COMPETENT INSPECTORATE

IB 056

Green Audit Certificate

We take pleasure in Certifying that we have conducted Green Audit of

PONDICHERRY UNIVERSITY

Covering Sustainability, Environment, Water, Waste and Energy Management

IN line with National Building Code 2016-Part 11 and as per directives of NAAC & NABCB

During 14th to 16th May 2024

It indicates **92.11%** compliance as per our scoring method

"Detailed report No. CIC/GAR/003 Dated 2nd June 2024 is attached"

Dr Ajaya Shankar Gupta Ainapur
Principal Auditor
Director (Training and Systems)

Competent Inspectorate and Consultants Pvt. Ltd. Hyd-72

Dr Rama Dasu Pittala
Managing Director

Certificate No: CIC/ GARC/0003 Dt-02/06/2024

COMPETENT INSPECTORATE

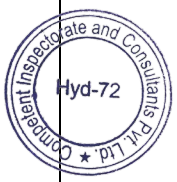
Pondicherry University
Green Audit Report
by
Competent Inspectorate and Consultants Pvt Ltd

104,203 - Park View, Plot Nos 5&6,

Pushpak Cooperative Housing Society

Prashanthi Nagar Industrial Estate, Kukatpally, Hyderabad – 500072

Green Audit Report

Report Number:	CIC/GAR/003	**Date of Issue**	3rd June 2024
Name of the University/ Institute		**Pondicherry University**	
Areas Covered (Departments/ Buildings/ Facilities)		**Pondicherry University**	
Audit Period		**14th to 16th May 2024**	
Name of Lead Auditor		Dr Ajaya Shankar Gupta	
Names of Auditors		Dr. Rama Dasu Pittala Mr Raghu Veera Tadivada	
Report Prepared by:  Dr Ajaya Shankar Gupta		**Reviewed and Approved by**   Dr Rama Dasu Pittala	

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1. Executive Summary:

Pondicherry University was audited during 14th to 16th May 2024 for Green Audit Criteria covering Sustainability, Environment, Water, Waste and Energy Management in line with National Building Code 2016Part 11 and as per the directives of NAAC & NABCB. The auditors were **Dr. Rama Dasu Pittala, Dr. Ajaya Shankar Gupta, and Mr. Raghu Veera Tadivada .**

The audit covered 12 major clauses covering Sustainability, Environment, Water, Waste and Energy Management as shown in the Table1:

	Table 1: NBC Part 11 Clauses Grouping	
Sl	NBC Part 11 Clause No	Major Focus
1	3 APPROACH TO SUSTAINABILITY	Sustainability, Environment, Water, Waste & Energy
2	4 APPLICABILITY OF THIS PART	Sustainability
3	5 IMPLEMENTATION OF THIS PART	Sustainability
4	6 SITING, FORM AND DESIGN	Environmental
5	7 EXTERNAL DEVELOPMENT AND LANDSCAPE	Environmental
6	8 ENVELOPE OPTIMIZATION	Environmental
7	9 MATERIALS	Sustainability
8	10 WATER AND WASTE MANAGEMENT	Water & Waste
9	11 BUILDING SERVICES OPTIMIZATION	Energy efficiency
10	12 CONSTRUCTIONAL PRACTICES	Sustainability
11	13 COMMISSIONING, OPERATION, MAINTENANCE AND BUILDING PERFORMANCE TRACKING	Energy efficiency
12	14 STATUTORY AND LEGAL COMPLIANCES	Regulatory

Also, the Check Points cover many of the requirements (around 31 Points) in NAAC's Self-Assessment Criteria as detailed in Annexure 1.

During audit the Checklist approved by NABCB has been used which has 150 check points and the auditors marked as NA if any clause is not applicable and then checked their Records, practices/ documents, physical verification, etc. against each check point. If the records/practice/ documents / Physical verification are meeting major requirement listed as Compliant, if not the observations are classified as below:

Major Nonconformity (NC)

Nonconformity that shows a NBC 11 clause or other requirement has not been implemented at all, or has been implemented in such a way that the requirements are not met at all.

Minor Nonconformity (NC)

Single instance, or small set of single instances, that show a requirement has not been met. At the Lead Auditor's discretion, a large number of related Minor Nonconformities may instead be filed as a single Major Nonconformity.

Opportunity for Improvement OFI:

Opportunity for Improvement is Not a nonConformity. It is a cause for a potential non conformity and or for further improvement

The summary of audit findings is as below:

Table 2: Summary of Audit Findings

PU Audit Summary (After FollowUp Audit on 20th May 2024)								
S. No.	NBC Part11 Clause	Total Check Points	Not Appl Points	Net Appl Points	Compliant points	OFIs	Minor NCs	Major NCs
1	3 APPROACH TO SUSTAINABILITY	19	1	18	15	2	1	0
2	4 APPLICABILITY OF THIS PART	1		1	0	1		
3	5 IMPLEMENTATION OF THIS PART	1		1	0	1		
4	6 SITING, FORM AND DESIGN	11		11	11	0		
5	7 EXTERNAL DEVELOPMENT AND LANDSCAPE	13	1	12	9	3		
6	8 ENVELOPE OPTIMIZATION	3		3	2	0	1	
7	9 MATERIALS	6		6	2	1	2	1
8	10 WATER AND WASTE MANAGEMENT	31	3	28	27	0	1	
9	11 BUILDING SERVICES OPTIMIZATION	28	9	19	8	10	1	
10	12 CONSTRUCTIONAL PRACTICES	16	2	14	9	4	1	
11	13 COMMISSIONING, OPERATION, MAINTENANCE AND BUILDING PERFORMANCE TRACKING	11		11	9	2		
12	Legal Compliances	10	1	9	9	0		
	Total	150	17	133	101	24	7	1
						122.5		
						92.11		

By giving a weightage of 1 to compliant, 0.75 to OFI, 0.5 to Minor NC and 0 to Major NC the total points against 133 applicable are 122.5 i.e. equal to 92.11%

THE MAJOR STRENGTHS/ GOOD PRACTICES:

1. **Comprehensive Green Protocol**: The university adheres to a well-defined green protocol for construction and demolition waste management, enhancing sustainability practices.
2. **Renewable Energy Utilization:** Significant use of solar photovoltaic systems connected to the grid demonstrates commitment to renewable energy. Solar energy is effectively harnessed to meet a substantial portion of the campus's energy needs, with an installed capacity of 3MW.

3. **Energy Efficient Installations:** Installation of LED fixtures in new buildings, the replacement of 50% of old building lights with LEDs improve energy efficiency and starting of sensor based lighting in verandas.
4. **Sustainable Water Management:** The campus features a Sewage Treatment Plant (STP) with a capacity of 7 lakh liters per day for B Block, exceeding current water consumption needs and designed for future expansion.
5. **Sustainable Rain Water Management:** The university has also submitted a paper to the National Water Mission. Rainwater recharge efforts have resulted in 7,87,062.1 m^3 per year, with a total water usage of 2,35,608 m^3 per year, raising the groundwater level by approximately 2.0 meters after implementing recharge pits, borehole recharge structures, and rooftop rainwater harvesting structures.
6. **Support for Differently Abled:** Louis Braille Centre, A state-of-the-art facility for visually impaired / differently abled students, scholars and faculty is located at the ground floor of the Library Annex Bilding. The computing facility with assistive technologies enabled them with their learning and research processes.
7. **Passive Cooling Systems:** Utilization of passive cooling systems, such as cavity walls and extensive greenery, reduces reliance on mechanical cooling.
8. **Training Programs**: The SDG Compliance Plan for 13.3 Environmental Education Measures includes environmental education measures, with various activities conducted, such as awareness on the triple planetary crisis at Sri Aishwaryam Apartments and environmental awareness in Rose Apartments, totaling around 20 activities in 2024.
9. **Landscape and External Development:** Effective landscaping contributes to stormwater management, groundwater recharge, and thermal comfort. The campus maintains extensive green cover, with only around 5% of the area occupied by buildings and the rest as green area.
10. **Material Reuse and Recycling**: The university procures cement supplied in paper bags and reuses paver blocks for parking lots opposite the admin block near the bus stop shelter.
11. **Construction Waste Management:** Construction debris is utilized for filling pits and levelling ground below the HT line, and construction waste is spread for parking cars opposite the School of Management.
12. **Electric Vehicle Usage**: Electric vehicles are used for the movement of staff, promoting sustainable transportation on campus. Also provided Electric Vehicle Charging points in the campus
13. **Natural Lighting Utilization**: The university has made significant use of natural lighting in buildings such as the administration building, library, and chemistry building, reducing the need for artificial lighting and enhancing energy efficiency.
14. **Collaborative Approach**: The University collaborates with various government departments, industries, NGOs, education and research institutes for campus sustainability and outreach.

These practices highlight Pondicherry University's commitment to sustainability and environmental stewardship, aligning with their broader green protocols and energy conservation measures.

MAJOR AREAS FOR IMPROVEMENT:

I. **Monitoring and Control Mechanisms**: Central Public Works Department (CPWD) Guidelines for Sustainable Habitat and Comprehensive Green Protocol are guiding documents for Sustainability Management. However, there is a lack of structured monitoring mechanisms, development and regular monitoring of benchmarks are essential for assessing and managing environmental factors associated with energy consumption, water utilization, waste generation, and reuse of waste throughout the construction and operation phases

II. **Digital Models for Construction**: The use of digital models like BIM (Building Information Modeling) may be started, which could enhance planning and execution of construction projects.

III. **Material Selection Based on Sustainability Criteria:** There is no evidence of using sustainable criteria such as embodied energy, GHG emissions, environmental impact, recyclability, and local availability in the selection of building materials.

IV. **Water Consumption Monitoring:** Water consumption monitoring is not conducted for individual buildings, which could help in better managing and conserving water resources.

V. **Energy Management Systems:** The absence of a centralized Energy Management and Control System (EMCS) for tracking energy performance across different building systems.

VI. **Use of Biofuels:** The exploration and use of biofuels are still in the planning stages and need further development.

VII. **Cycle Tracks for Sustainable Transportation**: While there are pedestrian pathways and restricted automobile entry, designated cycle tracks are not available, which could further promote sustainable transportation options.

VIII. **Tests and Air Quality Monitoring**: Periodical measurements of Illumination Levels, Noise levels, Humidity, Temperatures in Classrooms, Ambient air quality monitoring etc need to be done.

IX. **Neutralization Pits in Chemistry Labs:** The absence of neutralization pits in chemistry labs for managing chemical waste may impact the environment and water quality through contamination.

X. **Embodied Energy Data Monitoring**: Lack of monitoring embodied energy (EE) data while designing new buildings.

XI. **Maintenance Plan for Disaster Resistance Features**: No separate maintenance plan for disaster resistance features.

XII. **Envelope Optimization Methods**: No specific envelope optimization methods used to enhance energy efficiency.

XIII. **Risk Assessment**: Conducted for the Girls' Hostel construction but not prepared for all other construction sites, including dismantling.

