



7.1.3 Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following

1. **Green audit / Environment audit**
2. **Energy audit**
3. **Clean and green campus initiatives**
4. **Beyond the campus environmental promotion activities**

HEI Input: A. All of the above

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ENGRESS SERVICES

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ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

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

Date: 10/7/2023

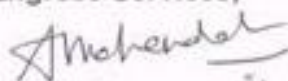
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The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 84 kWp

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
Certified Energy Auditor, EA-8192



ENERGY AUDIT REPORT

of

Lokmanya Tilak Jankalyan Shikshan Sanstha's,
PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING,

Harpur Nagar, Umred Road, Nagpur 440 024



Year: 2022-23

Prepared by:

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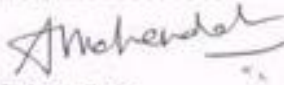
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Certified Energy Auditor, EA-8192



REGISTRATION CERTIFICATES



AUDITOR CERTIFICATE



MEDA REGISTRATION 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 Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini Bhagwati College of Engineering, Harpur Nagar, Umred Road, Nagpur, for awarding us the assignment of Energy Audit of their Campus for the Year: 22-23.

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



EXECUTIVE SUMMARY

1. Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini Bhagwati College of Engineering, Harpur Nagar, Umred Road, Nagpur consumes Energy in the form of Electrical Energy; used for various Equipment.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	311	kW
2	Annual Energy Purchased	38124	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	38124	kWh
2	Annual Energy Generated	29751	kWh
3	Annual Energy Consumed=1+2	67875	kWh
4	Total Built up area of College	22553.94	m ²
5	Energy Performance Index =(3) / (4)	3.01	kWh/m ²

4. Study of % Usage of LED Lighting:

No	Particulars	Value	Unit
1	% of Usage of LED Lighting to Total Lighting Load	4.27	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Installation of 84 kWp Roof Top Solar PV Plant

6. Assumption:

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

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO₂ Emissions: www.tatapower.com

ABBREVIATIONS

LTJSS	: Lokmanya Tilak Jankalyan Shikshan Sanstha
LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
BEE	: Bureau of Energy Efficiency
FTL	: Fluorescent Tube Light
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton

CHAPTER-I INTRODUCTION

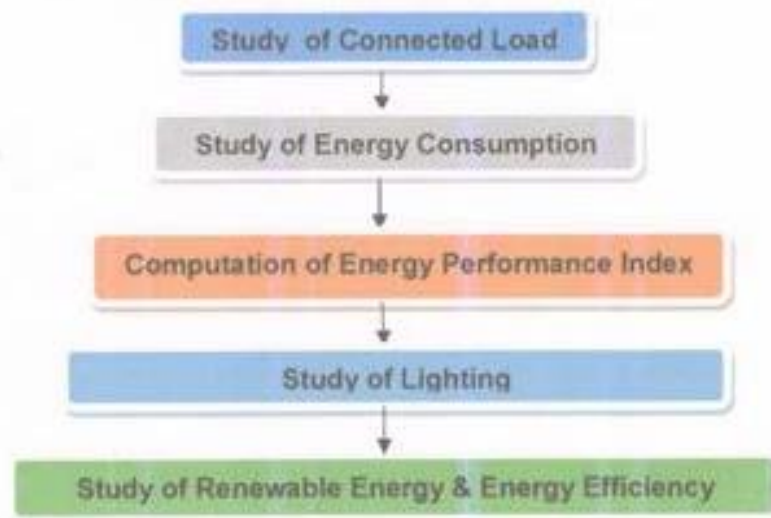
1.1 Introduction:

An Energy Audit is conducted at Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini Bhagwati College of Engineering, Harpur Nagar, Umred Road, Nagpur

The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Audit Procedural Steps:



1.3 Google Earth Image:



College
Campus

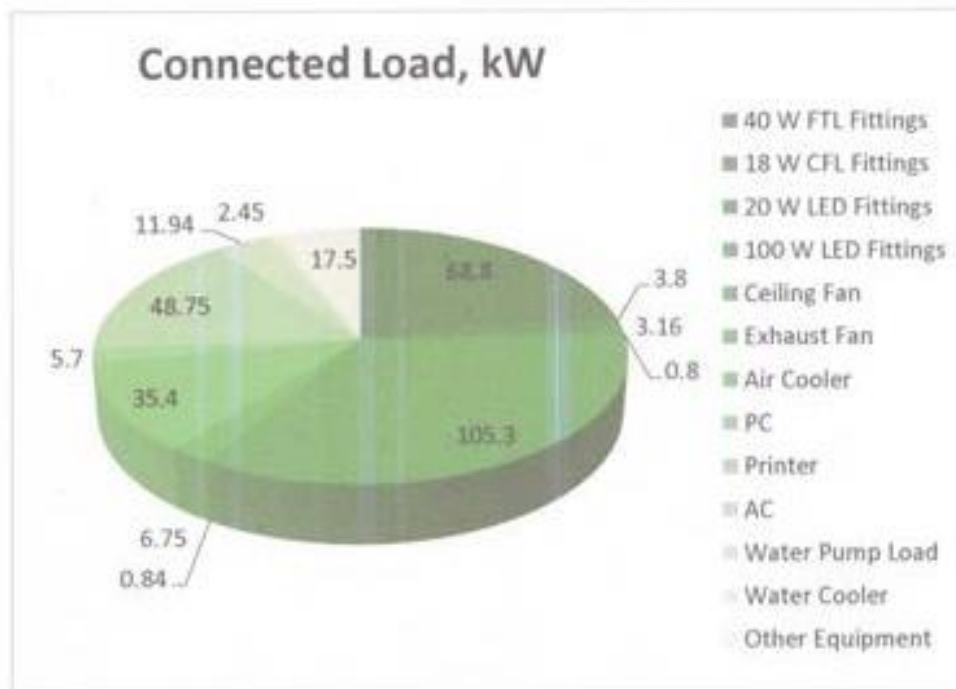
CHAPTER-II STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College include:

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fittings	1720	40	68.8
2	18 W CFL Fittings	190	20	3.8
3	20 W LED Fittings	158	20	3.16
4	100 W LED Fittings	8	100	0.8
5	Ceiling Fan	1620	65	105.3
6	Exhaust Fan	14	60	0.84
7	Air Cooler	27	250	6.75
8	PC	590	60	35.4
9	Printer	19	300	5.7
10	AC	26	1875	48.75
11	Water Pump Load	16	746	11.94
12	Water Cooler	7	350	2.45
13	Other Equipment	50	350	17.5
14	Total			311

Chart No 1: Study of Connected Load:



CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy Consumption.

