

ENVIRONMENTAL AUDIT REPORT

of

Sahayog Sevabhavi Sanstha's,
MOTHER TERESA NURSING SCHOOL,
Sahayog Educational Campus, Vishnupuri, Nanded

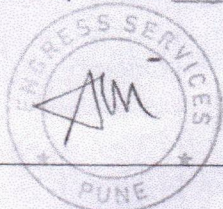


Year: 2021-22

Prepared by

ENGRESS SERVICES

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MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
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ECN/2022-23/CR-43/1709 10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Mukhtangan English School,
Parvati, Pune - 411 009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

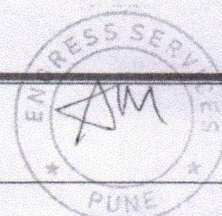
Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

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Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/ SSSMTNS/21-22/03

Date: 2/2/2023

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Sahayog Sevabhavi Sanstha's Mother Teresa Nursing School, Nanded in the Year 2021-22.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Installation of 10 kWp Capacity Roof Top Solar PV Plant
- Segregation of Waste at Source
- In process installation of Bio gas Plant for conversion of Bio degradable Waste
- Usage of Waste Liquid for Gardening purpose
- Internal Tree Plantation
- Creation of Awareness on Water Conservation by Display of Poster

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

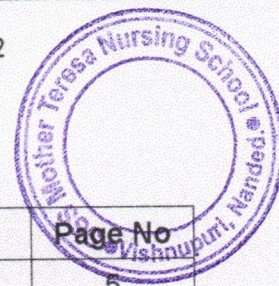
For Engress Services,

A Y Mehendale,
Certified Energy Auditor, EA-8192



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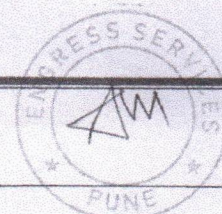
ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of Sahayog Sevabhavi Sanstha's Mother Teresa Nursing School, Nanded, for awarding us the assignment of Environmental Audit of their Nanded campus for the Year: 2021-22.

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



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EXECUTIVE SUMMARY

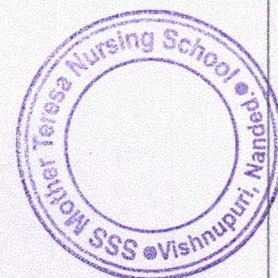
1. Sahayog Sevabhavi Sanstha's Mother Teresa Nursing School, Nanded, consumes Energy in the form of Electrical Energy; used for various gadgets, office & other facilities

2. Pollution caused due to College Activities:

- Air pollution: Mainly CO₂ on account of Electricity & LPG Consumption.
- Solid Waste: Bio degradable Waste, Garden Waste, Recyclable Waste and Human Waste.
- Liquid Waste: Human liquid Waste.

3. Present Energy Consumption & CO₂ Emission:

No	Parameter/Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	16426	14.78
2	Maximum	2825	2.54
3	Minimum	236	0.21
4	Average	1369	1.23



4. Various projects implemented for Environmental Conservation:

- Installation of 25 kWp Roof Top Solar PV Plant.
- Usage of Liquid Waste for gardening purpose

5. Usage of Renewable Energy & Reduction in CO₂ Emission:

- The College has installed Roof Top Solar PV Plant of Capacity 10 kWp.
- The Electrical Energy generated in 21-22 is 12000 kWh.
- Reduction in CO₂ Emissions in 21-22 works out to be 10.8 MT.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	166	83	93
2	Minimum	150	75	87

7. Waste Management:

7.1 Segregation of Waste at Source:

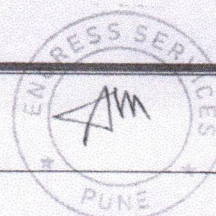
The Waste is segregated at source, by provision of separate Waste Collection Bins.

7.2 Organic Waste Management:

The College is in process of installation of Bio Gas Plant for conversion of Bio degradable Waste.

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7.3 Liquid Waste Management:

Liquid waste from the canteen & the wash rooms is collected and is recycled using four bed filtration method and is used for watering the garden.