XIV. **Emergency and Way Finding Signages**: Need further improvement to ensure clarity and coverage.

XV. **Specific Waste Management Guidelines:** In waste management PU may develop and implement specific guidelines for PU Campus under the Comprehensive Green Protocol. Create a compiled document showing different waste types, quantities, and disposal methods. Expedite the initiation of waste to energy projects for example integrated bio-methanation plant with spent slurry management and application and other upcycling projects. Establish neutralization structures in chemistry and other research labs for toxic waste management

XVI. **Water Management During Construction**: Not adequately addressed during the construction stage.

XVII. **Air Conditioning Units:** Transition from old A/C units using R22 to new A/C units with eco-friendly refrigerant such as R32, R134A, and R410, but the change needs speedy implementation strategies.

XVIII. **Building-Wise Monitoring:** While electricity consumption is monitored building-wise, water consumption monitoring needs to be implemented for different buildings.

By addressing these areas, Pondicherry University can further strengthen its commitment to sustainability and improve its environmental performance.

2. Introduction:

Pondicherry University, accredited with an “A” Grade by NAAC, is one of the most sought after campuses amongst students from across the nation as a destination for Higher Education and Research. Pondicherry University was the first in the country to implement a “Choice Based Credit System” (CBCS) which is now being followed by many other Universities. The University has 15 Schools, 38 Departments, 11 Centers, and 1 Chair offering over 144 PG, PG Diploma/ Certificate & Research programs with a student strength of 8000 plus including foreign students.

For conducting Green Audits CICPL has followed the prescribed methodology outlined in NABCB's policy (Ref. No.: NABCB/P001/09/2022/V.1). This methodology incorporates the relevant clauses of the National Building Code, 2016, Part11, as applicable to the audit process. CICPL obtained approval from NABCB to carry out the audit, ensuring compliance with the necessary standards.

ABOUT PONDICHERRY UNIVERSITY:

Pondicherry University, established in 1985, is a central university located in Puducherry, India. The university is known for its high academic standards, extensive research facilities, and vibrant campus life. Here are some key aspects of Pondicherry University:

Pondicherry University offers a wide range of undergraduate, postgraduate, and doctoral programs across various disciplines, including humanities, science, engineering, management, and social sciences. It has several schools and departments, each dedicated to specific fields of study.

The university places a strong emphasis on research and innovation. It hosts numerous research projects funded by national and international agencies. The university's research activities span various fields, including science, technology, social sciences, and humanities, contributing significantly to academic and applied research.

The main campus is located in Kalapet, Puducherry, and spans over 780 acres. It is equipped with modern facilities such as libraries, laboratories, hostels, sports complexes, and health centers. The university also promotes a **green and sustainable campus environment**.

The university is committed to inclusive education and offers various scholarships and support programs for students from diverse backgrounds, including economically disadvantaged groups and **differently abled students**.

The university promotes a vibrant cultural and extracurricular life. It hosts various cultural festivals, seminars, workshops, and student clubs that provide students with opportunities to engage in creative and intellectual activities outside the classroom.

The university operates under the governance of the University Grants Commission (UGC) and the Ministry of Education, Government of India. It is managed by a team of administrators, including the Vice-Chancellor, who oversees the academic and administrative functions of the institution.

VISION

To serve as an enabler of societal transformation through state-of-the-art higher education and research that match global benchmarks by providing access, resources and opportunities.

To become an institution of global eminence.

Adapting to everchanging needs of the society and industries.

MISSION STATEMENT

To deploy globally competent resources in terms of people, infrastructure and partners through development of trained human resources, who will serve as agents of value based societal transformation in various spheres of life enriched with technology – assisted education, research, training and cultural integration.

CORE VALUES:

The Core Values of our Institution are:

- Promoting excellence in the learning process.
- Expanding the horizon of knowledge through creative research.
- Maintaining high ethical standard in teaching, research, and administration.
- Catering to diverse needs of multicultural, multilinguist strata of society.
- Providing good academic ambience in pursuit of excellence in education.
- Ecofriendly campus as a substratum of multidisciplinary courses.
- State-of-the-art infrastructure to support the students' participatory means of seeking knowledge.
- Encouraging awareness about social responsibility and accountability.
- Promotion of equity through continuous improvement and sustainable growth.

ABOUT COMPETENT INSPECTORATE AND CONSULTANTS PVT LTD (CICPL):

Competent Inspectorate and Consultants Pvt Ltd is formed in 2022 by converting Competent Inspectorate and Consultants LLP which was established in 2015 by merging Sun Mann Engineers & Consultants (Serving Industry Since 2009) to provide highly competitive specialized Third Party Inspection and Field Services to support companies in building and managing their assets, ensure quality and compliance, improve reliability, performance and avoid the occurrence of incidents

CICPL performs third party inspections, which include the examination of materials, products, installations, plants, processes, work procedures or services, and the determination of their conformity with requirements and the subsequent reporting of results of these activities to the clients.

3. Audit Scope:

Audit is Covering Sustainability, Environment, Water, Waste and Energy Management in line with National Building Code 2016Part 11 and as per directives of NAAC & NABCB.

4. References:

- NABCB Policy on Green Audit by Inspection Bodies
- NAAC's advisory ref No.F.No.1429/2022 Dated 26.05.2022
- National Building Code of India 2016 Vol 2 Part 11 Approach to Sustainability
- ISO 17020 Manual and SOPs of CICPL
- National Lighting Code 2010 edition

5. Audit Plan, Opening and Closing Meetings:

Audit plan is attached as Annexure 1

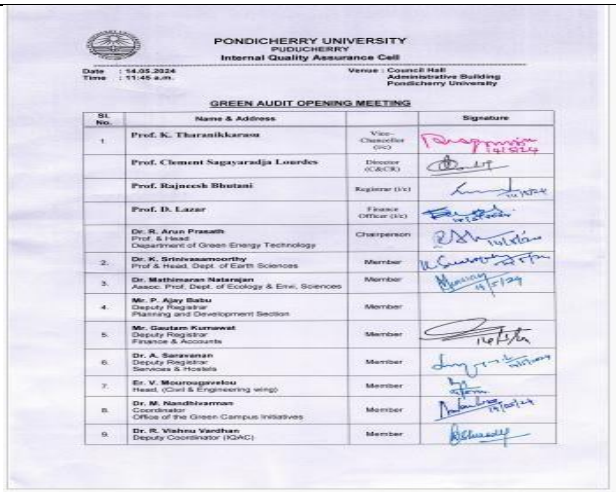
Audit was performed during 14th to 16th May. Follow up audit was conducted on 21st May after receiving action plan on NCR Report.

Opening meeting and closing meeting photos, attendance sheet are given below.

Photo 1: Opening Meeting on 14th May 2024

Photo 2: Closing Meeting on 16th May 2024

COMPETENT INSPECTORATE



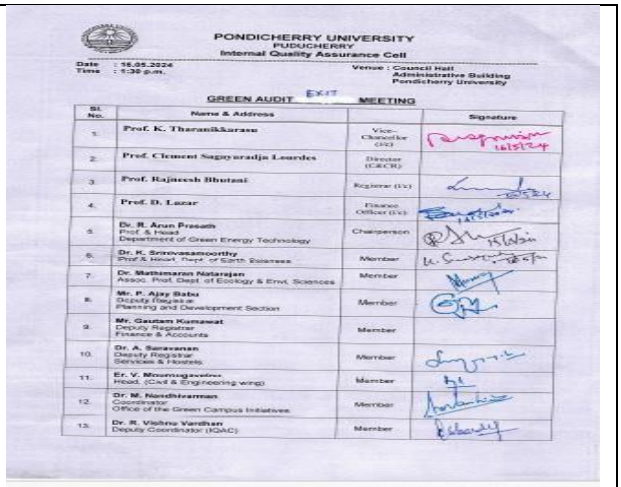
PONDICHERRY UNIVERSITY
PUDUCHERRY
Internal Quality Assurance Cell

Date : 14.05.2024
Time : 11:45 a.m.

Venue : Council Hall
Administrative Building
Pondicherry University

GREEN AUDIT OPENING MEETING

Sl. No.	Name & Address		Signature
1.	Prof. K. Tharanikkarasu	Vice-Chancellor (i/c)	
	Prof. Clement Sagayaradja Lourdes	Director (C&CR)	
	Prof. Rajneesh Bhutani	Registrar (I/c)	
	Prof. D. Lazar	Finance Officer (I/c)	
	Dr. R. Arun Prasath Prof. & Head Department of Green Energy Technology	Chairperson	
2.	Dr. K. Srinivasamoorthy Prof & Head, Dept. of Earth Sciences	Member	
3.	Dr. Mathimaran Natarajan Assoc. Prof, Dept. of Ecology & Envt. Sciences	Member	
4.	Mr. P. Ajay Babu Deputy Registrar Planning and Development Section	Member	
5.	Mr. Gautam Kunawat Deputy Registrar Finance & Accounts	Member	
6.	Dr. A. Saravanan Deputy Registrar Services & Hostels	Member	
7.	Er. V. Moorthyvelou Head, (Civil & Engineering wing)	Member	
8.	Dr. M. Nandhivarman Coordinator Office of the Green Campus Initiatives	Member	
9.	Dr. R. Vishnu Vardhan Deputy Coordinator (IQAC)	Member	
11.	Dr. Rama Dasu Pittala Audit Team M/s Competent Inspectorate and Consultants Pvt Ltd	External Member	
12.	Dr. Ajaya Shankar Gupta Ainapur Audit Team M/s Competent Inspectorate and Consultants Pvt Ltd	External Member	
13.	Mr Raghu Veera Tadivada Audit Team M/s Competent Inspectorate and Consultants Pvt Ltd	External Member	
14.	Er. G. Raghupathi Assistant Engineer (Civil)	Supporting Staff	
15.	Er. S. Vengadesan Assistant Engineer (Civil)		
16.	Er M. Kalaiyanagan Junior Engineer (Civil)		
17.	Er. R. Douneradjane Junior Engineer (Civil)		
18.	Er. D. Singaravelou Electrical Wing		
19.	Er. SenthilSumar - R Civil		
20.	Mr. V. Nagamuthu Electrical Wing		
21.	Mr. Karthik Electrical wing		
22.	Mr. R. Jayamurthy Electrical Wing		
23.	Mrs. Reka Electrical Wing		
24.	Mr. Ekmaran DEO, Civil		
25.	Mr. Sivachandran Project Management Consultancy		
26.	Mrs. Kavitha Project Management Consultancy		



PONDICHERRY UNIVERSITY
PUDUCHERRY
Internal Quality Assurance Cell

Date : 16.05.2024
Time : 1:30 p.m.

