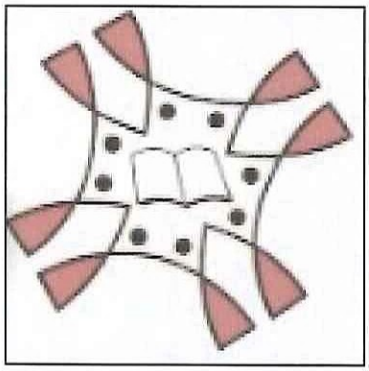
ENVIRONMENTAL AUDIT REPORT

of

Harikisan Jajoo Education Sanstha's

College of Management & Computer Science

Naringe Nagar, Dhamangaon Road, Yavatmal 445 001



Year: 2022-23

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society
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Phone: 09890444795Email: engress123@gmail.com

ENGRESS SERVICES * PUNE *

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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/CMCS/22-23/03 **Date: 21/10/2023**

This is to certify that we have conducted Environmental Audit at College of Management & Computer Science, Yavatmal in the Year 2022-23.

The Institute has adopted following Energy Efficient& Green Practices:

- Usage of Energy Efficient LED Light Fitting
- Installation of 15 kWp Roof Top Solar PV Plant
- Segregation of Waste at Source
- Installation of Sanitary Waste Incinerator
- 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 Mehendale

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

REGISTRATION CERTIFICATES

Maharashtra Energy Development Agency

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

MEDA Registration Certificate

GEM Certificate

ASSOCHAM hereby certifies that

Mr. A Y Mehendale

has successfully passed the
Green and Eco-friendly Movement Certified Professional Test (GEM CP)
with
"Excellent Performance"
on
06 June, 2022

Pankaj R. Dharkar — GEM CP 22/788 — Deepak Sood

GEM Certified Professional Certificate

Certificate of Registration

This is to Certify that
Quality Management System of

ENGRESS SERVICES

has been assessed and found to conform to the requirements of
ISO 9001:2015
for the following scope :

CONSULTANCY SERVICES FOR ENERGY AUDIT, GREEN AUDIT & ENVIRONMENTAL AUDIT IN EDUCATIONAL INSTITUTIONS & SUBMISSION OF AUDIT CERTIFICATE AND REPORT

Director

Magnitude Management Services Pvt. Ltd.

ISO: 9001-2015 Certificate

Certificate of Registration

This is to Certify that
Environmental Management System of

ENGRESS SERVICES

has been assessed and found to conform to the requirements of
ISO 14001:2015
for the following scope :

Director

Magnitude Management Services Pvt. Ltd.

ISO: 14001-2015 Certificate

INDEX

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of of Management & Computer Science, Yavatmal 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. College of Management & Computer Science, Yavatmal 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 CO_2 on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste
- Liquid Waste: Human liquid waste

3. Present Energy Consumption & CO_2 Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumption	**21128**	kWh
2	Annual CO_2 Emissions	**19.01**	MT

4. Various initiatives taken for Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Bio Composting Pit Installation
- Installation of 15 kWp Capacity Roof Top Solar PV Plant

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	**108**	**68**	**107**
2	Minimum	**102**	**61**	**103**

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	**31**	**47**	**250**	**41**
2	Minimum	**29**	**42**	**141**	**36**

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 Bio Composting Pit:

The Institute has a Bio Composting Pit, to convert the Leafy Waste into Bio 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 CO_2 into atmosphere

11. References:

- For CO_2 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:

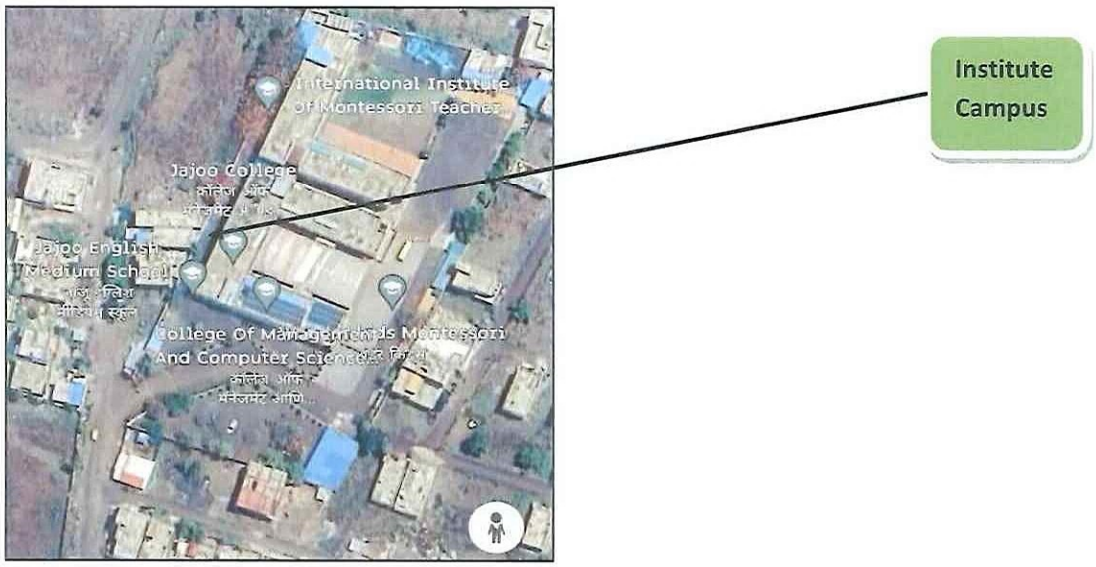
An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

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 Institute Location Image:

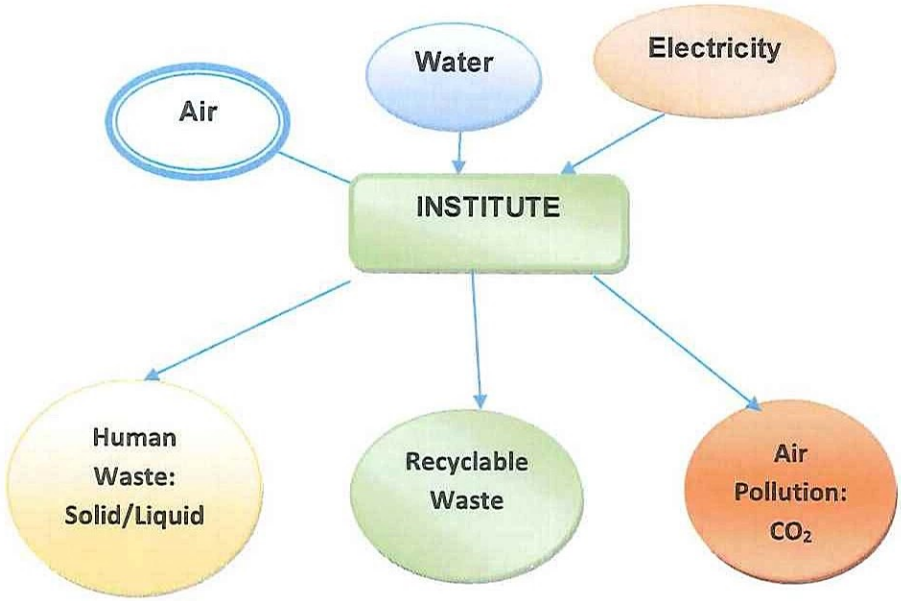


CHAPTER-II
STUDY OF RESOURCE CONSUMPTION& CO_2 EMISSION

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 CO_2 on account of consumption of Electrical Energy. The basis of Calculation for CO_2 emissions due to Electrical Energy is as under.

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO_2 Emissions: 22-23:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-22	1273	1.145
2	May-22	1529	1.376
3	Jun-22	2638	2.374
4	Jul-22	1894	1.704
5	Aug-22	1796	1.616
6	Sep-22	2941	2.646
7	Oct-22	1772	1.594
8	Nov-22	1716	1.544

9	Dec-22	1675	1.507
10	Jan-23	1311	1.179
11	Feb-23	624	0.561
12	Mar-23	1959	1.763
13	Total	21128	19.015
14	Maximum	2941	2.646
15	Minimum	624	0.561
16	Average	1760.66	1.584

Chart No 2: Month wise CO_2Emissions:

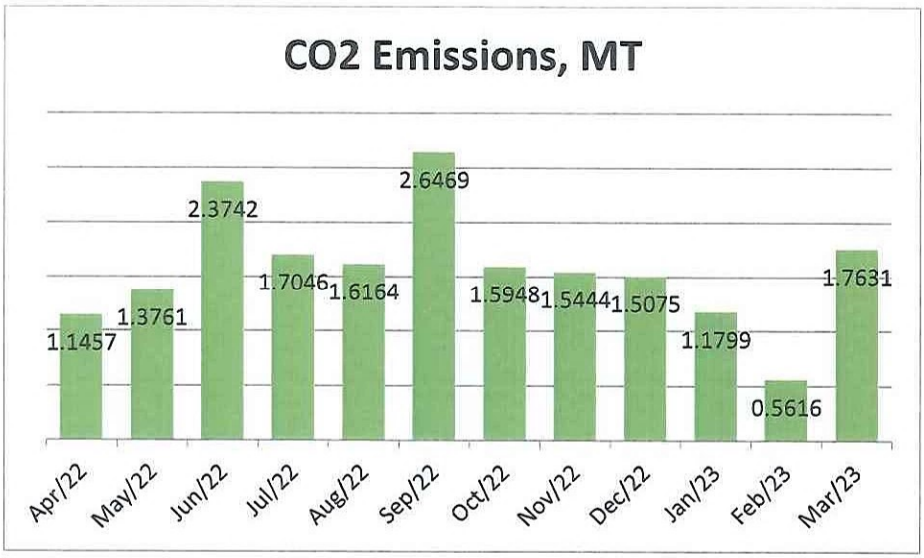


Table No 6: Important Parameters:

No	Parameter/ Value	Net Energy Consumption (kWh)	CO2 Emissions MT
1	Total	21128	19.015
2	Maximum	2941	2.646
3	Minimum	624	0.561
4	Average	1760.66	1.584

CHAPTER III
STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed a **15 kWp** capacity Roof top Solar PV Plant this year.
Now we compute the Percentage of Alternate Energy to Annual Energy demand:

Table No 7: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Energy Purchased from MSEDCL	21128	kWh
2	Installed Roof Top Solar PV Plant Capacity	15	kWp
3	Average Daily Energy Generated	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated	18000	kWh
6	Total Energy Demand = (1) + (5)	39128	kWh
7	Expecting % of Usage of Alternate Energy to Total Annual Energy Demand for Current Year Consumption= (5)*100/ (6)	46	%

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. 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	Principal Cabin	108	68	107
2	Admin Office	107	67	107
3	IQAC Room	107	67	105
4	Staff Room	107	68	107
5	Library	106	65	104
6	Seminar Hall	105	65	105
7	Computer Lab	103	64	104
8	EXTC Lab	109	69	108
9	Class Room 10	106	65	104
10	Class Room 11	105	65	106
11	Class Room 09	102	61	102
12	Class Room 08	103	64	103
13	**Maximum**	108	68	107
14	**Minimum**	102	61	103

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	Principal Cabin	31	42	220	37
2	Admin Office	30.1	44	240	39.2
3	IQAC Room	30.1	44	210	37
4	Staff Room	30.2	44	230	40
5	Library	29.8	47	141	39.2
6	Seminar Hall	29.6	44	244	38.2
7	Computer Lab	29	47	142	38
8	EXTC Lab	30.1	45	156	41
9	Class Room 10	30	46	241	42
10	Class Room 11	30	46	250	41
11	Class Room 09	30	45	240	41
12	Class Room 08	30.1	44	243	42
13	**Maximum**	**31**	**47**	**250**	**41**
14	**Minimum**	**29**	**42**	**141**	**36**

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 Bio Composting Pit:

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

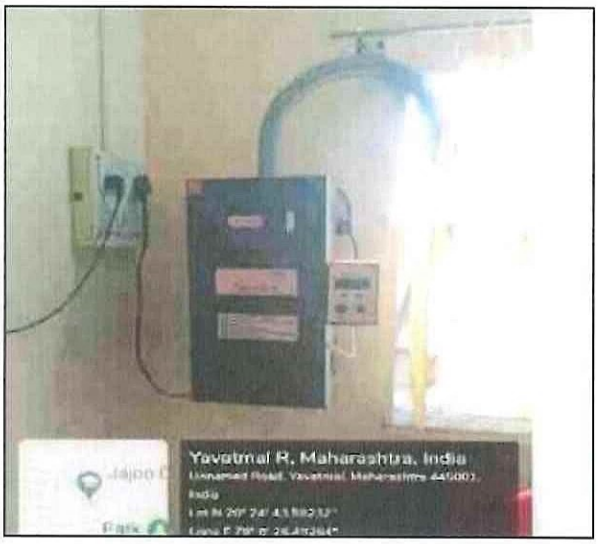
Photograph of Bio Composting Pit:

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.