Table No 2: Electrical Energy Purchase Analysis- 2022-23:

No	Month	Energy Purchased, kWh	CO2 Emissions, MT
1	Jun-22	4735	4.26
2	Jul-22	4389	3.95
3	Aug-22	2803	2.52
4	Sep-22	4255	3.83
5	Oct-22	2988	2.69
6	Nov-22	2373	2.14
7	Dec-22	2227	2.00
8	Jan-23	2364	2.13
9	Feb-23	1979	1.78
10	Mar-23	2874	2.59
11	Apr-23	3622	3.26
12	May-23	3515	3.16
13	Total	38124	34.31
14	Maximum	4735	4.26
15	Minimum	1979	1.78
16	Average	3177	2.86

Chart No 2: Variation in Monthly Energy Purchased:



CHAPTER-IV STUDY OF ENERGY PERFORMANCE INDEX

Energy Performance Index: Energy Performance Index of a Building is its Annual Energy Consumption in Kilo Watt Hours per square meter of the Building

It is determined by:

$$\text{EPI} = \frac{\text{(Annual Energy Consumption in kWh)}}{\text{(Total Built-up area in m}^2\text{)}}$$

Now we compute the EPI for the College as under:

Table No 3: Computation of Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	38124	kWh
2	Energy Generated by Solar PV Plant	29751	kWh
3	Total Energy Consumed= 1+2	67875	kWh
4	Total Built up area of College	22553.94	m ²
5	Energy Performance Index =(3) / (4)	3.01	kWh/m ²

CHAPTER-V STUDY OF LIGHTING

Terminology:

- 1. Lumen** is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.
- 2. Lux** is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.
- 3. Circuit Watts** is the total power drawn by lamps and ballasts in a lighting circuit under assessment.
- 4. Installed Load Efficacy** is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m^2)
- 5. Lamp Circuit Efficacy** is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)
- 6. Installed Power Density.** The installed power density per 100 lux is the power needed per square metre of floor area to achieve 100 lux of average maintained illuminance on a horizontal working plane with general lighting of an interior. Unit: watts per square metre per 100 lux ($\text{W/m}^2/100 \text{ lux}$) 100 Installed power density ($\text{W/m}^2/100 \text{ lux}$)
- 7. Lighting Power Density:** It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the Percentage usage of LED Lighting to total Lighting Load of the College.

Table No 4: Percentage Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	1720	Nos
2	Load per unit of 40 W FTL Fitting	40	W
3	Total Load of 40 W FTL Fittings	68.8	kW
4	No of 18 W CFL Fittings	190	Nos
5	Load per unit of 18 W CFL Fitting	20	W

6	Total Load of 18 W CFL Fittings	3.8	kW
7	No of 20 W LED Fittings	158	Nos
8	Load per unit of 20 W LED Fitting	20	W
9	Total Load of 20 W LED Fittings	3.16	kW
10	No of 100 W LED Fittings	8	Nos
11	Load per unit of 100 W LED Fitting	10	W
12	Total Load of 100 W LED Fittings	0.08	kW
13	Total LED Lighting Load = 9+12	3.24	kW
14	Total Lighting Load = 3+6+9+12	75.84	kW
15	% of LED to Total Lighting Load = $13 \times 100 / 14$	4.27	%



CHAPTER-VI

STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

The College has installed:

- Roof Top Solar PV Plant of Capacity 84 kWp

Photograph of Roof Top Solar PV Plant:



6.2 Energy Efficiency Measures adopted:

- The College has Energy Efficient LED Fittings.
- Usage of BEE STAR Rated Equipment

Photograph of LED Lighting:



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

Date: 10/7/2023


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The Institute has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Fittings
- Installation of 84 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Vermi Composting Bed for conversion of Organic Waste
- Implementation of Rain Water Management Project
- Tree Plantation in the campus
- 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 Eco Friendly.

For Engress Services,



A Y Mehendale,

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



ENVIRONMENTAL AUDIT REPORT

of

Lokmanya Tilak Jankalyan Shikshan Sanstha's,
PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING,
Harpur Road, Umred Road, Nagpur



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



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EXECUTIVE SUMMARY

1. Lokmanya Tilak Jankalyan Shikshan Sanstha's Priyadarshini Bhagwati College of Engineering, Harpur Nagar, Umred Road, Nagpur consumes Energy in the form of Electrical Energy; used for various Equipment.

2. Pollution due to Institute Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste, Paper, Plastic Waste
- **Liquid Waste:** Human Liquid Waste

3. Present Electrical Energy & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	38124	kWh
2	Annual CO ₂ Emissions	34.31	MT

4. Initiatives Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Implementation of 84 kWp Roof Top Solar PV Plant
- Segregation of Waste at source
- Implementation of Rain Water Management Project

5. Renewable Energy & Reduction in CO₂ Emissions:

- The Institute has installed Roof Top Solar PV Plant of Capacity 84 kWp.
- The Energy generated by Solar PV Plant in 22-23 is 29751 kWh.
- Reduction in CO₂ Emissions in 22-23 is 26.78 MT

6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	57	32	38
2	Minimum	45	24	27

7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	27	60.1	145	49
2	Minimum	26.5	59	121	39

8. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Vermi Composting Bed for conversion of Organic Waste
3	E Waste Management	Recommended to dispose of through Authorized Agency

9. Rain Water management:

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

10. Eco Friendly Initiatives:

- Tree Plantation in the campus
- Creation of Awareness on Water Conservation by Display of Posters

11. Assumption:

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

12. References:

- For CO₂ Emissions: www.tatapower.com
- For AQI Parameters: www.cpcb.com
- For Indoor Comfort Parameters: www.isharae.com

ABBREVIATIONS

LTJSS	: Lokmanya Tilak Jankalyan Shikshan Sanstha
LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
FTL	: Fluorescent Tube Light
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton
AQI	: Air Quality Index
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 Google Earth Image:



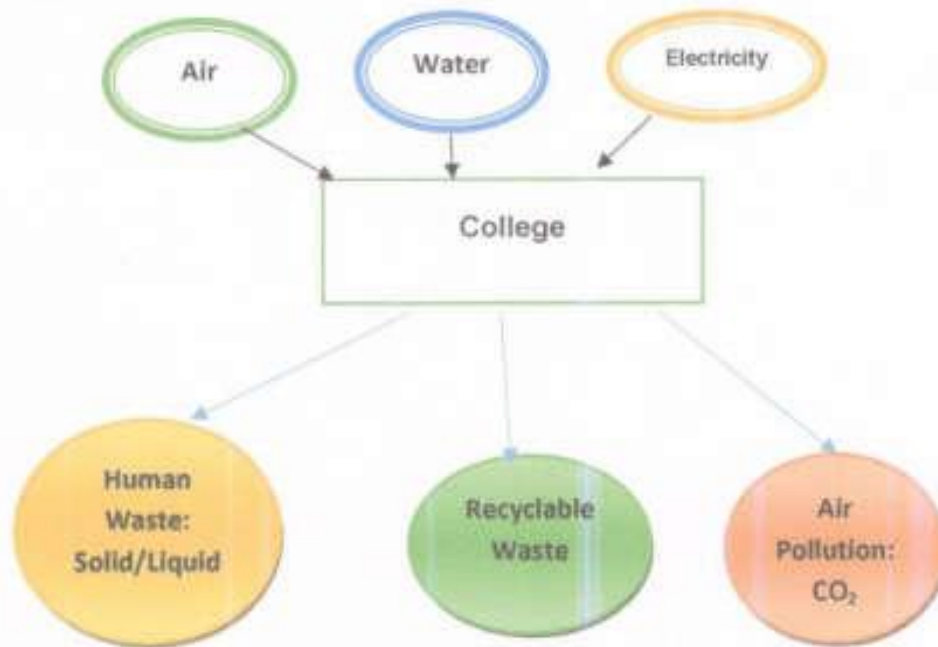
College
Campus

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

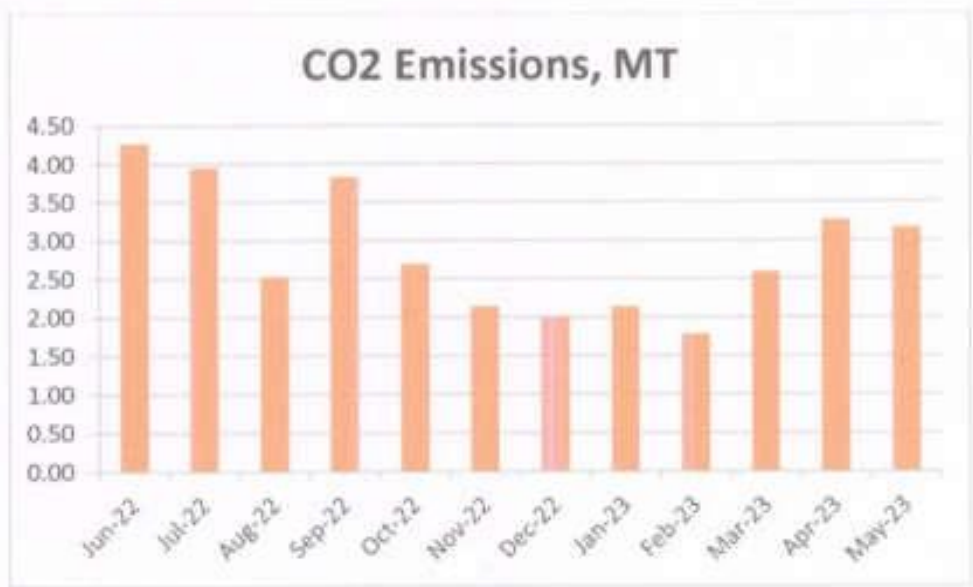
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

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

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Jun-22	4735	4.26
2	Jul-22	4389	3.95
3	Aug-22	2803	2.52
4	Sep-22	4255	3.83
5	Oct-22	2988	2.69
6	Nov-22	2373	2.14
7	Dec-22	2227	2.00
8	Jan-23	2364	2.13
9	Feb-23	1979	1.78
10	Mar-23	2874	2.59

11	Apr-23	3622	3.26
12	May-23	3515	3.16
13	Total	38124	34.31
14	Maximum	4735	4.26
15	Minimum	1979	1.78
16	Average	3177	2.86

Chart No 2: Variation in Monthly CO₂ Emission:



CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **84 kWp**.

In the following Table, we present the Energy Generation & Reduction in CO₂ Emissions due to Solar Energy.

Table No 3: Energy Generation & Reduction in CO₂ Emissions:

No	Month	Energy Generated, kWh	Reduction in CO ₂ Emissions, MT
1	Jun-22	3674	3.31
2	Jul-22	3195	2.88
3	Aug-22	2201	1.98
4	Sep-22	3596	3.24
5	Oct-22	2345	2.11
6	Nov-22	1745	1.57
7	Dec-22	1654	1.49
8	Jan-23	1746	1.57
9	Feb-23	1414	1.27
10	Mar-23	2267	2.04
11	Apr-23	3049	2.74
12	May-23	2865	2.58
13	Total	29751	26.78
14	Maximum	3674	3.31
15	Minimum	1414	1.27
16	Average	2479.25	2.23

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.

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.

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 4: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Admin Section	51	32	38
2	Civil Engg Department	50	30	37
3	Computer Lab	45	24	27
4	Mech Engg Department	57	32	36
5	Library	51	31	33
	Maximum	57	32	38
	Minimum	45	24	27

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 5: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Admin Section	26.5	60	145	41
2	Civil Engg Department	26.7	59	140	39
3	Computer Lab	26.6	59.6	139	47
4	Mech Engg Department	26.8	60.1	129	49
5	Library	27	60	121	47
	Maximum	27	60.1	145	49
	Minimum	26.5	59	121	39

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at source:

The Waste is segregated at source. Waste Bins are kept at various points.

Photograph of Waste Bin:



6.2 Bio Composting Pit:

For conversion of Organic Waste, a Bio Composting Pit is provided

Photograph of Bio Composting Pit:



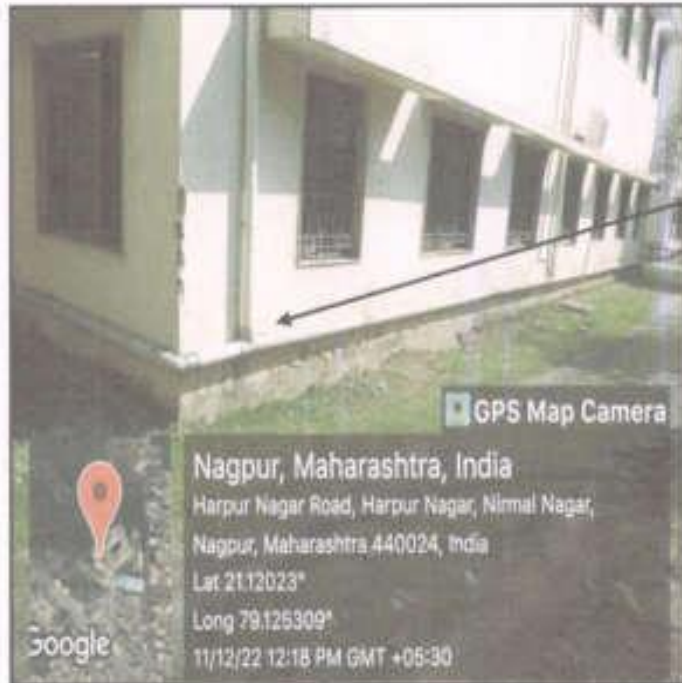
6.3 E Waste Management:

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

CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

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

Photograph of Rain Water Pipe Section:



Rain Water
Carrying Pipe

CHAPTER-VIII STUDY OF ECO FRIENDLY INITIATIVES

7.1 Tree Plantation:

The College has done Tree Plantation in the campus.

Photograph of Tree Plantation:



7.2 Creation of Awareness by Display of Posters:

The College has displayed Posters on creation about Water Conservation.

Photograph of Poster on Water Conservation:



ANNEXURE:

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%



GREEN AUDIT

CERTIFICATE

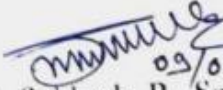
This is to certify that a Green Audit at **PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR (PBCOE)** was conducted for 2022-2023 session to assess green initiatives for sustenance of institute ecosystem and environment.

Green Audit Team has prepared this report for based on College representatives data compiled with the best judgment capacity of the expert team. All reasonable care has been taken in its preparation based on information gathered at site. Institute has submitted necessary data and credentials for scrutiny. The activities and measures carried out by the institute have been verified based on the report submitted and actual field observations. It was observed that a number of environmentally friendly best practices are undertaken in the college.

The institute constantly strives to care for the mother earth, biodiversity and landscaping as per the requirements of the flora. Also motivates the students to keep the campus green, clean and plastic free.

The efforts taken by the institute towards environmental safety is appreciable and in consonance with the future sustainability.

Internal Green Audit officer


09/04/2023
(Dr. Subhash R. Somkuwar)
External Green Audit Officer
Co-ordinator
Environmental Science,
Dr. Ambedkar College,
Deekshabhoomi, Nagpur.