Venue : Council Hall
Administrative Building
Pondicherry University

GREEN AUDIT EXIT MEETING

Sl. No.	Name & Address		Signature
1.	Prof. K. Tharanikkarasu	Vice-Chancellor (i/c)	
2.	Prof. Clement Sagayaradja Lourdes	Director (C&CR)	
3.	Prof. Rajneesh Bhutani	Registrar (I/c)	
4.	Prof. D. Lazar	Finance Officer (I/c)	
5.	Dr. R. Arun Prasath Prof. & Head Department of Green Energy Technology	Chairperson	
6.	Dr. K. Srinivasamoorthy Prof & Head, Dept. of Earth Sciences	Member	
7.	Dr. Mathimaran Natarajan Assoc. Prof, Dept. of Ecology & Envt. Sciences	Member	
8.	Mr. P. Ajay Babu Deputy Registrar Planning and Development Section	Member	
9.	Mr. Gautam Kunawat Deputy Registrar Finance & Accounts	Member	
10.	Dr. A. Saravanan Deputy Registrar Services & Hostels	Member	
11.	Er. V. Moorthyvelou Head, (Civil & Engineering wing)	Member	
12.	Dr. M. Nandhivarman Coordinator Office of the Green Campus Initiatives	Member	
13.	Dr. R. Vishnu Vardhan Deputy Coordinator (IQAC)	Member	
14.	Dr. Rama Dasu Pittala Audit Team M/s Competent Inspectorate and Consultants Pvt Ltd	External Member	
15.	Dr. Ajaya Shankar Gupta Ainapur Audit Team M/s Competent Inspectorate and Consultants Pvt Ltd	External Member	
16.	Mr Raghu Veera Tadivada Audit Team M/s Competent Inspectorate and Consultants Pvt Ltd	External Member	
17.	Er. G. Raghupathi Assistant Engineer (Civil)	Supporting Staff	
18.	Er. S. Vengadesan Assistant Engineer (Civil)		
19.	Er M. Kalaiyanagan Junior Engineer (Civil)		
20.	Er. R. Douneradjane Junior Engineer (Civil)		
21.	Er. D. Singaravelou Electrical Wing		
22.	Er. SenthilSumar Civil		
23.	Mr. V. Nagamuthu Electrical Wing		
24.	Mr. Karthik Electrical wing		
25.	Mr. R. Jayamurthy Electrical Wing		
26.	Mrs. Reka Electrical Wing		
27.	Mr. Ekmaran DEO, Civil		
28.	Mr. Sivachandran Project Management Consultancy		
29.	Mrs. Kavitha		

Photo 3: Attendance Sheets

6. Areas Covered (Departments/ Buildings/ Facilities)

The physical area covered during audit were as detailed below:

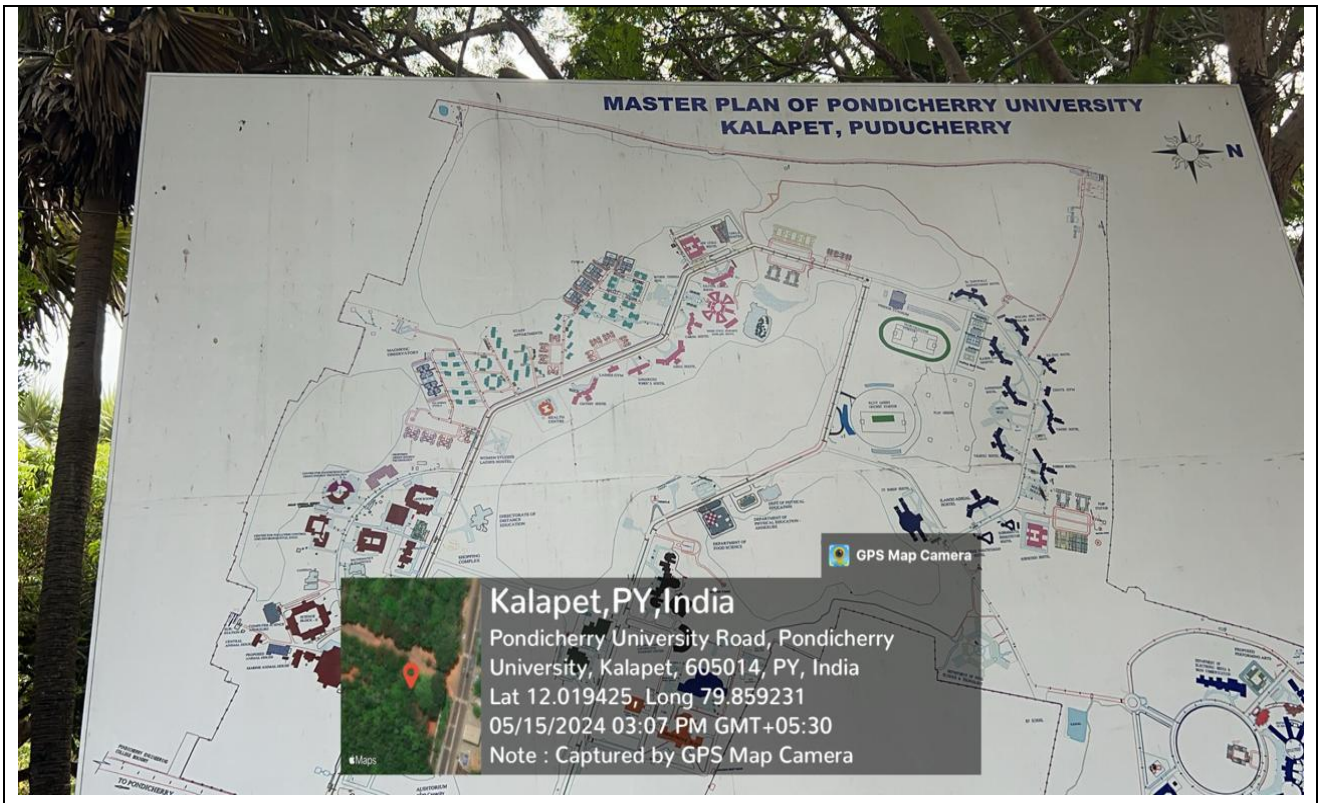


Photo 4: Master Plan of Areas covered during Green Audit

7. NBC Code Section 11 Clause wise Observations

CLAUSE 3 APPROACH TO SUSTAINABILITY

The objective of this clause is to see overall commitment of management towards Sustainability and their approach /system of planning from concept, design, construction, commissioning, operation and maintenance, and also decommissioning and disposal at the end of useful life of structure. Also focuses on Energy Efficient Design and Processes.

In recent years, the University has undertaken a concerted effort to build a green campus that reflects its commitment to sustainability and responsible environmental resource management. To this end, the University has developed a comprehensive vision, mission, and scope for its **Green Campus Initiative** addressing the triple planetary crisis: climate change, loss of biodiversity, and waste & pollution, and to speed up the implementation of Sustainable Development Goals at all levels.

Photo 5: Office of Green Campus displayed o*n the University*

Office of Green Campus

Pondicherry University

Pondicherry University has firmly embraced the University Grants Commission Quality Mandate to address the climate crisis and safeguard the natural resources and surrounding environment of the campus. This significant initiative involves a groundbreaking collaboration with alumnus Dr. M. Nandhivarman. Driven by a commitment to instigate a shift in attitudes among current students and the esteemed alumni community, as well as to inspire the upcoming generation of scholars and students towards climate change adaptation, alumnus Dr. M. Nandhivarman has taken the lead in establishing the "Office of Green Campus" (Climate Change, Environment, and Sustainability). This dedicated effort serves as an extension of his dissertation, titled *Evolving and Implementing an Action Research Framework for Green Campus Strategies at Educational Institutions with Special Reference to Water-Food-Energy Nexus and Sustainability*. It underscores Pondicherry University's unwavering commitment to being nature-positive and contributing to the Sustainable Development Goals (SDGs).

Drawing upon more than three decades of experience, Dr. M. Nandhivarman, a seasoned senior executive and distinguished alumnus, advocates the mantra *"sustainability is doing for others."* He has outlined the operational framework for the "Office of Green Campus" (Climate Change, Environment, and Sustainability), emphasizing four key principles: Environmental Justice (in alignment with the Fundamental Duties of Man, Article 51-A (g)), the Precautionary Principle (as articulated in Principle 15 of the Rio Declaration), Tipping Theory (focused on promoting positive actions rather than merely preventing negative ones), and the concept of Picking Low Hanging Fruit (acknowledging the impact of meaningful small actions).

In a meticulous fashion, the alumnus Dr. M. Nandhivarman has aligned the scope of the initiative with carefully woven strategies, emphasizing easily achievable outcomes for the protection and conservation of the campus's natural resources and beyond complementing the targets of multiple SDGs. Simultaneously, the initiative aims to instigate a "change in attitude" among students and stakeholders under five key areas: Awareness Creation, Green Initiatives for Behavioral Change, Standard Operation and Transformation, Dissemination, and Fundraising and Outreach. By actively contributing to real-world connections, the initiative plays a pivotal role in preparing stakeholders to be more "world-ready."

From the left Officer-on-Special Duty (Cultural & Cultural Relations) Prof. Rajeev Jain, Vice Chancellor, Prof. Gurmeet Singh, Director of Studies, Educational Innovation and Rural Reconstruction, Prof. Tharanikkarasu, and Coordinator, Office of Green Campus, Dr. M. Nandhivarman.

Vision of Green Campus:

At Pondicherry University, our vision for the Office of Green Campus is to create a model campus that not only embraces sustainability and environmental responsibility but also serves as a beacon of hope and inspiration for future generations of environmental leaders to address the urgent challenges posed by the triple planetary crises of climate change, biodiversity loss, and pollution in tandem with the Sustainable Development Goals. Our ultimate goal is to contribute to the preservation of our planet's ecosystems and the wellbeing of all its inhabitants.

For construction of Buildings and infrastructure development PU follows Central Public Works Department (CPWD) Guidelines for Sustainable Habitat dated March 2014 and Comprehensive Green

Protocol for the educational institutions, Industries' etc. of UT of Puducherry (developed with active participation of PU Team).

The commitment of PU by establishing Green Campus Initiatives and following CPWD Guidelines and Green Protocol indicate it's drive for Sustainability. However, there is no monitoring mechanism is found. Structured Checklist/KPIs, Benchmarks etc. for monitoring may be developed.

