

# ENVIRONMENT AUDIT

STUDY PERIOD (TWO YEARS) 2022 – 2023 & 2023 - 2024

Sustainability study  
**AUDIT REPORT**

Studied for  
**Nagpur Institute of Technology**

Survey no.13/2,Katol Road,  
Near Fetri,mahurzari,  
Nagpur,Maharashtra-441501, India

Studied in the capacity of  
Accredited and Certified GBP



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# Disclaimer

The Audit Team has prepared this report for the **Nagpur Institute of Technology** located Survey no.13/2, Katol Road, Near Fetri, Mahurzari, Nagpur, Maharashtra-441501, India based on input data submitted by the Institute analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the internal team. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who is as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

**Ar. Nahida Abdulla**

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Developing Healthy and Sustainable Environment

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## Acknowledgement

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Our special thanks are extended are due to everyone from the Management.

Our heartfelt thanks are extended to the Chairperson of the entire process **Dr.A.Y.Deshmukh** (Principal) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection.

- Teaching staff member – **Mr. Amit M Kharwade** (Assistant Professor) and **Mr. R.D Khorgade** (Assistant Professor)
- Non-teaching staff member – **Mr.N.Khode** and **Mr.Kiran Sawarkar**
- Admin staff member – **Mr. Sandip Kale**, (Registrar) and **Mr.R.Khobe** (Assistant Registrar)

### **Sustainable Academe**

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

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# 1. Introduction

## 1.1 About statements of the Institute

### 1.1.1 Vision

The Institute proposes "Service to Society by creating Technical & Skilled manpower through Value based Technical Education."

### 1.1.2 Mission

The Institute adheres and focuses:

- To provide quality technical education to meet the requirements of industries and society
- To equip students with need based technical skills through continual improvements in Teaching Learning processes and research activities
- To inculcate ethical values for overall holistic development of students

## 1.2 Assessment of the Institute

### 1.2.1 Affiliations

The courses provided by the College have received their affiliation through **RTMNU ,Nagpur**

### 1.2.2 Certification

The College has received the following Certifications

- **AISHE** – The All India Survey of Higher Education code is C-18725
- **ISO** – Certification for 9001:2015 Quality Management System

### 1.2.3 Approval

The courses provided by the College are approved by:

- **All India Council for Technical Education (AICTE), New Delhi**
- **Directorate of Technical Education (DTE), Maharashtra**



## 2. Overview about college

Nagpur Institute of Technology is a brand name in Central India for conveying Quality Education that gathers International Standards. It is one of the rapid budding technological institutes of elevated status in the region and is one of the **Top Engineering Colleges in Nagpur**. This institute is very well known for its farsighted management, full-fledged and marked guidance, superior enthusiastic faculty, state of art infrastructure, towering academic principles, stringent academic restraint, outstanding co-curricular and extracurricular bustles and much endowed scholars. The college places exceptional and unique prominence interrelated to the expansion of the students such as all round persona progress, option of international revelation at UG echelon, temperament and proficiency edifice, industrial training and industrial projects. Nagpur Institute of Technology was established in 2008 and is a self-financed institution affiliated to RTM Nagpur University and approved by All Indian Council for Technical Education (AICTE), New Delhi and Government of Maharashtra and Directorate of Technical Education (DTE), Mumbai.

## 3. Research

### 3.1 Campus area

The **site spread over 10 acres of land covering 1,43,946 sq. ft. of built-up area.**

### 3.2 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

### 3.3 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- ➔ Investigation
- ➔ Technical
- ➔ Observations
- ➔ Inferences