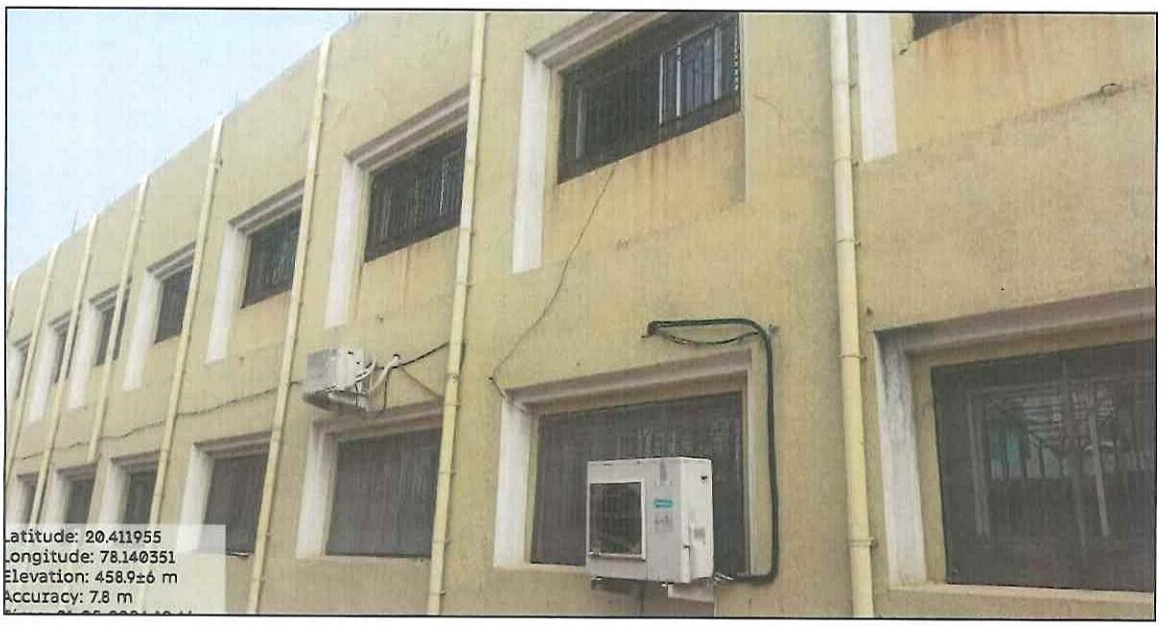
6.5 E Waste Management:

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

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 and gardening purpose.

Photograph of Rain Water Management & Pipe Section:



CHAPTER-VIII
STUDY OF ECO FRIENDLY INITIATIVES

8.1 7.1 Internal Tree Plantation:

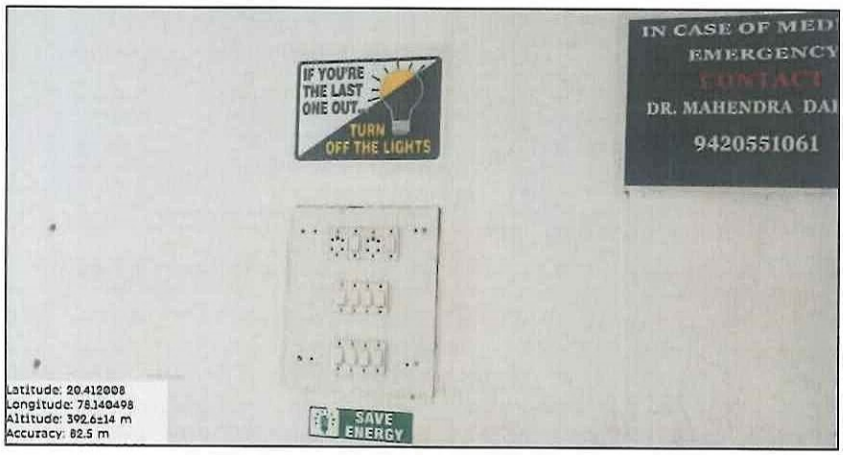
The College has internal Tree Plantation.

Photograph of Internal Tree Plantation:

8.2 Creation of Awareness about Energy Conservation:

The Institute has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



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 33^0C
2	Humidity	Less Than 70%