7.4 E Waste Management:

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

8. Rain Water Harvesting:

The Rain Water falling on the terrace as well as free flowing water is collected in an underground water tank and is further used for gardening purpose.

9. Environmental Friendly Initiatives:

- Internal Tree Plantation
- Creation of Awareness by Display of Posters on Water Conservation.

10. Assumptions:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere
- Average Energy generated by 1 kWp Solar PV Plant : 4 kWh/Day
- Annual Solar Energy Generation Days: 300 Nos

11. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar Energy Generation: www.solarrooftop.gov.in
- For AQI & Water Quality Standards: www.cpcb.com



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ABBREVIATIONS

SSS	: Sahayog Sevabhavi Sanstha
MSEDCL	: Maharashtra State Distribution Company Limited
MT	: Metric Ton
kWh	: kilo-Watt Hour
KLPD	: Kilo Litres 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

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CHAPTER-I INTRODUCTION



1.1 Important Definitions:

1.1.1 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

1.1.2. 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"

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

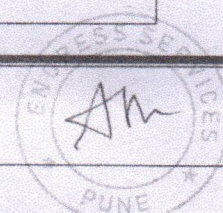
1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

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1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules



2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research College)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen: India's Position on Climate Change Issues (MoEF)

1.2 Audit Methodology:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To Study Waste Management
5. To Study Rain Water Harvesting
6. To Study Environment Friendly Initiatives



1.3 General Details of College: Table No: 4

No	Head	Particulars
1	Name of the Institution	Sahayog Sevabhavi Sanstha's Mother Teresa Nursing School
2	Address	Vishnupuri, Nanded, 431 606
3	Year of Establishment	2011
4	Affiliation	Maharashtra University of Health Sciences, Nashik

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CHAPTER-II

STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

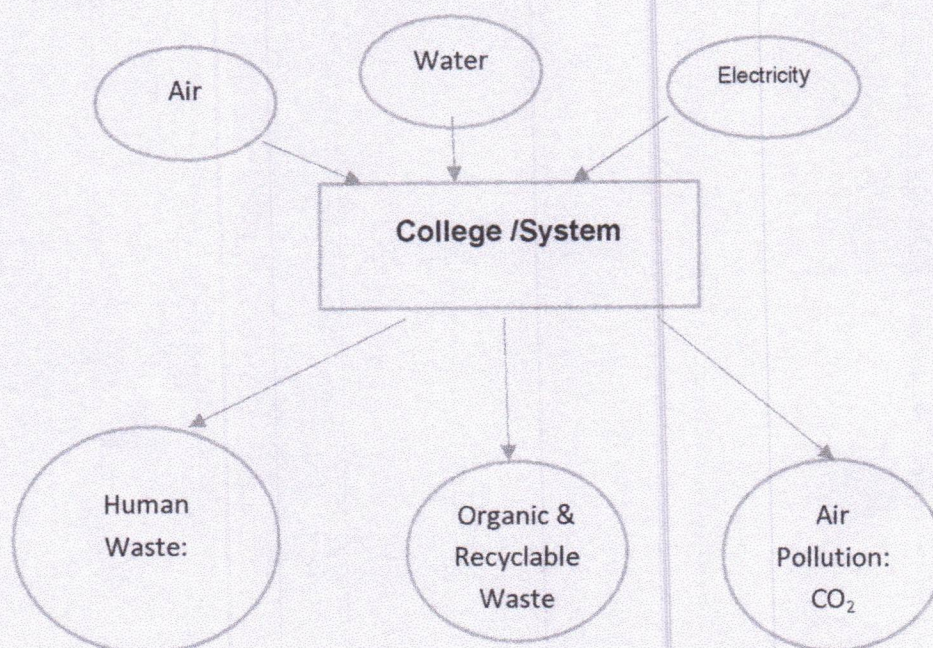
The College consumes following Natural/derived Resources:

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:



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 Energy & CO₂ Emissions: 21-22:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Dec-21	515	0.46
2	Jan-22	236	0.21
3	Feb-22	249	0.22
4	Mar-22	1236	1.11
5	Apr-22	1911	1.72
6	May-22	797	0.72
7	Jun-22	1165	1.05