### 3.4 Strategy adopted for Green Building Study Audit

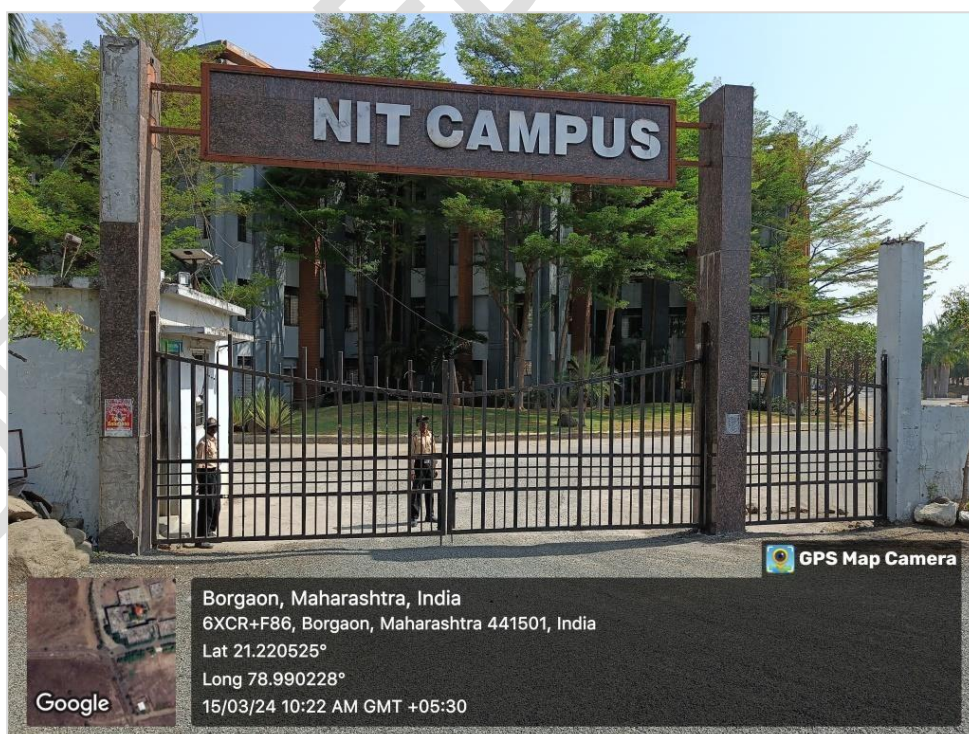
The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

## 4. Investigation



*Plate 1: Greenery surrounding the building*

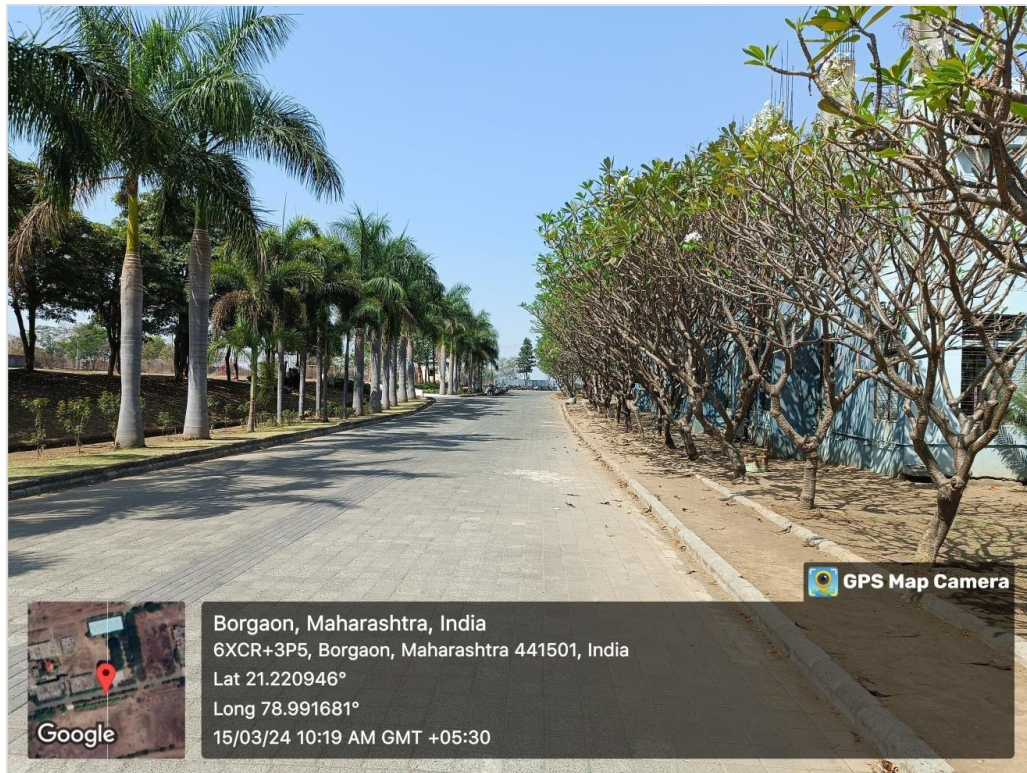
Observation: The greenery near the campus is quite enchanting.



*Plate 2: Entrance of the premises*

Observation: There could be some more nos. of trees near the entrance gate.