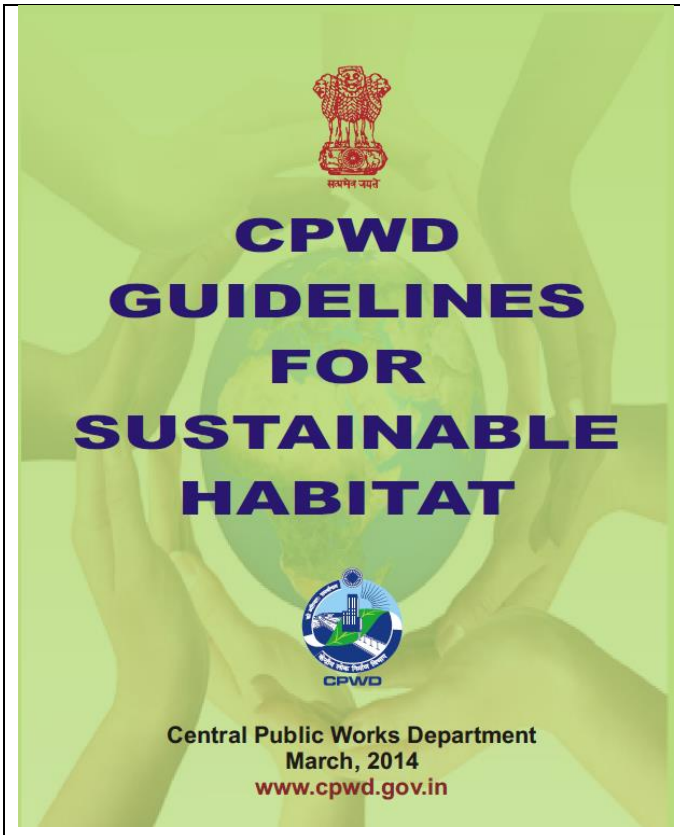


Figure 7-1: Central Public Works Department (CPWD) Guidelines for Sustainable Habitat

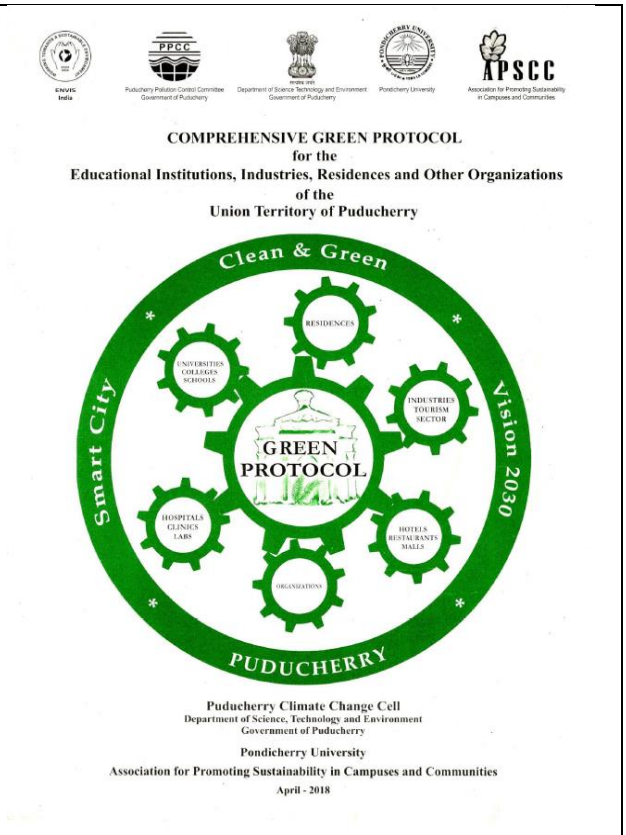


Figure 7-2: Comprehensive Green Protocol for the educational institutions, Industries' etc of UT of Puducherry

Pondicherry University have provided plumbing services as desired to meet the needs of persons with disabilities and for different age groups in washrooms, ramps, and other facilities like lifts for easy access to classrooms

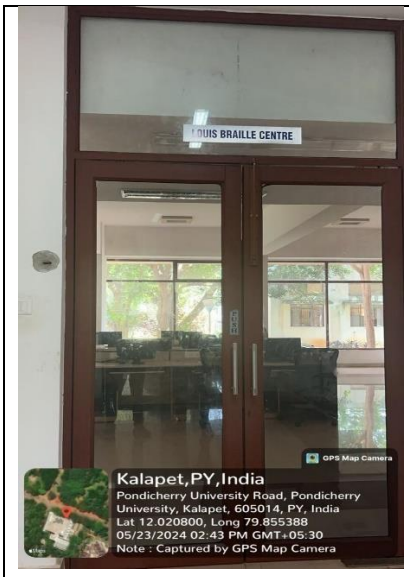
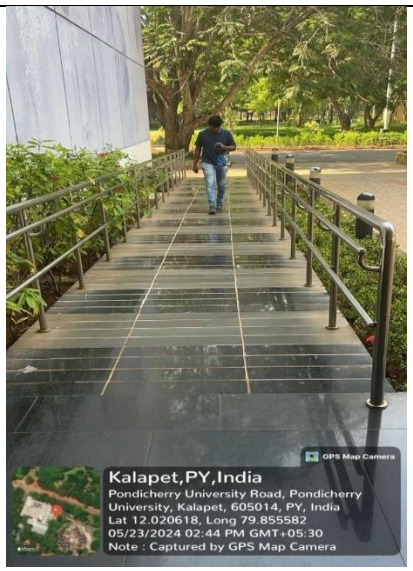
	

Photo 6: Louis Braille Centre, A state-of-the-art facility for visually impaired	**Photo 7: Ramps for Wheelchair Movement**	**Photo 8: Washrooms for Differently Abled**

Louis Braille Centre, A state of the art facility for visually impaired / differently abled students, scholars and faculty is located at the ground floor of the Library Annex Building. The computing facility with assistive technologies enabled them with their learning and research processes.

To have a system of planning from concept, design, construction, commissioning, operation and maintenance, and also decommissioning and disposal at the end of useful life of structure, Pondicherry University follows Comprehensive Green Protocol for the Educational Institutions. It addresses Construction and Demolition Waste Management on page 13. Also, different committees are available for monitoring:

- Finance Committee
- Planning Committee
- CPP – Tendering process
- Building Committee
- GEM portal
- E-Auction committee

To address the possible reuse and recycling of materials, components, structures, or parts thereof, and to ideally close the loop (cradle to grave) regarding the originally used resources, Pondicherry University follows the Comprehensive Green Protocol for educational institutions. This protocol specifically covers construction and demolition waste management, as detailed on page 13.

To encourage and harness building materials from agricultural, industrial, and biowastes, which have significant potential for regeneration, Pondicherry University follows the guidelines outlined by the

CPWD (Central Public Works Department). As per CPWD Guidelines Point No. K, traditional techniques are included and promoted in these practices.

Pondicherry University encourages the use of traditional materials, technologies, vernacular design, and construction practices in its building projects. According to the CPWD Guidelines Point No. K, the university has effectively utilized several traditional techniques for thermal insulation and other construction purposes. These include:

- Brick bat Koba (Brick Koba, DSR Item No. 22.7) for waterproofing and thermal insulation.
- Mud Phuska (Mud Phuska, DSR Item Nos. 12.16, 12.17) for traditional insulation and cooling.
- Broken ceramic mosaic tiles (in flooring, DSR Item No. 11.44) for sustainable and aesthetic flooring solutions.
- Cavity wall insulation (Cavity Wall, DSR Item No. 6.6) for improved thermal efficiency.

These practices not only enhance the sustainability of the buildings but also preserve and promote traditional construction techniques.

To address the tapping of renewable energy sources for lighting, heating, cooling, and ventilation needs, Pondicherry University has implemented several initiatives. These initiatives include installing solar panels to harness solar energy efficiently.

To improve the daylight factor and reduce the need for artificial lighting during the day, strategic changes have been made. For example, the university has switched to using transparent sheets instead of nontransparent ones in certain buildings. This change allows more natural light to enter, thereby reducing the reliance on artificial lighting.

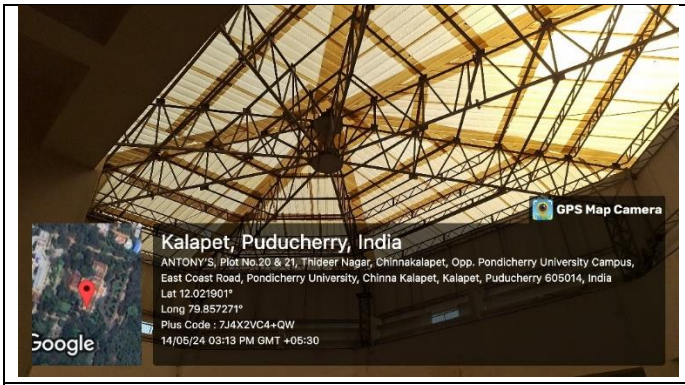


Photo 9: Lighting by Transparent Sheets

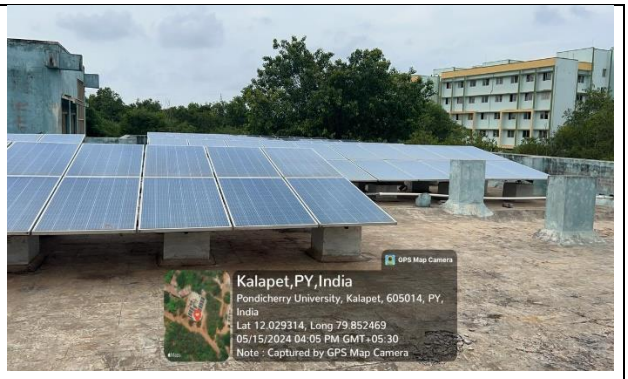


Photo 10: Solar Panels

These efforts reflect the university's commitment to sustainability and energy efficiency, aligning with their broader green protocols and energy conservation measures.

Pondicherry University has undertaken calculations for embodied energy (EE) for several newly constructed facilities, including the Boys Hostel, Girls Hostel, and the Chemistry Department building. These calculations are detailed in Annex 3 of their documentation. However, the embodied energy and greenhouse gas (GHG) emissions per square foot or square meter have not been calculated.

The per capita water consumption at Pondicherry University has been as follows:

Total Water Consumption: 545,000 liters per day

Total Occupants: Approximately 10,000 (with 90% being residents)

This results in an average water consumption of about 55 liters per person per day. This consumption rate is within the acceptable range of 35 to 60 liters per person per day, which is typical for boarding schools (*Ref Water consumption in public schools: A case study Article in Journal of Water, Sanitation and Hygiene for Development · January 2019,DOI: 10.2166/washdev.2019.074*)

Pondicherry University has implemented an integrated and sustainable water management system focused on minimizing anthropogenic water discharge from human activities. A key component of this system is the Sewage Treatment Plant (STP) designated for B Block.

An ecofriendly wetland type Sewage Treatment Plant (STP) is part of this strategy. The STP is funded by the Ministry of Human Resource Development (MHRD) under the Higher Education Financing Agency (HEFA) and is being implemented in three phases at various locations. The treated water from this plant is used for horticultural activities, which helps reduce water usage within the university premises. STP Capacity: 7 lakh liters per day. The STP is designed to handle the present water consumption and also accommodate future requirements. This approach ensures that the treated water can be safely reused for various purposes, significantly reducing the amount of untreated water discharge and promoting sustainable water management on the campus.