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8	Jul-22	2650	2.39
9	Aug-22	2752	2.48
10	Sep-22	2825	2.54
11	Oct-22	1262	1.14
12	Nov-22	830	0.75
13	Total	16426	14.78
14	Maximum	2825	2.54
15	Minimum	236	0.21
16	Average	1369	1.23



Chart No 2: Study of CO₂ Emission:

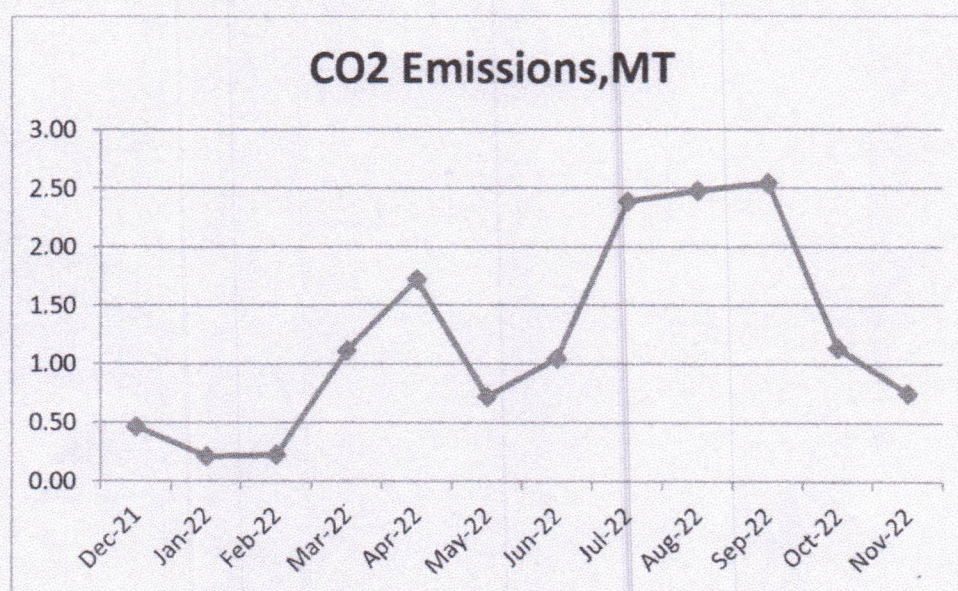
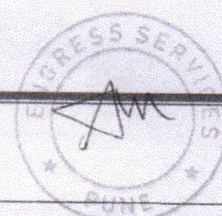


Table No 6: Various Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	16426	14.78
2	Maximum	2825	2.54
3	Minimum	236	0.21
4	Average	1369	1.23

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CHAPTER IV STUDY OF CO₂EMISSION REDUCTION



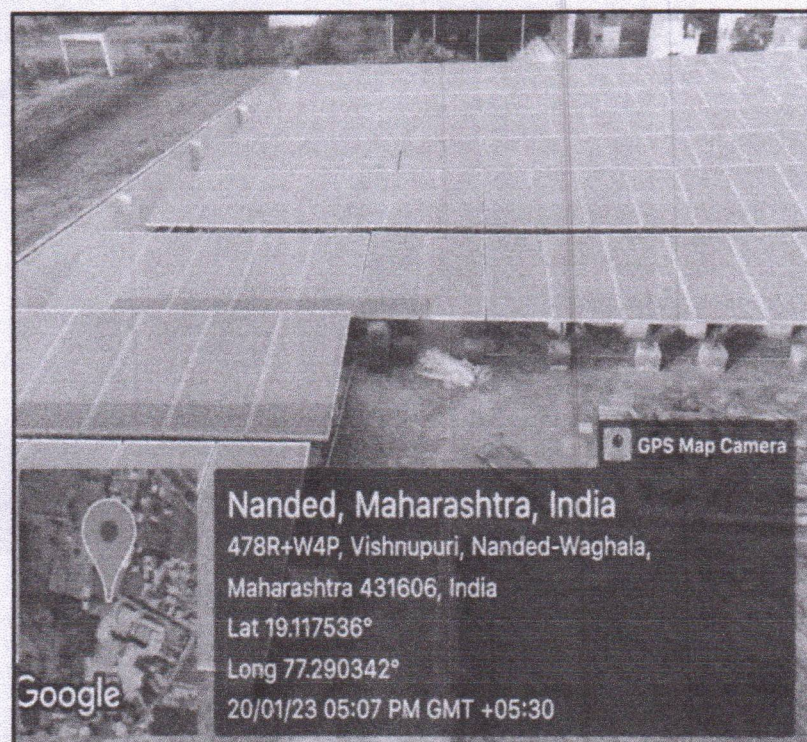
The College has installed Roof Top Solar PV Plant of Capacity 10 kWp.