**Plate 3: Approach to the main building**

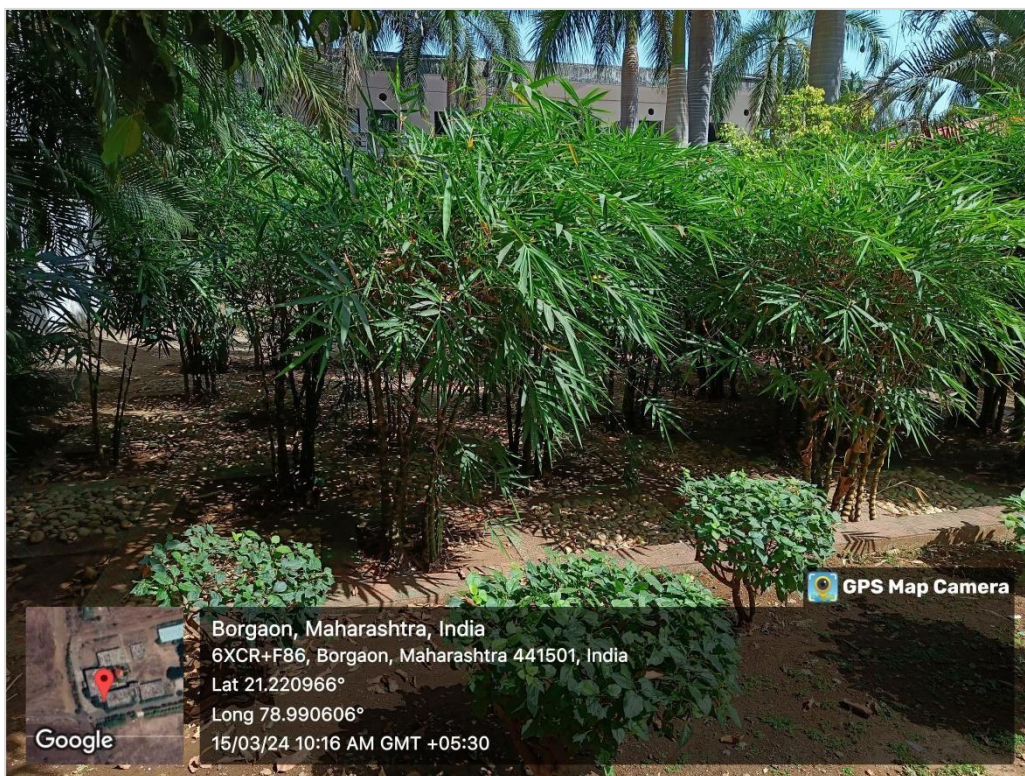
Observation: The approach way is covered with shade providing trees on both sides, however the walkway can be further developed in addition speed breakers etc. can be introduced.



**Plate 4: Parking area in the premises**

Observation: There should be provision to cover the parking as direct sun exposure can harm the vehicles during summer season





**Plate 5: Green plantations within the premises**

Observation: There is scope to develop landscape elements and well-designed pockets.



**Plate 6: Terrace area in the premises**

Observation: The terrace area flooring has withered out, appropriate painting with „Cooltop“ material should be undertaken

## 5. Documentation

### 5.1 Open Spaces

The first hand observations are documented below:

- ➔ The campus is located in an urban area
- ➔ It is at an eight min. distance from the Gorewada Zoo, thereby providing a fresh environment in the surrounding
- ➔ Through the ground cover and plantations seem to be fine, there is still scope to improve the same.

### 5.2 Biodiversity audit

#### 5.2.1 Flora audit

A flora survey to identify the total numbers of plants and trees by internal team as documented below displays the varieties of the plantations.

S. No.	Plant name	Type	Nos.	Planted by
1	Neem Tree	Tree	20	Planted By Staff
2	Vidya Tree	Plant	21	Planted By Staff
3	Bottle Palm	Plant	20	Planted By Staff
4	Royal Palms	Plant	30	Planted By Staff
5	Chinese Ixora.	Plant	24	Planted By Staff

<b>6</b>	White Rose	Plant	1	Planted By Student
<b>7</b>	Banboo Ventricosa	Plant	25	Planted By Staff
<b>8</b>	Aclipa Tree	Tree	15	Planted By Staff
<b>9</b>	Bismorck Plam	Tree	3	Planted By Staff
<b>10</b>	Spider Lily	Plant	3	Planted By Staff
<b>11</b>	Ponytail Palm Tree	Tree	3	Planted By Staff
<b>12</b>	Agave Angustifolia	Plant	20	Planted By Staff
<b>13</b>	Chapa	Tree	23	Planted By Staff
<b>14</b>	Gulmohar	Tree	30	Planted By Staff
<b>15</b>	Kadam Tree	Tree	10	Planted By Staff
<b>16</b>	Saptaparni	Tree	20	Planted By Staff

*Table 3: Details of the Flora in the premises*

At present there are **268 numbers of plantations** in the premises confined to the campus.