Under SDG 6 Goal-Specific Policy was developed which addresses Water Conservation, water accounting etc. Also, PU has submitted a paper National Water Mission, which can be accessed through link below

https://nwm.gov.in/sites/default/files/Pondicherry_UniversityCTR2020.pdf

The total rainwater recharges attempted presently were found to be (7,87,062.1 m3 year1) and the total water usage calculated were (2, 35,608 m3 year1). About 2.0 m raise in groundwater level has been observed after the erection of recharge pits, borehole recharge structures and roof top harvesting structures.

Pondicherry University is actively engaging with stakeholders, including top management, to promote sustainable development. Environmental education measures, such as awareness sessions on the triple planetary crisis and environmental awareness activities in various residential complexes, are conducted which is essential for fostering a culture of sustainability.

These efforts extend beyond the campus environment to include surrounding residential areas like Sri Aishwaryam Apartments, Rose Apartments etc. With around 20 activities documented in the Annual Report for SDG 13 in 2024, it's evident that Pondicherry University is actively pursuing its commitment to environmental education and sustainable development.

Environmental impact assessment carried out for buildings under construction as shown below

Table 7: EH&SMS – Concrete Columns Erection **Annexure: 6**

Sl. No.	Impact	Aspect	Type DA/IA	Type N/A/E	(A)	(B)	(C)	(D)	(E)	Score	Control Measures (Workers, Public, and Environment Safety)
I.	Air Pollution	Generation of Dust & Vehicular Exhaust gases	DA	N	1	2	1	1	1	2	a – Barricaded to limit public intervention b – Working under daylight with wind direction c – Cordon off the area
II.	Water Pollution	Worker self-cleaning & tools washing	DA	N	1	2	1	1	1	2	a – Will be done in a demarked area b – The water diverted to the walkway and parking lot
III.	Land Pollution	Concrete leakage	DA	N	1	2	1	1	1	2	a – A demarked walkway and mobility lane will be used b – Metal sheets shall be provided to collect spillage
IV.	Soil Erosion	Vehicular movement on the soil	DA	N	1	2	1	1	1	2	
V.	Noise Pollution	-	-	-	-	-	-	-	-	-	-
VI.	Energy Consumption	Concrete mixing	DA	N	1	2	1	1	1	2	a – Working during the day avoiding electrical lighting b – Preventing the idling of the mixer machine/vehicle
VII.	Impact on Natural Heritage	-	-	-	-	-	-	-	-	-	-
VIII.	Habitat Disturbance	-	-	-	-	-	-	-	-	-	-
IX.	Depletion of Natural Resources	-	-	-	-	-	-	-	-	-	-
X.	Waste Generation	Cement bags, excess concrete mixture	DA	N	1	1	1	1	1	1	a – Cement bags collected separately and disposed of b – Excess & spillage concrete will be used in parking lot
XI.	Odor	Concrete smell	DA	N	1	1	1	1	1	1	a – Barricaded to limit public intervention b – Mask use c – Smell allergic worker will not be involved

Score = (A)x(B)x(C)x(D)x(E)

Quantity (A)		Occurrence (B)		Impact Severity (C)		Legislation (D)		Detection (E)		Situation/ Operation
Negligible	1	Once in a month/ Less frequent	1	Negligible Impact/ visual/ aesthetic	1	Complying with legislative requirements	1	Immediately	1	DA – Direct activity controlled by the institute
Low	2	Once in a week/ Several times in a month	2	Cause discomfort/ nuisance	2			More than 1 hour	2	IA – Indirect activity influenced by the institute
Moderate	3	Once in a day	3	Resource consumption/water pollution/ air pollution	3			More than 1 shift	3	N – Normal situation
High	4	Several times a day	4	Chronic Human health effect/ Land contamination	4			More than 24 hours	4	A – Abnormal situation
Excessive	5	Continuous	5	Fatal to Human Health	5	Not Complying	5	More than a week	5	E – Emergency situation

11

Environmental Health and Safety Management System (EH&SMS)
Identification and Evaluation of Environmental Aspects. Inventory Form, Office of Green Campus, Pondicherry University, 2023

Figure 7-3: Environmental Risk Assessment Sample

University has prepared Disaster Risk Assessment and mitigation plan comprising identification of risks

MINUTES OF THE MEETING ON VETTING THE DRAFTED DISASTER MANAGEMENT AND EMERGENCY PREPAREDNESS PLAN ON 17.05.2024 AT 4.00 PM IN THE BOARD ROOMA, ADJECENT TO THE DIRECTOR (SEI&RR) ADMINISTRATIVE BUILDING, PONDICHERRY UNIVERSITY, PUDUCHERRY.

The following members were present:

Sl. No.	Name and Designation	Status
1.	**Prof. K. Anbalagan** Dean, School of Physical, chemical & Applied Sciences	Chairman
2.	**Dr. S. Balaji** Prof. & Head, Dept. of Coastal Disaster Management	Member
3.	**Dr. P. Thambidurai** Assistant Professor, Dept. of Coastal Disaster Management	Member
4.	**Er. V. Mourougavelou** Head, Electrical/Civil	Member
5.	**Dr. S. Humayun** Nodal Officer (NSS / NCC)	Member
6.	**Dr. R. Vishnu Vardhan** Deputy Coordinator (IQAC)	Coordinator
7.	**Dr. M. Nandhivarman,** Coordinator, Office of the Green Campus Initiatives	Special Invitee

Figure 7-4: Disaster Management Plan Approval Meeting

during construction, risks during occupancy stages/operations and decommissioning. Training on Snake Bite was conducted for all students 4/10/2023, Speaker Satyam Gupta.Fire Safety Training was conducted on 20th April 2023, Notice PU/ELW/2324/42 verified.Preventive Measures in Connection with cyclone "NIVAR' seen.

Campus is in coastal and cyclonic proximity area. Whenever there are warnings by Meteorological dept, a Circular is issued. Sample PU/ELW/2223/1598 dtd 08/12/2022 seen.

CLAUSE 4 APPLICABILITY OF THIS PART

The evaluation of existing buildings or parts thereof under the provisions of the Code and its application to development projects are critical aspects of ensuring adherence to construction standards and promoting sustainable practices. While CPWD Guidelines and the Green Protocol serve as valuable resources in this endeavor, there exists a notable gap in their effective implementation.

CLAUSE 5 IMPLEMENTATION OF THIS PART

Regarding material selection, design methodology, construction techniques, operation, and maintenance for ensuring the safety, efficiency, and sustainability of construction projects, CPWD Guidelines and the Green Protocol serve as comprehensive resources for guiding these processes, their effective implementation requires improvement.

To enhance oversight and ensure compliance with these standards, the development of structured checklists, Key Performance Indicators (KPIs), benchmarks, and monitoring mechanisms is required.

CLAUSE 6 SITING, FORM AND DESIGN

The objective of this clause is to see if passive design strategies for every building as a means to reducing overall energy demand before pursuing active and mechanical means in an effort to not only save energy but also to minimize the overall negative impact on the environment (energy conservation, water conservation and reduced greenhouse gas emissions.)

The consideration of passive design strategies represents a fundamental step in promoting energy efficiency and environmental sustainability in building construction. By prioritizing passive design measures, such as proper orientation, shading, natural ventilation, and insulation, buildings can significantly reduce their overall energy demand and minimize reliance on active and mechanical systems.

It is observed that orientation markings on the drawing for the Science Block addon Building for the Computer Science Department indicates a proactive approach to incorporating passive design principles. Additionally, the review of test reports dated 14.2.2022 for fly ash bricks underscores a commitment to utilizing sustainable building materials, further aligning with the goal of reducing environmental impact.

A responsible design professional, engaged by PMC M/s UPRNL, conducted a thorough assessment of onsite natural resources and pre-site conditions, as per the stipulated requirements. Geo technical Report dt 31.05.2021 also verified.

The development plan incorporates thoughtful design strategies to ensure energy efficiency, occupant comfort, and environmental sustainability. By providing external shading during summer, vertical shading to mitigate glare, optimal building orientation based on sunpath analysis, and protection against thermal losses and natural elements, such as wind and rainwater, the plan addresses key considerations comprehensively. Additionally, the inclusion of tree blanketing further enhances shading and microclimate regulation.

The review of the thermal massing calculation for the Girl's Hostel indicates a proactive approach to assessing and optimizing the thermal performance of the building. However, it is essential to ensure that this calculation is accompanied by a comprehensive report that includes the justification for the proposed wall material and design approach.

The requirement specifies that at least 30 percent of open spaces should be maintained as softscapes, which are permeable surfaces on the ground and in areas where the calculated softscape area is less than 10 percent of the total plot area, a minimum of 10 percent softscape area is mandated. In PU only around 5 percent of the area is occupied and the rest is forest, the softscape area requirement is already being met.

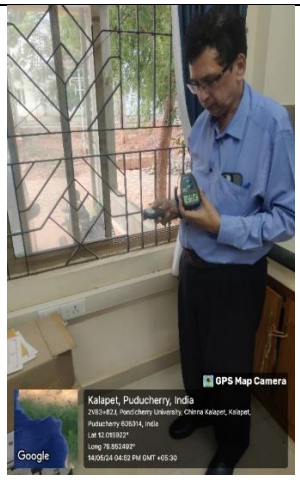
The institute has indeed considered strategies to reduce building volume by adjusting floor to floor and floor to ceiling heights while ensuring no compromise to the utility and functional efficiency of the buildings. A standard ceiling height of 11.8 feet has been maintained across all buildings, which is conducive to creating spacious and comfortable indoor environments. Additionally, in airconditioned rooms, the ceiling height has been optimized to 9 feet, balancing energy efficiency with occupant comfort. Random measurements in two buildings have confirmed the adherence to these height

specifications, demonstrating a deliberate effort to optimize building volume without compromising functionality or usability.

The use of landscaping and green massing to enhance thermal comfort in classrooms aligns with the objective of maximizing natural ventilation and cooling based on adaptive thermal comfort criteria. The incorporation of landscaping and greenery serves as a practical implementation of natural ventilation strategies. By strategically placing vegetation around the building, particularly near classroom areas, it leverages the cooling effects of vegetation and promotes airflow, thereby contributing to a more comfortable indoor environment.

The measured daylight factor of 5.22 in the Department of Pollution Control exceeds the minimum requirement specified in the building standards, which mandates that at least 25 percent of regularly occupied areas achieve sufficient daylighting with a minimum daylight factor of 2 percent. This indicates that the department's indoor spaces are well illuminated by natural light, surpassing the stipulated standards for daylighting.

<table>
<tr><td colspan="2"> 


</td><td colspan="2"> 


</td></tr>
<tr><td colspan="2">Outside Illumination: 1400 Lumex
Indoor illumination: 260 Lumex
DF = 266 / 1406 100
DF = 18.92%</td><td colspan="2">Outside Illumination: 1400 Lumex
Indoor illumination: 292 Lumex
DF = 292 / 3680 100
DF = 8.00%</td></tr>
<tr><td colspan="4">Photo 11: Day Light Factor Measurements</td></tr>
</table>

CPWD maintenance manual has considered building service life planning in conjunction with design and construction documents. But, it is not having a comprehensive building service life plan.