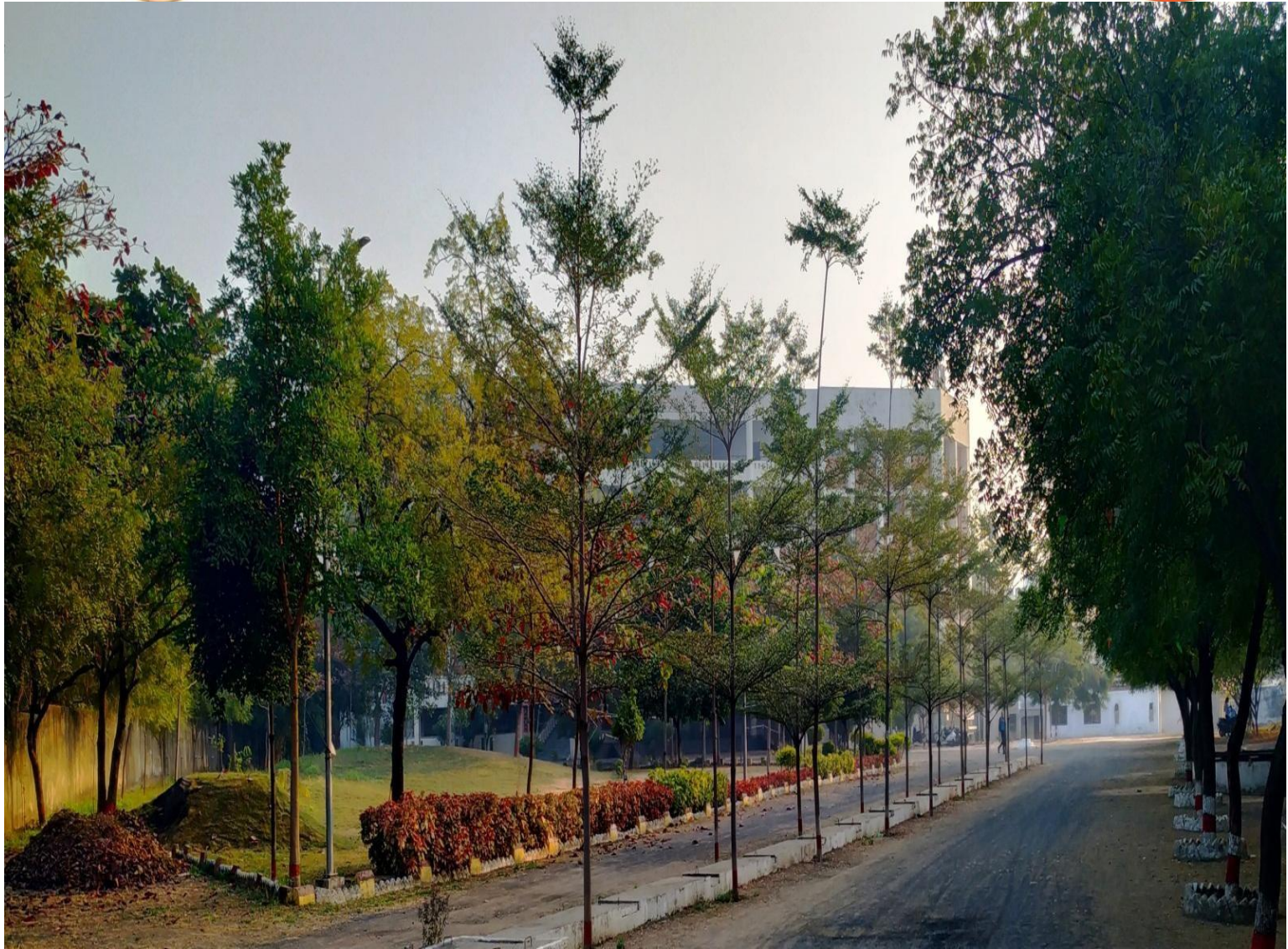

(Dr. Rupali R. Chaudhary)
External Green Audit Co-officer

**PRIYADARSHINI BHAGWATI COLLEGE OF
ENGINEERING, NAGPUR**



T REPORT PBCOE

**PRIYADARSHINI BHAGWATI COLLEGE OF
ENGINEERING, NAGPUR**



THE GREEN AUDIT REPORT

2022-2023

CERTIFICATE

Green Audit Team has prepared this report for PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR (PBCOE) based on College representatives data compiled with the best judgment capacity of the expert team. All reasonable care has been taken in its preparation based on information gathered at site.

To preserve the ecosystem and biodiversity within the college campus, various green initiatives and practices have been undertaken in the college. College has submitted necessary data and credentials for scrutiny. The activities and measures carried out by the college have been verified based on the report submitted and was found to be accurate.

It was observed that a number of environmental friendly practices are undertaken in the college as a part of environmental sustainability. The college constantly strives to care the mother earth and motivate the students keep the campus eco-friendly. The efforts taken by the college towards environment and sustainability is appreciable.

Internal Green Audit Officer

(Dr. Subhash R. Somkuwar)

External green audit officer

(Dr. Rupali R. Chaudhary)

External green audit Co-officer

**PRIYADARSHINI BHAGWATI COLLEGE OF
ENGINEERING, NAGPUR**

GREEN AUDIT REPORT PBCOE

2022-

**Trees, Shrubs and Lianas occurs in
(PBCOE)Premises 2022-23**

Sr. No.	Botanical Name	Family	Common Name	Total No. of Individual/s	Total No. of Sapling/s
1	<i>Abutilon indicum</i>	Malvaceae	Indian mallow	43	9
2	<i>Abelmoschus moschatus</i>	Malvaceae	RanBhindi	4	-
3	<i>Acacia nilotica</i>	Fabaceae	Babul	21	13
4	<i>Acacia concinna</i>	Fabaceae	Shikakai	4	-
5	<i>Acacia leucophleca</i>	Fabaceae	Hiwar	3	3
6	<i>Acalypha sp. ornamental</i>	Euphorbiaceae	fox tail	345	-
7	<i>Achyranthes aspera</i>	Amaranthaceae	Kutri	52	-
8	<i>Aegle marmelos</i>	Rutaceae	Bel	1	1
9	<i>Agave sisalana</i>	Asparagaceae	Ghaypat	2	-
10	<i>Agave sp. ornamental</i>	Asparagaceae	Ghaypat	4	-
11	<i>Ailanthus excelsa</i>	Simaroubaceae	Maharukh	-	1
12	<i>Andrographis echinoides</i>	Acanthaceae	Bhuineem	154	-
13	<i>Alstonia scholaris</i>	Apocynaceae	Saptparni	26	3
14	<i>Aralia sp.</i>	Araliaceae	Aralia	53	-
15	<i>Argemone mexicana</i>	Papaveraceae	Pipla dudi	23	-
16	<i>Albizia lebbeck</i>	Fabaceae	Chichva	-	1
17	<i>Albizia sp.</i>	Fabaceae	Siris	-	1
18	<i>Alternanthera sessilis</i>	Amaranthaceae	Kanchari	146	-
19	<i>Amaranthus viridis</i>	Amaranthaceae	Chawlibhaji	71	-
20	<i>Annona squamosa</i>	Annonaceae	Sitaphal	8	2
21	<i>Azadirachta indica</i>	Meliaceae	Neem	124	11
22	<i>Baliospermum montanum</i>	Euphorbiaceae	Danti	-	2
23	<i>Bambusa arundinacea</i>	Poaceae	Bamboo	2	-
24	<i>Bambusa ventricosa</i>	Poaceae	Buddha's Bamboo	2	-
25	<i>Bauhinia purpurea</i>	Fabaceae	Kanchan	-	1
26	<i>Boerhavia diffusa</i>	Nyctaginaceae	Khaperkhuti	39	-
27	<i>Bryophyllum pinnatum</i>	Crassulaceae	Panphuti	-	1

PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR

GREEN AUDIT REPORT PBCOE					2022-
28	<i>Butea monosperma</i>	Fabaceae	Palas	14	21
29	<i>Canna indica</i>	Cannaceae	Kardal	1	
30	<i>Canavalia gladiata</i>	Fabaceae	Badi sem	21	-
31	<i>Calliandra haematocephala</i>	Mimosaceae	Powder Puff	50	-
32	<i>Carica papaya</i>	Caricaceae	Papaya	4	-
33	<i>Ceiba pentandra</i>	Malvaceae	Sawar	1	-
34	<i>Commelina benghalensis</i>	Commelinaceae	Kena	142	-
35	<i>Casuarina equisetifolia</i>	Casuarinaceae	Beach pine,	-	1
36	<i>Cardiospermum halicacabum</i>	Sapindaceae	Kapalphodi	9	-
37	<i>Cardiospermum microcarpa</i>	Sapindaceae	Kapalphodi	1	-
38	<i>Convolvulus arvensis</i>	Convolvulaceae	Morning glory	178	-
39	<i>Caryota urens</i>	Arecaceae	Bhedlimad	-	1
40	<i>Citrus limon</i>	Rutaceae	Limboo	1	-
41	<i>Cleome viscosa</i>	Cleomaceae	Tiwar	71	-
42	<i>Cocos nucifera</i>	Arecaceae	Naral	1	-
43	<i>Cocculus hirsutus</i>	Menispermaceae	Washingwel	213	-
44	<i>Crinum viviparum</i>	Amaryllidaceae	River Lily	11	4
45	<i>Crinum asiaticum</i>	Amaryllidaceae	River Lily	1	-
46	<i>Cucurbita sp.</i>	Cucurbitaceae	Cucurbita	21	-
47	<i>Cucumaria sp</i>	Cucurbitaceae	Cucumaria	92	-
48	<i>Croton bonplandianum</i>	Euphorbiaceae	Croton	7	-
49	<i>Croton sp.</i>	Euphorbiaceae	Croton	25	-
50	<i>Codiaeum variegatum</i>	Euphorbiaceae	Croton	3	-
51	<i>Corchorus capsularis</i>	Malvaceae	Banpat	97	-
52	<i>Celosia argentea</i>	Amaranthaceae	Kombda	148	-
53	<i>Clerodendrum inerme</i>	Lamiaceae	Mahendi	68	-
54	<i>Clitoria ternatea</i>	Fabaceae	Gokurna	3	-
55	<i>Combretum ovalifolium</i>	Combretaceae	Veragai	-	1
56	<i>Cosmos bipinnatus</i>	Asteraceae	Garden cosmos	16	-
57	<i>Cryptolepis buchananii</i>	Apocynaceae	Dudwel	32	1
58	<i>Calotropis procera</i>	Apocynaceae	Rui	18	4
59	<i>Coix lacryma-jobi</i>	Poaceae	Ran Maka	-	3
60	<i>Cordia dichotoma</i>	Boraginaceae	Bhokar	-	2

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2022-

					2022-
61	<i>Cassia fistula</i>	Fabaceae	Bahava	-	1
62	<i>Cymbopogon martini</i>	Poaceae	Gawat	3	-
63	<i>Cymbopogon citratus</i>	Poaceae	Gawaticaha	15	-
64	<i>Cyperus difformis</i>	Cyperaceae	Gawat	9	-
65	<i>Dalbergia sissoo</i>	Fabaceae	Sisam	16	1
66	<i>Datura metel</i>	Solanaceae	Datura	2	-
67	<i>Delonix regia</i>	Fabaceae	Gulmohar	43	-
68	<i>Desmodium gangeticum</i>	Fabaceae	Shalaparni	3	-
69	<i>Digera muricata</i>	Amaranthaceae	Getna	21	-
70	<i>Diplocyclos palmatus</i>	Cucurbitaceae	Shivlingi	6	-
71	<i>Dolichos lablab</i>	Fabaceae	Wall	-	2
72	<i>Dracaena reflexa</i>	Asparagaceae	Dracaena	8	2
73	<i>Dracaena fragrans</i>	Asparagaceae	Dracaena	2	-
74	<i>Dracaena sp</i>	Asparagaceae	Dracaena	23	-
75	<i>Dregea volubilis</i>	Apocynaceae	Akad bel	21	-
76	<i>Duranta repens</i>	Verbenaceae	Bagad	41	-
77	<i>Dyopsis lutescens</i>	Arecaceae	Areca palm	-	2
78	<i>Eclipta prostrata</i>	Asteraceae	Bhringaraj	67	-
79	<i>Erythrina variegata</i>	Fabaceae	Pangara	-	2
80	<i>Euphorbia tithymaloides</i>	Euphorbiaceae	Euphorbia	11	-
81	<i>Euphorbia pulcherrima</i>	Euphorbiaceae	latin red plant	50	-
82	<i>Euphorbia milli</i>	Euphorbiaceae	Euphorbia	15	25
83	<i>Euphorbia hirta</i>	Euphorbiaceae	Dudi	246	-
84	<i>Euphorbia tirucalli</i>	Euphorbiaceae	Dudi	49	-
85	<i>Ficus benghalensis</i>	Moraceae	Wad	2	-
86	<i>Ficus hispida</i>	Moraceae	Katumber	-	2
87	<i>Ficus religiosa</i>	Moraceae	Pipal	6	2
88	<i>Ficus racemosa</i>	Moraceae	Umber	15	2
89	<i>Ficus microcarpa</i>	Moraceae	Berry	7	-
90	<i>Gardenia gummifera</i>	Rubiaceae	Dikemali	10	-

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91	<i>Gomphrena celosioides</i>	Amaranthaceae	Neervadamalli	126	-
92	<i>Grewia hirsuta</i>	Malvaceae	Govli	13	4
93	<i>Hamelia patens</i>	Rubiaceae	Chota Hamelia	-	2
94	<i>Hemidesmus indicus</i>	Apocynaceae	Khobarwel	9	-
95	<i>Hyptis suaveolens</i>	Lamiaceae	Vilayati Tulsi	68	-
96	<i>Hibiscus rosa-sinensis</i>	Malvaceae	Jaswand	6	1
97	<i>Hibiscus sp. 1</i>	Malvaceae	Jangli Bhendi	33	-
98	<i>Hibiscus sp. 2</i>	Malvaceae	Jangli Bhendi	8	-
99	<i>Holoptelea integrifolia</i>	Ulmaceae	Papra	1	3
100	<i>Indigofera tinctoria</i>	Fabaceae	Nili	2	-
101	<i>Isomeles sp</i>	Lamiaceae	Dipmal	7	1
102	<i>Ixora coccinia</i>	Rubiaceae	Lokhandi	99	-
103	<i>Ipomoea hederifolia</i>	Convolvulaceae	Suryakanti	42	-
104	<i>Jasminum sambac</i>	Oleaceae	Jasmin/Jai	5	40
105	<i>Jasminum sp.</i>	Oleaceae	Jasmin/Jai	4	-
106	<i>Jatropha integerrima</i>	Euphorbiaceae	Ornamental Jatropha	26	-
107	<i>Justicia procumbens</i>	Acanthaceae	Karamba 1	145	-
108	<i>Lagenaria siceraria</i>	Cucurbitaceae	Dudhi	6	-
109	<i>Lagerstroemia speciosa</i>	Lythraceae	Jarul	20	-
110	<i>Lantana camara</i>	Verbenaceae	Ghaneri	53	2
111	<i>Lawsonia inermis</i>	Lythraceae	Mehandi	10	-
112	<i>Lindernia crustacea</i>	Scrophulariaceae	-	122	-
113	<i>Leucaena leucocephala</i>	Fabaceae	Subabul	79	-