**The study suggests increasing the nos. of plantations.**

### 5.2.2 Fauna audit

The details of the fauna within the prmeises is documented below:

<b>Fauna available</b>	<b>Names</b>
Birds	Owl, Parrot
Insects	Ant, Grasshopper, Honeybee, Termite, Cricket, Spider, Centipede, Lizard, Mosquito
Invertebrates	Earthworm, Fly, Whelk
Reptiles	Snake, Lizards, Viper, Boa
Amphibians	Frog, Tod
Mammals	Monkey, Bats, Tars

*Table 4: Details of the fauna within the premises*



### 5.3 Noise Audit

On a macro level the campus is close to multiple farms, zoo, multiple educational institutes including colleges and schools.

This emphasizes that the noise levels here are anywhere between low to very low because of the educational campuses all over.

### 5.4 Carbon Footprint Audit - Heat Island Reduction

The heat island effect refers to the study of micro climatic feature within a site. There are multiple factors that add on to the feature such as external temperature, internal temperatures, site context including available and site adjacent facilities. The shaded areas (Due to the built space and green cover) add to low heat island effects of campus.

## 6. Inferences

The suggestion (inference) would act as a „PLAN OF ACTION“ to implement all the suggestions in a detailed manner. The same has been identified in two phases for a total duration of three years.

### ➔ Phase 1

- Duration: One year from the date of Report submission – Shared currently
- These are first hand suggestions
- They are easy and quick to implement
- They involve close very less or almost no expenses
- They can serve as a foundation for the entire plan of action

## Section 1 – Eco-restoration of outdoors (Landscape perspective)

### ➔ Feeders

- At appropriate locations there can be provisions for drinking water and some grains for birds as they visit the site much frequently.

### ➔ Numbering the plantations in the premises

- Make a list of all the plantations in the premises
- Secondly, start numbering the plantations in either of the ways:
  - i. Painting the nos. on iron plates and nailing the same
  - ii. Printing the nos. on paper, laminating and pasting the same
  - iii. Painting the nos. with letters and nos. directly
- Care should be taken that the display should be visible
- Uniform color palette should be identified and used
- Measures should be taken to avoid withering during monsoon
- This could be undertaken as a student activity



*Reference suggestions 1: Numbering the plantations*

### ➔ Improve the ecological footprint of the premises

- Undertake the landscape ecological redesign to increase green cover
- Opportunity can be explored to have a dedicated:
  - i. Nursery
  - ii. Greenhouse
  - iii. Organic farm
  - iv. Kitchen garden in backyard
- The following plantations can be planted for Carbon neutralisation as an additional measure, even though they might be existing in premises
  - i. Pine – Known for its ability to sequester carbon  
(<https://www.single.earth/blog/which-trees-absorb-the-most-carbon#:~:text=Pine%20trees%20as%20carbon%20sinks,their%20ability%20to%20sequester%20carbon.&text=These%20trees%20are%20found%20in,also%20make%20good%20landscape%20plants>)
  - ii. Neem – Helps reduce greenhouse gases through photosynthesis absorbing large quantities of CO<sub>2</sub> producing oxygen  
(<https://neemfoundation.org/greening-india-with-neem/#:~:text=The%20planting%20of%20Neem%20trees,of%20CO2%20and%20producing%20oxygen>)
  - iii. Peepal – Can uptake CO<sub>2</sub> during the night as well because of its ability to perform a type of photosynthesis called Crassulacean Acid Metabolism (CAM)

([https://nurserylive.com/blogs/sustainable-living/do-you-know-plants-that-give-oxygen-24-hours#:~:text=2.-,Peepal,Crassulacean%20Acid%20Metabolism%20\(CAM\)\)](https://nurserylive.com/blogs/sustainable-living/do-you-know-plants-that-give-oxygen-24-hours#:~:text=2.-,Peepal,Crassulacean%20Acid%20Metabolism%20(CAM))))

- iv. Bamboo - Can absorb as much as 12 tonnes of carbon dioxide per hectare per year, giving the plant a potentially crucial role in stabilising our planet's atmosphere.