The Embodied Energy and GHG Calculations given by PU shows the summary as below:

Table 3: EE Sample Data

Building	GHG Total	SqM	GHG KgCO2e/SqM	EE Total in Mj	EE Gj/SqM
Girls Hostel	6548926.40	14191.22	461.48	7551997.33	0.53
Boys Hostel	5779334.98	7500.00	770.58	4885861.26	0.65
Chemistry Building	6210217.91	3260.00	1904.97	10694884.00	3.28

Though it shows Low Specific EE & GHG Per SqM, Calculations need to be rechecked

CLAUSE 7 EXTERNAL DEVELOPMENT AND LANDSCAPE

This clause focusses on Landscape planning and design, because effective landscaping plays a vital role in preserving the natural capacity of a site for stormwater management, groundwater recharge, soil structure maintenance, and filtration, leading to the growth of soil organic matter and erosion prevention. Furthermore, it helps to regulate the microclimate by facilitating evaporation, transpiration, and the absorption and storage of carbon by trees and other vegetation.

Landscape planning and design records for Girls Hostel verified. Architect : M/s NJR Constructions Pvt Ltd, Hyderabad. Photos shown below

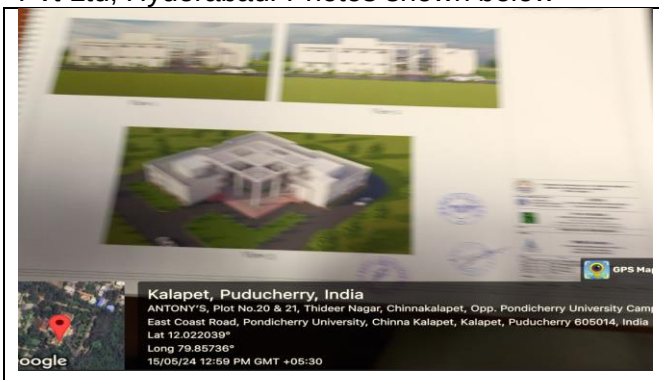


Photo 12: Landscape Plans

Additionally, the design of the external landscapes has been thoughtfully integrated with the shading patterns of the buildings. The landscaping plan for the Girls Hostel Building has been verified, showing a building to landscaping distance of 20 feet. This consideration of shading patterns ensures that the landscaping not only enhances the aesthetic appeal but also contributes to the thermal comfort of the building

The institute has taken appropriate measures to assess and address noise reduction at the site. All buildings are situated far from the road, effectively mitigating noise pollution. Random noise

Photo 13: Noise Levels Measurement

Photo 14: Paved area

measurements were taken and recorded, with photos indicating that noise levels are within acceptable limits.

The Girls Hostel Building has successfully maximized the perviousness in the paved areas of the site. The calculated pervious area is 54.0%, with the total percolation area being 7002 sqm out of the total site area. (Fencing area 12966 sqm, Road area 2400 sqm, Building area 3564 sqm, Total percolation area 7002 sqm, Percentage 54%.).

Additionally, a comprehensive site maintenance plan for landscaping has been developed. The garden maintenance work for the PU Main Campus has been verified and found to be satisfactory. This plan ensures the ongoing care and sustainability of the landscape, contributing to the overall environmental quality and aesthetics of the campus. Landscape maintenance is carried out by the Horticulture team. the entire campus is divided into zones for precise maintenance.

The university has adopted a comprehensive water management strategy that includes both storing rainwater for direct use and recharging groundwater. This is achieved through the construction of two borehole recharge structures near the girls hostel and the Madanjeet School of Green Energy Technology. These structures tap into shallow aquifers and collect rainwater from building rooftops, which is then diverted to recharge pits.

In addition to these structures, the campus features rooftop rainwater harvesting structures and additional recharge structures at the Green Energy building. A total of 12 recharge pits have been strategically placed across the premises, adding a groundwater recharge capacity of approximately 14,328.425 cubic meters per year.

Photo 15: Check dams

To prevent rooftop rainwater contamination, PU avoided overhanging trees to prevent leaves and bird droppings from falling onto the roof. Additionally, PU diverted the initial rainfall, which often carries airborne dirt and debris, away from the collection tank. The water entering the tank under go filtration, and both the filter and tank receive regular cleaning to uphold water quality.

The site maintenance plan currently includes various maintenance activities and utilizes checklists and an online complaints system for managing tasks. The electrical checklist for Sub Station X, dated 15.5.2024, has been reviewed. However, the plan lacks a schedule for preventive maintenance and does not specifically address the maintenance procedures and checklists for water features as required by Clause 7.3.1 of NBC Part 11.

The institute has implemented measures to reuse water resources effectively. Specifically, treated water from the Sewage Treatment Plant (STP) is partially used for gardening, contributing to sustainable irrigation practices. However, excess treated water is released into the drainage system.

The campus has successfully met the sustainability requirements for paved areas. With green cover present throughout the entire campus, it exceeds compliance with the prescribed standards.

The extensive green cover on campus not only meets these requirements but also enhances the aesthetic and environmental quality of the campus, contributing to reduced heat island effect, improved stormwater management, and a more pleasant campus environment.

The practice of preserving topsoil during construction has been effectively implemented at the site. For the new construction at the Physics Department, topsoil has been carefully stacked on one side for

future use. This measure helps in maintaining soil health and ensures that the topsoil can be reused for landscaping or other purposes once construction is completed. Photo is shown below:

Photo 16: Top Soil

The campus has taken steps towards promoting sustainable transportation and pedestrian access. Pedestrian pathways are available, and there are restrictions on automobile entry, encouraging the use of bicycles and battery powered vehicles. However, designated cycle tracks are not yet available, indicating an area for potential improvement to further support sustainable transport options.

Develop Designated Cycle Tracks: Introduce designated cycle tracks to promote the use of bicycles, enhancing safety and convenience for cyclists.

Regarding external lighting and signage, compliance with clause 7.5 of NBC Part 11 requires attention. While there are signages for emergency and wayfinding, these need to be improved to fully meet the

Photo 17: Signages

standards. Enhancing the clarity, visibility, and coverage of emergency and wayfinding signage will ensure better navigation and safety across the campus.

CLAUSE 8 ENVELOPE OPTIMIZATION

The interface between indoor and external climatic conditions is maintained by the building envelope, which has the potential to regulate the building's climatic response. It is essential that the building envelope be designed to significantly conserve energy. An effectively designed building envelope optimizes daylight, provides access to natural ventilation for fresh air, offers views to the exterior, and enables modulation of solar heat gain while also controlling or reducing noise.

The building envelope has been designed with considerations for energy conservation, maximizing daylight, natural ventilation, and views to the exterior. Additionally, it enables modulation of solar heat gain and noise control. Systems for rainwater harvesting have been integrated into the building envelope, contributing to sustainable water management practices.

Daylight Factor, Ventilation, Rainwater Harvesting: Verified and found satisfactory.

Photo 18:Daylight Factor, Ventilation, Rainwater Harvesting

Envelope Optimization:

No specific envelope optimization methods have been deployed for energy efficiency. Explore strategies such as improved insulation, high performance glazing, and reflective coatings to enhance thermal performance and energy efficiency

Humidity levels were measured and found to be higher due to location near sea and rain.

	
Department of Statistics Temperature: 33.3 degree centigrade Humidity: 95 %	**<u>Park opposite Library Annexe</u>** Temperature: 32.5 degree centigrade Humidity: 77%
Photo 19: Temperature and Humidity Measurements	

Integration of Renewable Energy:

The buildings have integrated renewable energy systems, with an installed solar power capacity of 3MW. In April 2024, solar power generated accounted for 48.39% of the total units consumed.

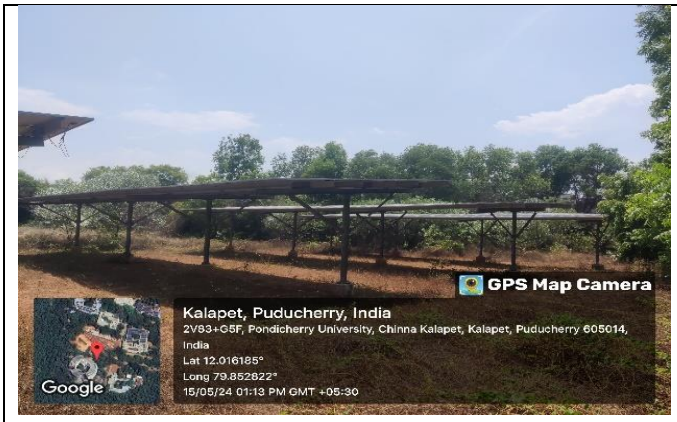


Photo 20: Solar Panels and Solar Power Plant

While the current solar power system is robust, it is recommended to consider increasing the capacity or efficiency of the solar installations and explore other renewable energy sources for further energy diversification and sustainability.

Instruments Calibration certificates

TransCal Technologies LLP

Measurement to Perfection...

100, West Park Road (Between Sampige and Margosa Road) 10th Cross, Malleshwaram, Bengaluru - 560 003

CC-2231

CALIBRATION CERTIFICATE

Customer Name & Address: M/s. COMPETENT INSPECTORATE AND CONSULTANTS PRIVATE LIMITED
Pushpak Co-op Housing Society, 5-5-35/38 and 40/104, 203, Park View, Prashanthinagar Industrial Estate, Kukatpally, Hyderabad, Medchal, Malkajgiri - 500 072.