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114	<i>Leucophyllum frutescens</i>	Scrophulariaceae	Nikotia	30	-
115	<i>Lonicera sp.</i>	Caprifoliaceae	honeysuckles	30	-
116	<i>Luffa aegyptiaca</i>	Cucurbitaceae	Dhodka/Padwa l	3	-
117	<i>Malachra capitata</i>	Malvaceae	Vilayati Bhendi	120	-
118	<i>Mimusops elengi</i>	Sapotaceae	Bakul	12	-
119	<i>Mangifera indica</i>	Anacardiaceae	Aamba	12	5
120	<i>Millettia pinnata</i>	Fabaceae	Karanj	18	7
121	<i>Mitragyna parvifolia</i>	Rubiaceae	Karamb (Krishna	-	2
122	<i>Mimosa pudica</i>	Fabaceae	Tree)Lazalu	3	1
123	<i>Moringa oleifera</i>	Moringaceae	Mungna	1	-
124	<i>Mucuna pruriens</i>	Fabaceae	Khachkuli	3	-
125	<i>Mukia maderaspatana</i>	Cucurbitaceae	Ghugri	4	-
126	<i>Murraya exotica</i>	Rutaceae	Murraya	18	-
127	<i>Murraya koenigii</i>	Rutaceae	Godnimb	2	4
128	<i>Muntingia calabura</i>	Muntingiaceae	Cherry	-	1
129	<i>Nerium oleander</i>	Apocynaceae	Kaner	-	2
130	<i>Ocimum tenuiflorum</i>	Lamiaceae	Tulsi	7	-
131	<i>Ocimum americanum</i>	Lamiaceae	Tulsi	18	-
132	<i>Opuntia monacantha</i>	Cactaceae	Cactus	1	-
133	<i>Opuntia sp.</i>	Cactaceae	Cactus	1	-
134	<i>Oldenlandia corymbosa</i>	Rubiaceae	Damanpapad	167	-
135	<i>Parthenium hysterophorus</i>	Asteraceae	Gajargawat	98	-
136	<i>Passiflora foetida</i>	Passifloraceae	Vel-ghani	3	-

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137	<i>Polyalthia longifolia</i>	Annonaceae	Ashoka	25	-
138	<i>Peltophorum pterocarpum</i>	Fabaceae	Tamrashimbi	3	-
139	<i>Pergularia daemia</i>	Asclepiadaceae	Utranwel	22	-
140	<i>Phoenix sylvestris</i>	Arecaceae	Shindi	-	1
141	<i>Phoenix sp.1</i>	Arecaceae	Shindi	-	6
142	<i>Phoenix sp.2</i>	Arecaceae	Phoenix Palm	-	2
145	<i>Physalis angulata</i>	Solanaceae	Phophundi	87	-
146	<i>Plumeria alba</i>	Apocynaceae	Chafa	9	1
147	<i>Plumeria rubra</i>	Apocynaceae	Chafa	9	-
148	<i>Philodendron sp.</i>	Araceae	Show well	3	-
149	<i>Phyllanthus emblica</i>	Phyllanthaceae	Aamla	-	1
150	<i>Pithecellobium dulce</i>	Fabaceae	Chichbilai	-	3
151	<i>Phyllanthus reticulatus</i>	Phyllanthaceae	Kalaawla	142	-
152	<i>Phyllanthus virgatus</i>	Phyllanthaceae	Kalaawla	127	-
153	<i>Phyllanthus niruri</i>	Phyllanthaceae	Bhuiawla	89	-
154	<i>Phyllanthus amaras</i>	Phyllanthaceae	Bhuiawla	32	-
155	<i>Phyllostachys aurea</i>	Poaceae	Monk's belly bamboo	4	-
156	<i>Portulaca oleracea</i>	Portulacaceae	Ghol	33	-
157	<i>Prosopis cineraria</i>	Fabaceae	Shami	1	2
158	<i>Rhynchosia minima</i>	Fabaceae	Dhakta	27	-
159	<i>Ricinus communis</i>	Euphorbiaceae	Airand	1	-
160	<i>Psidium guajava</i>	Myrtaceae	Jamb	1	1
161	<i>Psoralea corylifolia</i>	Fabaceae	Bauchi	68	-

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162	<i>Rosa indica</i>	Rosaceae	Gulab	1	-
163	<i>Roystonea regia</i>	Arecaceae	Royal Palm	-	1
164	<i>Ruellia tuberosa</i>	Acanthaceae	Minnieroot	64	-
165	<i>Sida cordifolia</i>	Malvaceae	Chikna	134	-
166	<i>Sida mysorensis</i>	Malvaceae	Chikna	79	-
167	<i>Securinega leucopyrus</i>	Phyllanthaceae	Ainta	78	-
168	<i>Senna tora</i>	Fabaceae	Tarota	109	-
169	<i>Senna siamea</i>	Fabaceae	Cassia	3	-
170	<i>Sesbania sesban</i>	Fabaceae	Shewarie	-	4
171	<i>Samanea saman</i>	Fabaceae	Gulabi Shiris	-	2
172	<i>Scoparia dulcis</i>	Plantaginaceae	Bon Dhonya	146	-
173	<i>Sonchus aspera</i>	Asteraceae	Dudhi	69	-
174	<i>Solanum nigrum</i>	Solanaceae	Ranwangi	28	-
175	<i>Spathodea campanulata</i>	Bignoniaceae	Fountain Tree	-	1
176	<i>Striga asiatica</i>	Orobanchaceae	Pivla agya	21	-
177	<i>Syzygium cumini</i>	Myrtaceae	Jambul	2	1
178	<i>Tabebuia rosea</i>	Bignoniaceae	Gulabi Rani	22	2
179	<i>Tecoma stans</i>	Bignoniaceae	Ghatpuspa	6	2
180	<i>Tabernaemontana divaricata</i>	Apocynaceae	Swastik	264	1
181	<i>Tabernaemontana sp.</i>	Apocynaceae	Tagar/Swastik	21	2
182	<i>Tagetes erecta</i>	Asteraceae	Zendu	3	-
183	<i>Tragia involucrata</i>	Euphorbiaceae	Khachkuli	1	-
184	<i>Tephrosia purpurea</i>	Fabaceae	Sarphonk	3	-

