091
4	Average	901.167	0.811



CHAPTER III

STUDY OF USAGE OF RENEWABLE ENERGY

As on today College has not install solar roof-top PV plant, It is recommended to install solar rooftop plant on the college building., But College has installed solar lighting in the campus for night lightning.



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. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

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 10micron

Table No7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Administrative Office	46	30	32
2	Principal Cabin	46	27	42
3	Library	50	30	42
4	Dept of Physics	46	28	42
5	Dept of Chemistry	35	21	26
6	IOAC Cell	45	23	37
7	Class Room 1	45	23	37
8	Class Room 2	46	30	32
9	Class Room 3	50	31	42
10	Class Room 4	35	21	27
11	Maximum	50	31	42
12	Minimum	35	21	32

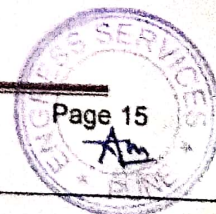
CHAPTER V STUDY OF INDOOR COMFORT CONDITION PARAMETERS

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 8: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Administrative Office	34	42	220	37
2	Principal Cabin	34	44	240	39.2
3	Library	34.2	44	210	37
4	Dept of Physics	34.6	44	230	40
5	Dept of Chemistry	34.2	45	245	39.2
6	IOAC Cell	34	44	244	38.2
7	Class Room 1	34.1	44	310	38
8	Class Room 2	34.2	45	305	41
9	Class Room 3	34.2	46	289	42
10	Class Room 4	34.6	46	250	41
11	Maximum	34.6	46	310	41
12	Minimum	34	42	210	37



CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

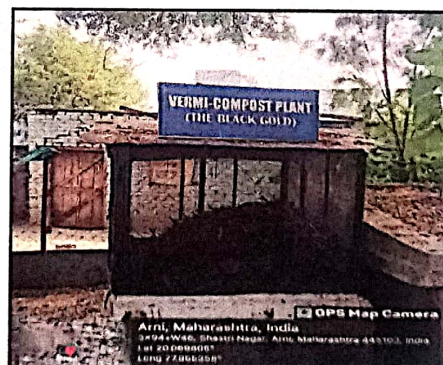
Photograph of Waste Collection Bins:



6.2 Vermi Composting Pit:

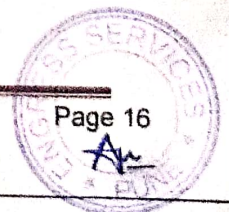
The Institute has a Vermi Composting Pit, to convert the Leafy Waste into Vermi Compost.

Photograph of Vermi Composting Pit:



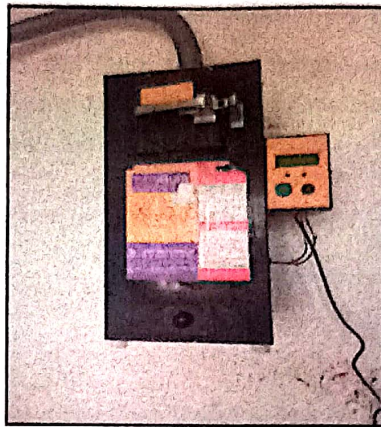
6.3 Liquid Waste Management:

The Institute has installed Septic Tanks it cleans periodically.



6.4 Sanitary Waste Management:

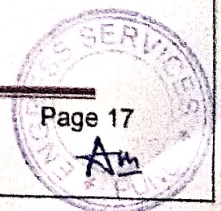
The Institute has installed Sanitary Waste Incinerator, for disposal of the Sanitary Waste.