SRF NO.: TSC24-25/2767 Dated : 07 May 2024 Cert. Issued Date : 10 May 2024
ULR No.: CC232140000502227F

CAL CERT. NO.	Calibrated Date	Calibration Due Date	Page No.
TSC24-25/2767-1	08 May 2024	08 May 2025	1 of 2

Details of device under calibration (DUC):		Transcal ID	: TSC485880
DUC	: Digital Illuminance Meter (Lux meter)	Calibration Procedure No.	: TSCCAL/676
Make	: Sigma	No. of Pages	: 2
Model	: LX1010B	DUC Received	: 07 May 2024
Sl.No.	: S504114	DUC Condition on Receipt	: Satisfactory
ID.NO.	: ---	Calibration Done At	: Mechanical Lab,Transcal

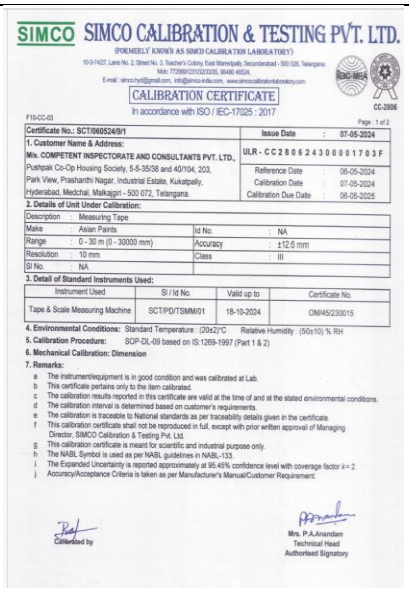
Calibrated By: Janardhan S, Calibration Engineer
Environmental Conditions : Temperature in °C : 23 ± 5 Humidity in RH % : 40 - 60
Standards used:

Sl. No.	Nomenclature	Make	Model	Sl No.	Traceable to / Cert. No.	Validity
1	Illuminance Meter / Light Meter	Lutron	LX-1102	B 005717	JRPM / JRPM-CCTR-OPT-2023-0061	13 Jun 2024

Note:
1. This Calibration Certificate relates only to the above DUC & Reported results are valid at the time of and under the stated conditions of measurements.
2. Partial Publication/ reproduction of this Certificate in any form is not permitted without the written consent of TransCal.
3. Errors if any, in this Certificate shall be brought to notice within 45 days from the date of this Certificate
4. Measurement Uncertainty reported is at approximately 95 % confidence level with k=2; Units of Measurement results & Measurement Uncertainty are same as that of range selected - Unless otherwise indicated
5. Calibration of the DUC is traceable to National/International Standards.
6. Corrections/erasing invalidate the Calibration Certificate.
7. Unless otherwise specified the Measurement Data reported is 'As Found'-Without any adjustment.
8. The Decision Rule:
Simple Conformity Decision: Decision without considering Measurement Uncertainty, "PASS" indicates measured value is within or on threshold of Tolerance limit/Accuracy. "FAIL" indicates measured value is beyond threshold of Tolerance limit/Accuracy. "–" indicates no tolerance limit/Accuracy furnished.

Reviewed & Authorised By
Manjunath D J
(Lab Incharge)

Tel : +91 80 4368 8889, 2334 4723 Telefax : 2344 0676 E-mail : info@transcal.com Website : www.transcal.com



SIMCO CALIBRATION & TESTING PVT. LTD.
(FORMERLY KNOWN AS SIMCO CALIBRATION LABORATORY)

CALIBRATION CERTIFICATE
In accordance with ISO / IEC-17025 : 2017

CC-2806

F19-CC-03 Page : 1 of 2

Certificate No.: SCT/0605524/9/1		Issue Date	: 07-05-2024
1. Customer Name & Address:		ULR - CC280624300001703F	
M/s. COMPETENT INSPECTORATE AND CONSULTANTS PVT. LTD., Pushpak Co-Op Housing Society, 5-5-35/38 and 40/104, 203, Park View, Prashanthi Nagar, Industrial Estate, Kukatpally, Hyderabad, Medchal, Malkajgiri - 500 072, Telangana.		Reference Date	: 06-05-2024
		Calibration Date	: 07-05-2024
		Calibration Due Date	: 06-05-2025

2. Details of Unit Under Calibration:

Description	: Measuring Tape		
Make	: Asian Paints	Id No.	: NA
Range	: 0 - 30 m (0 - 30000 mm)	Accuracy	: ±12.6 mm
Resolution	: 10 mm	Class	: III
Sl No.	: NA		

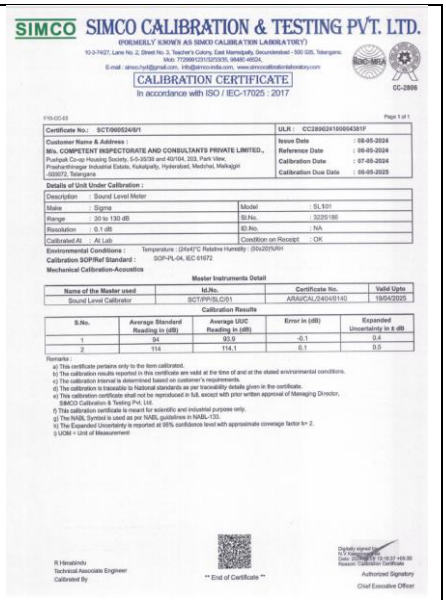
3. Detail of Standard Instruments Used:

Instrument Used	Sl / Id No.	Valid up to	Certificate No.
Tape & Scale Measuring Machine	SCT/PD/TSMM/01	18-10-2024	OM/45/230015

4. Environmental Conditions: Standard Temperature : (20±2)°C Relative Humidity : (50±10) % RH
5. Calibration Procedure: SOP-DL-09 based on IS:1269-1997 (Part 1 & 2)
6. Mechanical Calibration: Dimension
7. Remarks:
a The instrument/equipment is in good condition and was calibrated at Lab.
b This certificate pertains only to the item calibrated.
c The calibration results reported in this certificate are valid at the time of and at the stated environmental conditions.
d The calibration interval is determined based on customer's requirements.
e The calibration is traceable to National standards as per traceability details given in the certificate.
f This calibration certificate shall not be reproduced in full, except with prior written approval of Managing Director, SIMCO Calibration & Testing Pvt. Ltd.
g This calibration certificate is meant for scientific and industrial purpose only.
h The NABL Symbol is used as per NABL guidelines in NABL-133.
i The Expanded Uncertainty is reported approximately at 95.45% confidence level with coverage factor k= 2.
j Accuracy/Acceptance Criteria is taken as per Manufacturer's Manual/Customer Requirement.

Calibrated by

Mrs. P.A.Anandam
Technical Head
Authorised Signatory



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CALIBRATION CERTIFICATE
In accordance with ISO / IEC-17025 : 2017

CC-2806

F19-CC-03 Page 1 of 1

Certificate No.: SCT/0605249/9/1		ULR : CC280624100004381F	
Customer Name & Address : M/s. COMPETENT INSPECTORATE AND CONSULTANTS PRIVATE LIMITED., Pushpak Co-op Housing Society, 5-5-35/38 and 40/104, 203, Park View, Prashanthinagar Industrial Estate, Kukatpally, Hyderabad, Medchal, Malkajgiri -500072, Telangana.		Issue Date	: 06-05-2024
		Reference Date	: 06-05-2024
		Calibration Date	: 07-05-2024
		Calibration Due Date	: 06-05-2025

Details of Unit Under Calibration :

Description	: Sound Level Meter		
Make	: Sigma	Model	: SL101
Range	: 30 to 130 dB	Sl.No.	: 3291186
Resolution	: 0.1 dB	ID.No.	: NA
Calibrated At	: At Lab	Condition on Receipt	: OK

Environmental Conditions : Temperature : (24±4)°C Relative Humidity : (55±20)%RH
Calibration SOP/Ref Standard : SOP-PL-04, IEC 61672
Mechanical Calibration-Acoustics

Master Instruments Detail

Name of the Master used	Id.No.	Certificate No.	Valid Upto
Sound Level Calibrator	SCT/PP/SLC/01	ARAI/CAL/24/04/0140	19/04/2025

Calibration Results

S.No.	Average Standard Reading in (dB)	Average UUC Reading in (dB)	Error in (dB)	Expanded Uncertainty in ± dB
1	94	93.9	-0.1	0.4
2	114	114.1	0.1	0.5

Remarks :
a) This certificate pertains only to the item calibrated.
b) The calibration results reported in this certificate are valid at the time of and at the stated environmental conditions.
c) The calibration interval is determined based on customer's requirements.
d) The calibration is traceable to National standards as per traceability details given in the certificate.
e) This calibration certificate shall not be reproduced in full, except with prior written approval of Managing Director, SIMCO Calibration & Testing Pvt. Ltd.
f) This calibration certificate is meant for scientific and industrial purpose only.
g) The NABL Symbol is used as per NABL guidelines in NABL-133.
h) The Expanded Uncertainty is reported at 95% confidence level with approximate coverage factor k= 2.
i) UOM = Unit of Measurement

R Hanabindu
Technical Associate Engineer
Calibrated By

** End of Certificate **

Authorized Signatory
Chief Executive Officer

Photo 21:Instruments Calibration certificates

CLAUSE 9 MATERIALS

The selection of building materials is crucial in sustainable design due to the farreaching chain of events involved in producing a material, including extraction, processing, and transportation. Furthermore, these activities can have negative environmental impacts on the air, soil, and water, as well as harm natural habitats and deplete natural resources, not only during building construction but also in the long run.

Sustainable Building Materials:

The selection of building materials does not demonstrate adherence to sustainability criteria, such as environmental impact, recyclability, and use of renewable resources. There is no evidence of analysis or consideration of energy efficiency and greenhouse gas emissions in material selection. Furthermore, no Life Cycle Assessment (LCA) has been conducted for building materials.

There is no indication of the use of alternative materials or techniques to reduce energy consumption and CO2 emissions in construction.

Material Handling and Storage:

The facility has proper material handling and storage procedures in place, as evidenced by the use of construction site stores at the Department of Performing Arts and Food Science Department and the maintenance of stock registers. However, there is no mention of a first in first out policy for material withdrawal.

While the audit did not specifically address moisture sensitive material storage, it is recommended to ensure proper storage conditions for materials like cement, gypsum, steel, and plywood to prevent moisture related damage.

COMPETENT INSPECTORATE

CLAUSE 10 WATER AND WASTE MANAGEMENT

With the increasing population, industrial activity and pollution, surface and groundwater resources have been overexploited and severely polluted during the past few decades. As a result, the country is faced with immense water scarcity. Significant liquid and solid waste generation is witnessed and recorded in the urban areas of the country. Sustainable approach to water and waste management requires planning and design of building functions to integrate issues of water and waste management system at the early stages of design.

a) Conceptualization, Planning, and Design Stage

Waste Management: Addressed in the Comprehensive Green Protocol document (Chapter 5).

Recyclable Waste Collection is Managed by Astha Associates. The report for April 2024 (dated

Astha associates
ENGINEERS & CONTRACTOR
No-48, First Floor, Middle Street,Chinnakalapet,Puducherry-605014

07/05/2024

To :
The Coordinator,
Office of Green Campus
Pondicherry University (PU),
Pondicherry.