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2022-

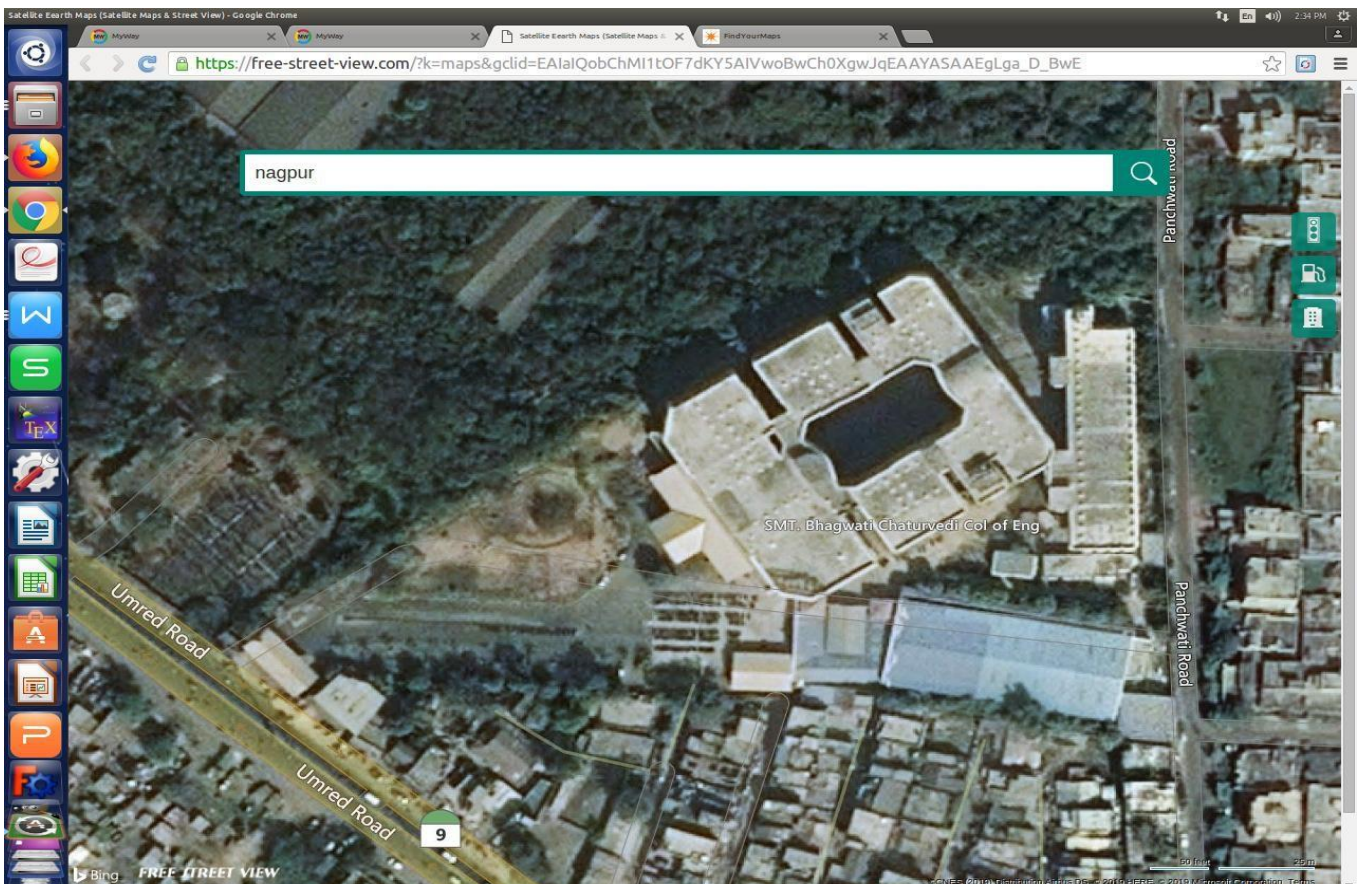
				2022-	
185	<i>Terminalia catappa</i>	Combretaceae	Badam	53	1
186	<i>Terminalia bellirica</i>	Combretaceae	Behda	10	1
187	<i>Terminalia variegata</i>	Combretaceae	Ornamental	19	-
188	<i>Terminalia arjuna</i>	Combretaceae	Arjun	7	-
189	<i>Tinospora cordifolia</i>	Menispermaceae	Gudwel	9	-
190	<i>Trichodesma indicum</i>	Boraginaceae	Chotakalpa	18	-
191	<i>Tribulus terrestris</i>	Zygophyllaceae	Gokharu	9	-
192	<i>Ventilago denticulata</i>	Rhamnaceae	Khaandvaela	3	-
193	<i>Vitis vinifera</i>	Vitaceae	Jangliangur	1	2
194	<i>Vernonia cinerea</i>	Asteraceae	Sahdevi	89	-
195	<i>Vigna radiata</i>	Fabaceae	Barbati	5	-
196	<i>Vinca rosea</i>	Apocynaceae	Sadaphuli	9	-
197	<i>Woodfordia fruticosa</i>	Lythraceae	Dhalas	-	2
198	<i>Ziziphus jujuba</i>	Rhamnaceae	Bor	2	-

	ATTRIBUTES	VARIABLES
COLLEGE AREA	<i>CAMPUS AREA</i>	5 Acre 09 decimal
	<i>BUILT UP AREA</i>	22553.944 Sq.Mt.
POPULATION	<i>STUDENTS</i>	1126
	<i>TEACHERS</i>	62
	<i>NON TEACHING STAFF</i>	40

AUDIT KEY STEPS	
Planning completed	June -2022
First Field work completed	August -2022
Second Field work completed	November -2022
Draft report completed and sent for office response	December -2022
Office response received	February -2023
Final report completed	May-2023

Green Audit Summary

- 1. Green Activities Conducted:** Tree plantation has been done every year in the campus as well as nearby areas.
- 2. College Building Geographical Location with campus map in Scale:** The Google map is attached and the located at 79.09°E longitude and 21.15°N latitude.



PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR

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3. **Land Use Data (Open Space and Built up Area):** Total land area is 5.09 acres of land and total Built up area is 22553.944 Sq.m.




PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR

GREEN AUDIT REPORT PBCOE

2022-

An ISO 9001 : 2015 Certified Company



SAI SHOBHA FIRE & SAFETY SERVICES

Design, Supply, Installation, Testing, Commissioning,
Maintenance Of All Fire System, Fire Extinguisher, Hydrant,
Sprinkler, Detection, Suppression, Foam Etc.

We Are Good At Putting Out Fires

UNDER TAKING

Certified that I have carried out inspection of the fire prevention and life safety extinguisher installed in the following building or premises

M/s. :- LTJSS, PRIYADARSHANI BHAGWATI COLLEGE OF ENGINEERING.

ADD :- HARPUR NAGAR OPPOSITE BADA TAJBAGH, UMRED ROAD, NAGPUR.

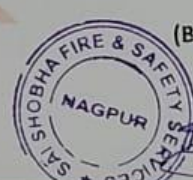
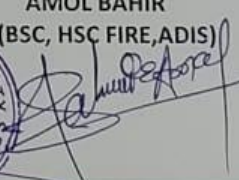
I Further certify that these installation in above mentioned building will be maintained in good repair and efficient condition during the period Nov-2022 to Nov-2023 as required under the provisions of the Maharashtra Fire and Life Safety Measures Act, 2006 (mah-iii of 2007) The details of the inspection of installation carried out by me mentioned in the repo appended herewith.

Refilling Status of Fire Extinguishers					
SR.NO.	DESCRIPTION	Capacity	Quantity	Refilling Date	Due Date
1.	ABC Type Fire Extinguisher	1 KG	1 Nos	04/11/2022	03/11/2023
2.	ABC Type Fire Extinguisher	2 KG	2 Nos	04/11/2022	03/11/2023
3.	ABC Type Fire Extinguisher	4 KG	3 Nos	04/11/2022	03/11/2023
4.	ABC Type Fire Extinguisher	5 KG	31 Nos	04/11/2022	03/11/2023
5.	DCP Type Fire Extinguisher	5 KG	2 Nos	04/11/2022	03/11/2023
6.	CO2 Type Fire Extinguisher	4.5 KG	2 Nos	04/11/2022	03/11/2023
7.	Foam Type Fire Extinguisher	9 litter	1 Nos	04/11/2022	03/11/2023

Details of The Inspection Carried out by Us.