(<https://www.theguardian.com/environment/2003/mar/20/research.science#:~:text=Research%20in%20Japan%20and%20elsewhere,in%20stabilising%20our%20planet's%20atmosphere>) and <https://www.nelda.org.in/15-indian-trees-that-produce-the-most-oxygen>

- v. Teak – The highest capacity for carbon sequestration among trees in India. This is the finding of a study conducted by the Gujarat Ecological Education and Research (GEER).

(<https://timesofindia.indiatimes.com/city/ahmedabad/teak-absorbs-max-co2-from-air-helps-check-global-warming/articleshow/51721842.cms>)

### ➔ Plant as an extension of 'Green motto'

- External resource persons visiting the premises can share the goal of green environment in the following ways:
  - i. Plant a sapling within the premises
  - ii. Handover a sapling as a gesture

### ➔ Compost pits

- Certain pits (mound of earth covered in green grass/ shrubs) can be demarcated as „Nutrition pits“ where the organic food from the kitchen and Canteen fruit peels and fruits or vegetables can be degraded for making nutrition-rich soil.

## Section 2 - Documentation

### ➔ Messages on the beam area

- Include quotes and messages from eminent personalities all over the premises on beam for inspiration and beautification.

### ➔ Awareness

- Introduce zone wise display boards at relevant locations



## Section 3 - Amenities

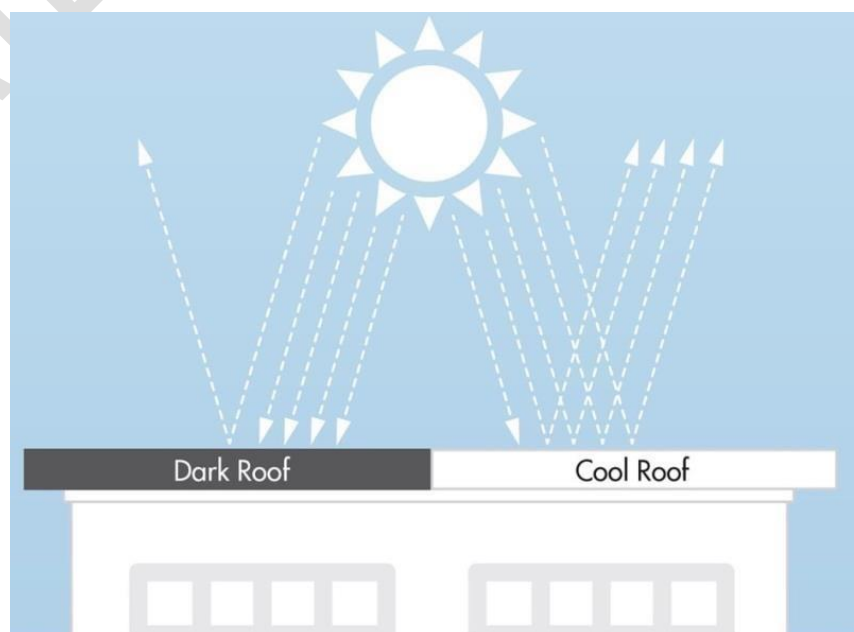
### ➔ Facilities

- Speed limit signage
- Speed breakers
- Zebra crossing
- First aid box near the administrative area
- Suggestion box every floor of the premises

## Section 4 - Environmental management systems

### ➔ Heat island control measures

- Cool rooftops
  - i. Keep terrace areas free of any kind of storage materials
  - ii. Terrace rooftops can be painted with Cooltop (Reflective material) to reflect the harsh sun rays and reduce the heat absorption in the top most floor and surrounding areas of the building.
  - iii. Introduce signboards about „No students are allowed to enter“
  - iv. Undertake feasibility study of before - after temperature reading.



**Plate 7: Cool roof comparative analysis (For reference purpose only)**

Source: Image by <https://www.gaf.com/en-us/blog/six-truths-about-cool-roofs-281474980105387>

### ➔ Pollution control measures

- Vehicle usage - Restricting the speed limit of vehicles on the premises to 10 km per hour, not honking on the premises will help in maintaining the sound in control and emphasis on a silent zone.
- Avoid burning waste - The waste produced on the premises should not be burned as it is dangerous to the health of students and staff

DETAILED REPORT

## 7. Compilation

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

### National references

- ➔ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- ➔ IGBC Green Landscape Rating system, March 2013

### International references

- ➔ The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- ➔ Streetscape elements – Chapter 6 on San Francisco
- ➔ American lung association <https://www.lung.org/>
- ➔ Study related to air pollution <https://www.airgle.com/>
- ➔ Exploring the light pollution <https://education.nationalgeographic.org/>
- ➔ Urban heat island effect <https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands>