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	10.8	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



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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 litres** 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 liveability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

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

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 'air pollution' has been defined as 'the presence in the atmosphere of any air pollutant.'

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as 'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment

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


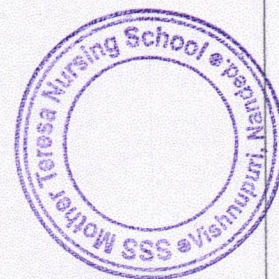

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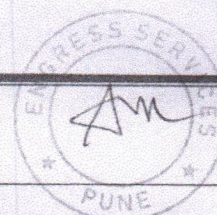
Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
	First Floor			
1	Library	150	75	87
2	HOD cabin	163	81	92
3	Classroom-4	160	78	90
	Second Floor			
4	HOD Cabin	166	80	91
5	Classroom-11	161	78	93
6	Classroom-10	163	80	92
	Third Floor			
7	MCH Lab	152	76	88
8	Store	163	82	92
9	Nutrition Lab	164	83	93
	Maximum	166	83	93
	Minimum	150	75	87



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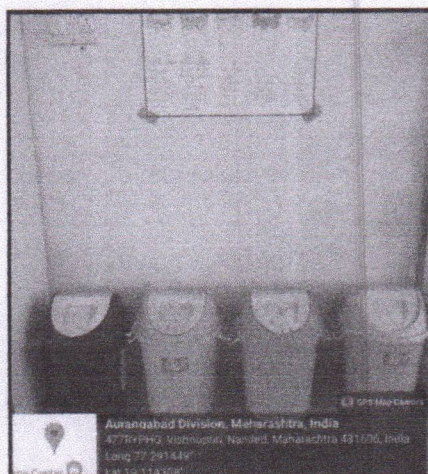
CHAPTER V STUDY OF WASTE MANAGEMENT



5.1 Segregation of Waste at Source:

The Waste is segregated at source, by provision of separate Waste Collection Bins.

Photograph of Waste Collection Bins:



5.2 Organic Waste Management:

The College is in process of installation of Bio Gas Plant for conversion of Bio degradable Waste.

5.3 Liquid Waste Management:

Liquid waste from the canteen & the wash rooms is collected and is recycled using four bed filtration method and is used for watering the garden.

Photograph of Underground Water Storage Tank:

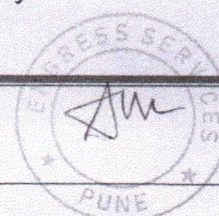


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5.4 E Waste Management:

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



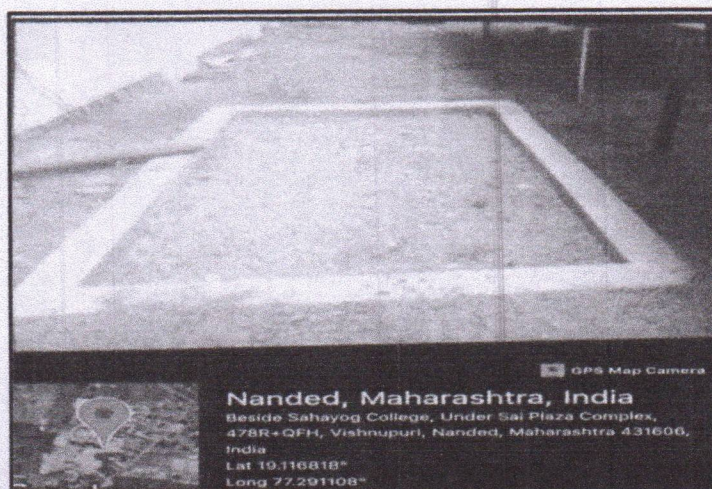


CHAPTER-VI

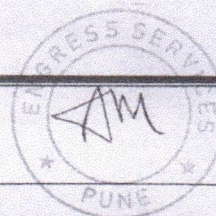
STUDY OF RAIN WATER MANAGEMENT

The Rain Water falling on the terrace as well as free flowing water is collected in an underground water tank and is further used for gardening purpose.

Photograph of Rain Water Storage Tank:



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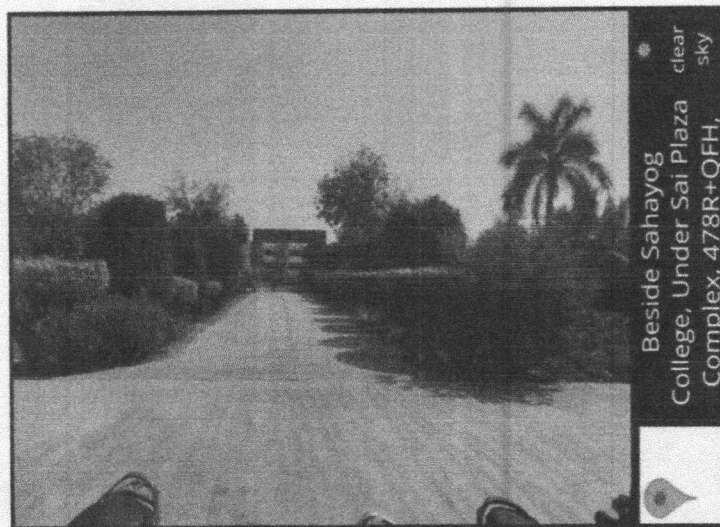
CHAPTER-VII

STUDY OF ENVIRONMENTAL FRIENDLY PRACTICES

7.1 Internal Tree Plantation:

The College has internal Tree Plantation.

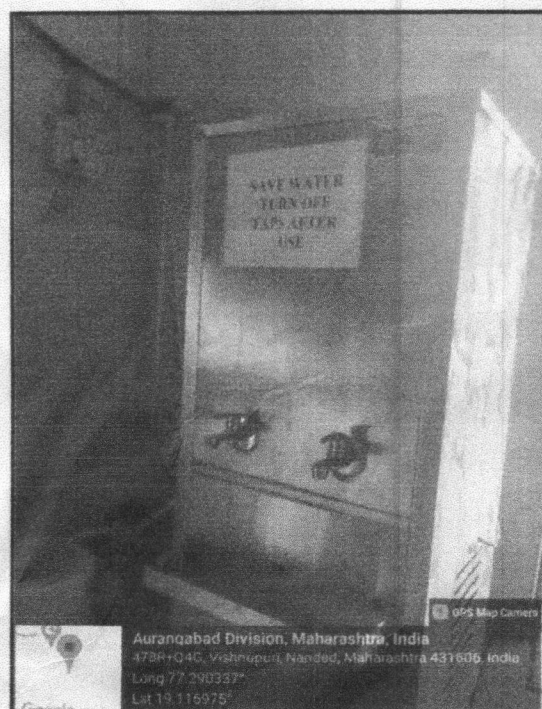
Photograph of Internal Tree Plantation:



7.2 Creation of Awareness on Water Conservation:

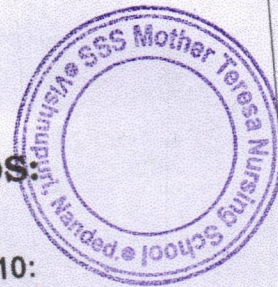
The College has displayed Poster emphasizing the importance of Water Saving.

Photograph of Poster on Saving Water:



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ANNEXURE-I: INDOOR AIR QUALITY & WATER QUALITY 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

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