For Sai shobha Fire & Safety Services

PROPRIETOR
AMOL BAHIR
(BSC, HSC FIRE, ADIS)



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9607007101, 7378404494, 7620030055

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Promising QualityReliability Authenticity

PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR

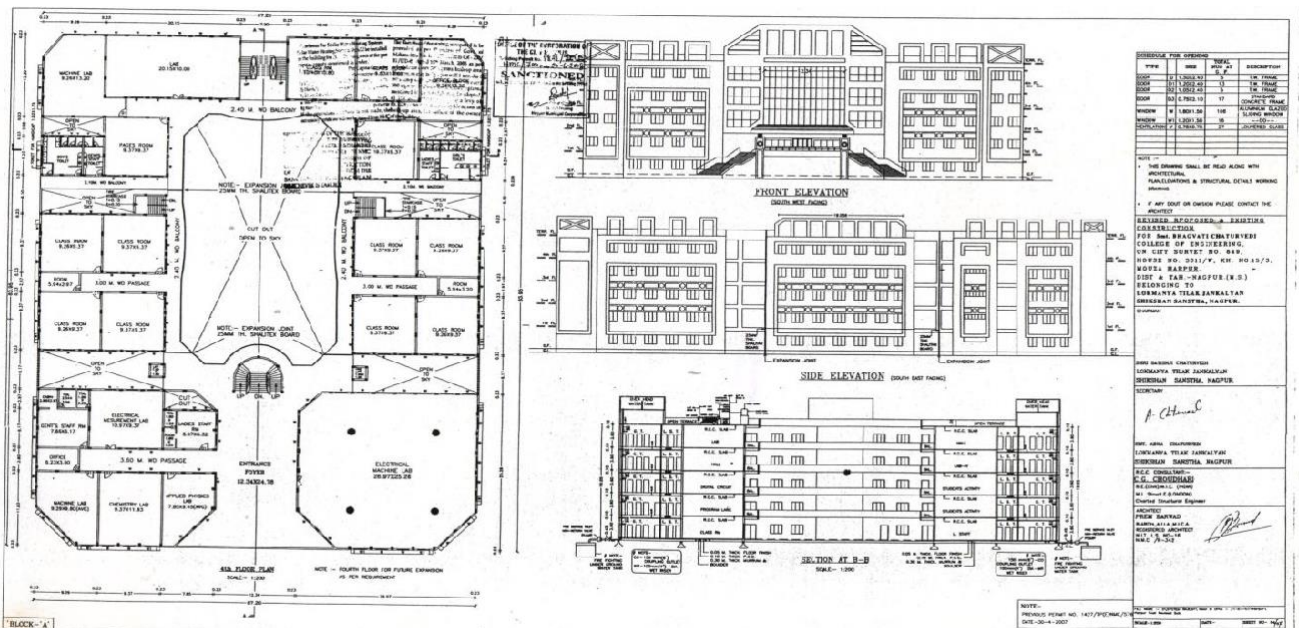
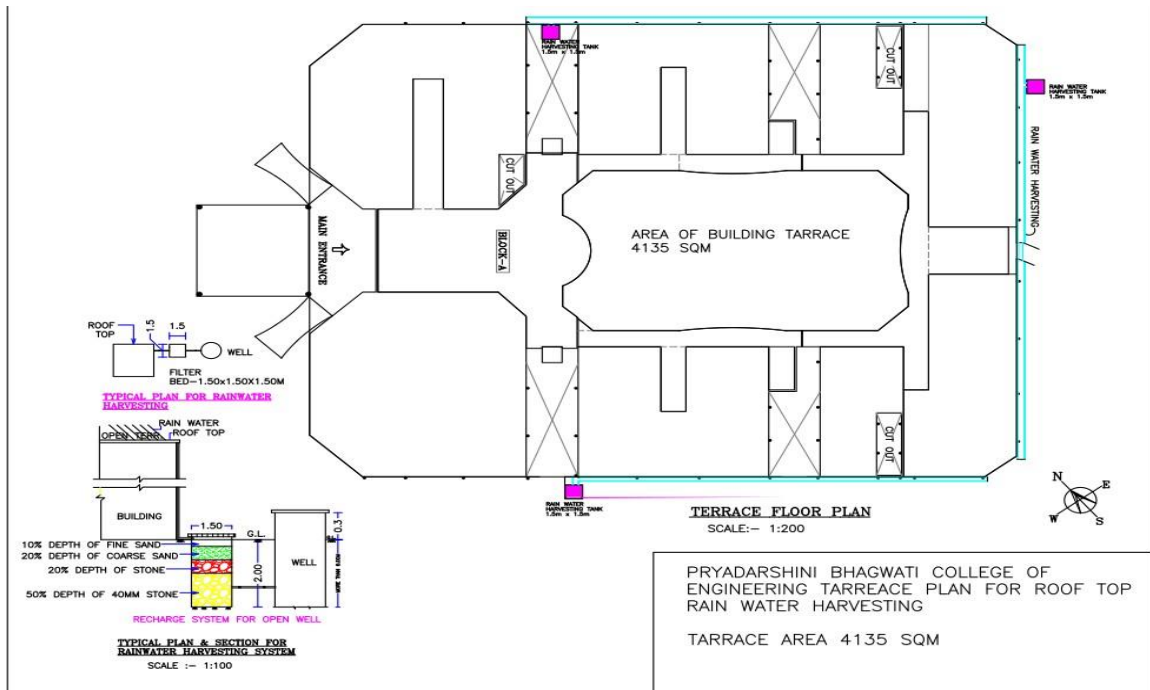
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T3, 3rd floor, Priyadarshani Bhagwati college of engineering, Nirmal Nagar, Nagpur, Maharashtra 440009, India

Nagpur



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4. Safety Measures installed in the college building in case of any Unforeseen problems: In the college campus for safety purpose, Fire safety equipments with three number of vertical water pipes lines are installed and about 6-7 Fire Extinguishers are provided on each floor as well as every year Fire Evacuation drill conducted.

5. Measures for optimum/minimum consumption of Electrical Power (Ex. Solar panel, LED light, Energy efficient Fans, Zero hour celebration in the month/year end, Bicycle day etc.): To achieve minimum consumption of Electrical Power we circulate a notice to all the departments regarding saving electricity. Whenever faculties leave the class room or laboratory, all the lights and fans in the room get switched off without fail. During night time only few lights use while most of gets switched off to save electricity. For lighting purpose some LED Tube lights are used on ground floor and first floor.

In order to minimise fuel consumption, we motivate the nearby students and faculty members to make use of Bicycles to come to college.

6. Water Resource available (Pond, Aqua-tanks, Aquarium, Ground Water Recharge pits, Water harvesting units, Bore-well, Well, Sprinklers, drip etc): To provide drinking water for students and staff, Aqua Guard water purifiers are provided on each floor.

In the college campus we tried to reduce the Cementation so that maximum water should be percolate inside the soil. As well as in the campus two Roof Top Rain Water Harvesting units are constructed. In the campus two water wells of 4m diameter and 60 to 70 feet depth are available. For gardening purpose, few sprinkler systems are used.

7. Composting/vermi-composting units: For composting of garbage, a pit of size 12ft X 10ft is provided in college campus and the daily generated decomposable waste are dump in the pit and some vermies are used for decomposition of garbage in it. The compost produced is then utilized for gardens.

8. Waste Disposal System: Other than the compostable waste, remaining wastes are disposed off to the NMC garbage systems.

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9. NSS/College level green initiatives/activities & plantation Geotagged Program Pics. of 2022-23.



ACKNOWLEDGEMENT

The green audit conducted by the **Dr. Priyadarshini Bhagwati College of Engineering, Umred Road, Nagpur** (PBCOE) is an internal audit that aims towards looking after a healthy environment and to take green initiatives to foster the ecofriendly environment for future sustainability.

Sincere thanks to the Principal, Dr. Priyadarshini Bhagwati College of Engineering, Umred Road Nagpur, and internal supporting staff for providing us necessary data, facilities and co-operation during the excursion and audit period that helped in making the audit report possible.

(Dr. Subhash Somkuwar)

External green audit officer

(Dr. Rupali R. Chaudhary)

External green audit Co-officer