6.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

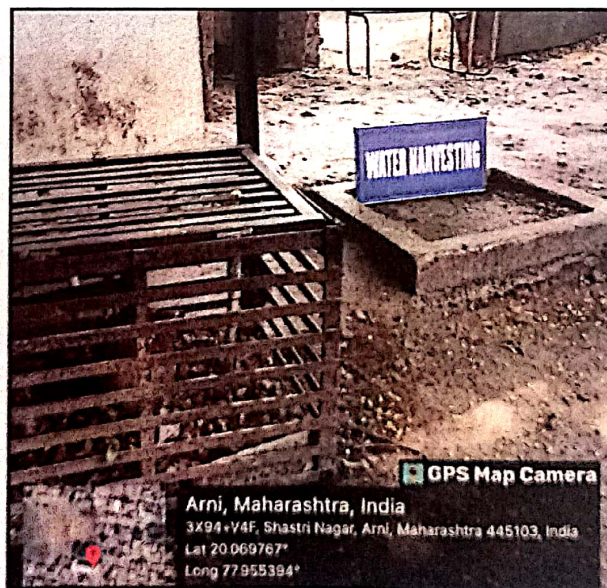
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CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The Institute has implemented the Rain Water Management Project. The Institute has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used for recharging the land water table purpose.

Photograph of Rain Water Management & Pipe Section:

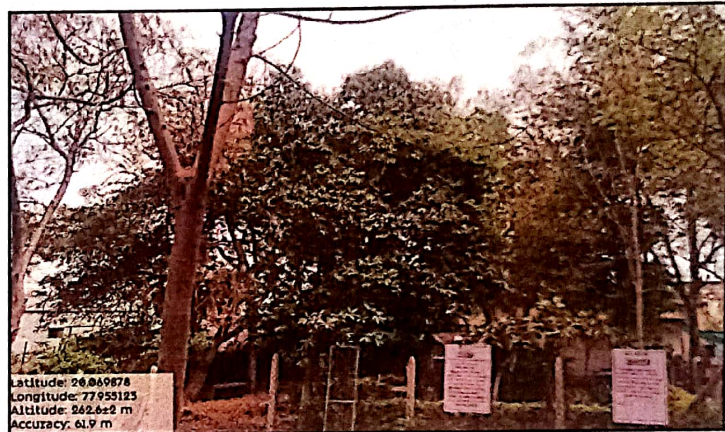


CHAPTER-VIII STUDY OF ECO FRIENDLY INITIATIVES

8.1 7.1 Internal Tree Plantation:

The College has internal Tree Plantation.

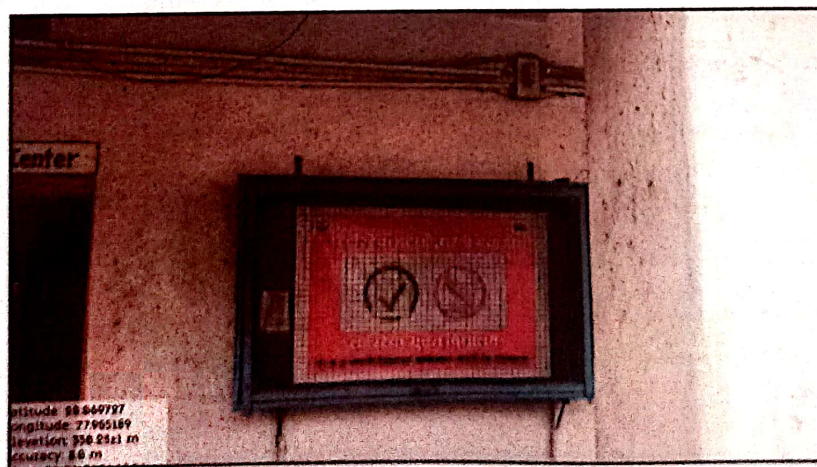
Photograph of Internal Tree Plantation:



8.2 Creation of Awareness about Plastic Ban:

The Institute has displayed posters emphasizing on importance of Plastic Ban.

Photograph of Poster on Plastic Ban:



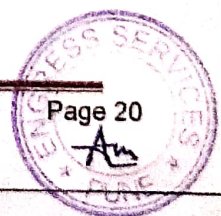
ANNEXURE-I: VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR COMFORT STANDARDS:

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 Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5



3. 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%