Dear Sir ,

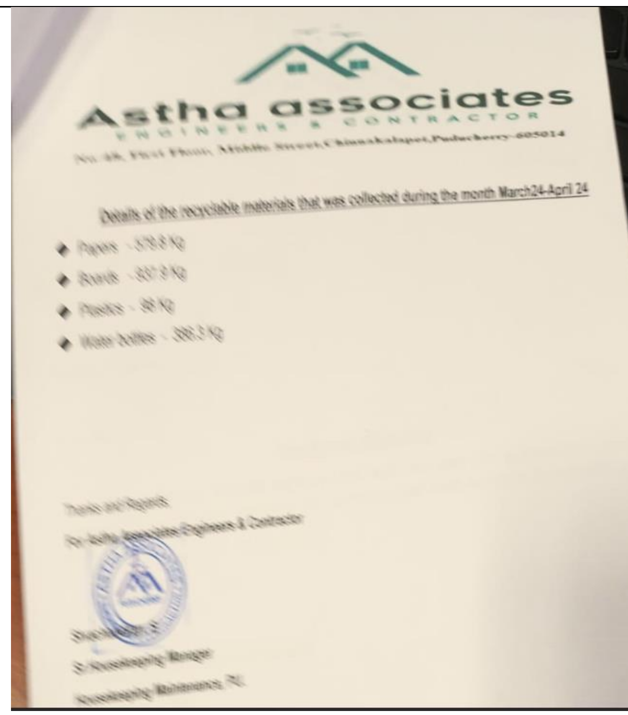
Sub: Details of the recyclable materials that was collected during the month Mar-24 & Apr-24 - Reg.

Here with I have submitted Details of the recyclable materials that was collected during the month Mar-24 & Apr-24 was send to the recycler.

- Gate pass & other Details also enclosed.

Thanks and Regards,
For Astha Associates Engineers & Contractor

Sivachandran .S
Sr.Housekeeping Manager
Housekeeping Maintenance, PU,



Astha associates
ENGINEERS & CONTRACTOR

Details of the recyclable materials that was collected during the month March24-April 24

7-5: Recyclable Waste Reports

07/05/2024) was reviewed.

Monthly Inventory: The detailed report (dated 07/05/2024) from Astha Associates covers hostelwise bin details and includes photos.

b) Construction Stage

Waste Management: Addressed in the Comprehensive Green Protocol document (Chapter 5). However, no specific guidelines for PU Campus are available.

Water Management: Not addressed during the construction stage.

Policies: Goalspecific policies for Sustainable Development Goals (SDGs) 9 & 11 have been developed and approved by the University Governing bodies. These policies will be implemented in fasttrack mode.

c) Performance During Use and Corrective Action

Water Consumption Monitoring: No benchmark data is available. However, specific water consumption is within norms, indicating adequate monitoring and control of water use.

Monitoring Water Consumption: There are no benchmark data available; however, specific water consumption is within norms. Horticulture uses approximately 3,16,800 LPD, while potable water consumption is around 6,00,000 LPD.

Water Balance Chart: Not provided in the audit. Develop and maintain a comprehensive water balance chart that includes all supplyside resources and the integration of recycled water

No largescale water heating systems are used. Electric heaters/geysers are planned with solar power compensation.

Water Efficiency Strategies

Recycled Water Use: STP water is used for gardening; excess water is released into the drainage system. Rainwater harvesting and recharge systems are in place.

PU has submitted a paper to the National Water Mission, accessible (https://nwm.gov.in/sites/default/files/Pondicherry_UniversityCTR2020.pdf).

Grey Water Treatment and Reuse: A wetland type water treatment system is in place near Gate . Photos of the treatment system have been provided.

Photo 22: STP Photos

Photo 23: Composting area

Composting and Manure Use: A composting area is developed, with photos provided below. Studies were conducted in small scale, large scale system is being planned to establish composting/ biogas plant.

Water and Waste Management During Construction:

Water Sourcing: During construction, water is sourced by the contractor through new borewells. Postconstruction, water management is handed over to the university. Establish benchmark data for water consumption to facilitate precise monitoring and corrective action.

Waste Management: Addressed in a comprehensive waste management plan.

Solid Waste Management and Additional Aspects

1. Burden Reduction on Municipal Waste Disposal:

Waste Management Plan: Addressed in Chapter 5 of the Comprehensive Green Protocol document, and standard operating procedure for plastic/solid waste is in place for PU Campus.

Recyclable Waste Collection: Astha Associates engaged for recyclable waste collection. Reports for April 2024 reviewed, covering papers, boards, plastics, and water bottles.

2. Functional Area Studies and User Responsibilities:

Inventory Reports: Monthly inventory of bins details by Astha Associates for April 2024 reviewed, including hostelwise bin details. However, there is no compiled document showing different waste types, quantities, or disposal methods.

User Roles and Responsibilities: Not specifically addressed in available documents.

3. Strategic Approach Documentation:

Comprehensive Green Protocol: Waste Management is addressed and standard operating procedure with multiple inventory forms for plastic/solid waste are available.

4. Planning and Design for Waste Management:

Waste Collection Zones Map, Waste collection bins are provided (photos given below).

Facilities for Waste Collection Personnel: Ventilation, washing, isolation, and provision for rest areas and uniforms are available.

Containers for Waste: Appropriate containers are provided (photos given below).

Transportation: Tractors are used for waste movement

Segregation Spaces: ATR submitted to Commissioner Oulgaret Municipality in compliance with SWM Rules & Bye Laws (photos given below).

Photo 24: Waste Collection Zones

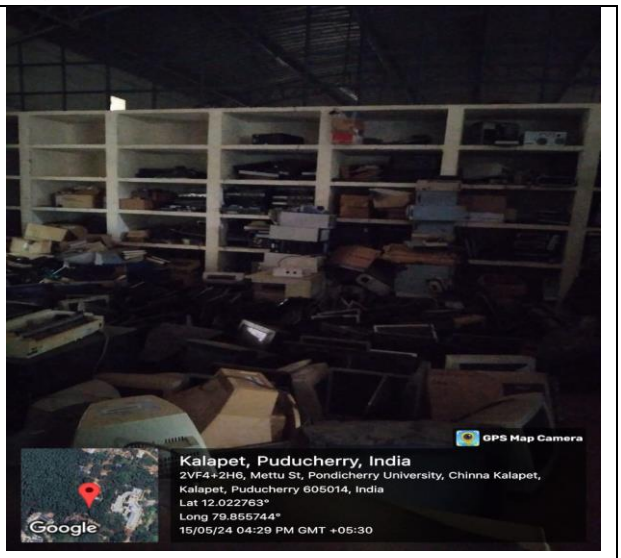
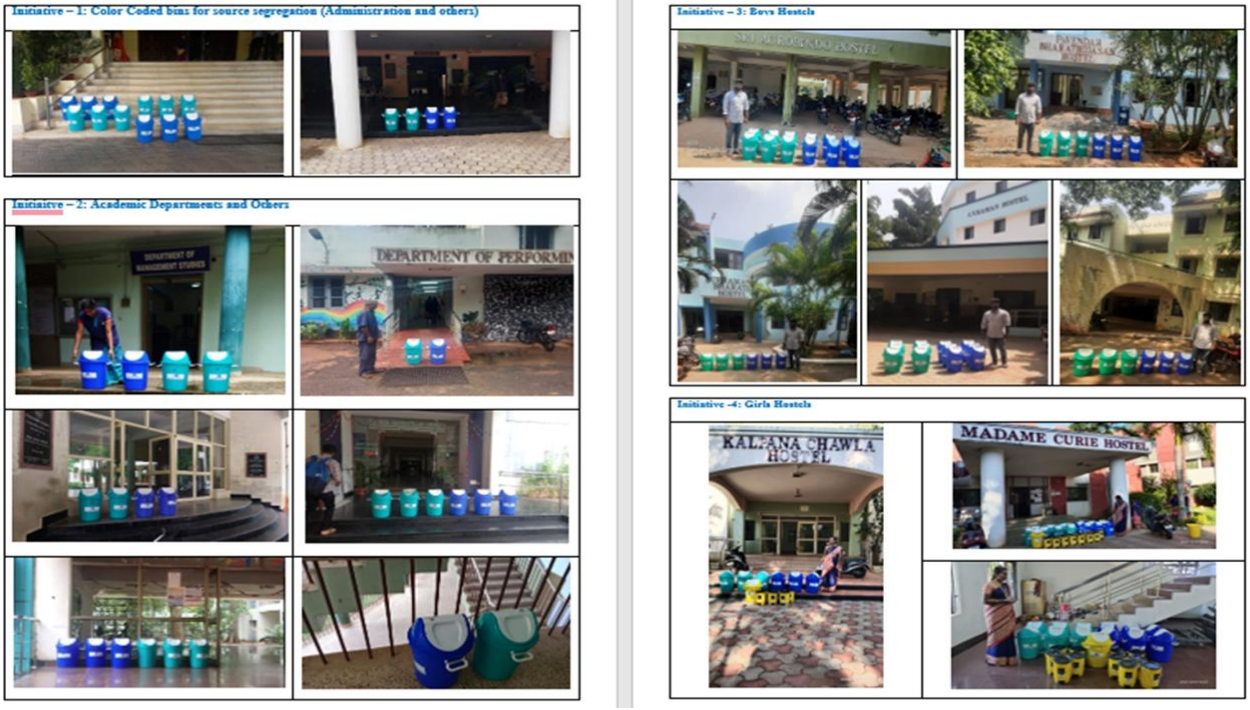


Photo 25: E Waste



Waste Collection Bins at different collection centres

Photo 26: Waste Collection Zones and Bins

5. Waste-to-Energy: Not yet initiated. Biogas plant negotiations are ongoing with the Association for Promoting Sustainability in Campuses and Communities.

6. Biomedical Waste Management:

Vendor: Authorized vendor M/S PSMPL. Agreement documentation available (photos provided).

Departmental Visits: Departments generating biomedical waste were visited by the CPCB team, with a list available (photos provided).

7. Radioactive Waste Management:

Central Instrumentation Department: Uses gamma irradiation chamber. End of life materials are handed over to AERB. Dosimeters are used for safety (details provided).

8. Toxic and Chemical Waste Management:

Neutralization Pits: Not available in chemistry and other research labs across disciplines.

9. Inflammable and Combustible Waste Management:

Storage: No inflammable wastes are stored, and diesel is not stored.

10. Electronic Waste Management:

Collection and Auction: E-waste are collected and auctioned through MSTC portal (photos provided).

Battery Management: Buyback contract in place with M/S PowerOne Micro Systems Pvt Ltd Bangalore (contract copy dated 11/05/2023 available).

11. Integrated Approach to Water Management:

SDG 6 Policy: Developed, addressing water conservation and water accounting.

National Water Mission: Paper submitted by PU,

(https://nwm.gov.in/sites/default/files/Pondicherry_UniversityCTR2020.pdf).

12. Construction and Demolition Waste Management:

Usage: Currently used for ground leveling for vehicle movement and leveling below HT electrical line.

For sustainable waste management, PU can develop and implement specific guidelines for PU Campus under the Comprehensive Green Protocol. Create a compiled document showing different waste types, quantities, and disposal methods. Expedite the initiation of waste to energy projects. Establish neutralization pits in chemistry labs for toxic waste management.

CLAUSE 11 BUILDING SERVICES OPTIMIZATION

The main objective of this clause is optimization of electromechanical services towards achieving a sustainable building. Reduction in heating, cooling, and lighting loads through climate responsive designs and conservation practices can enhance the energy efficiency of a building.

For optimization of electromechanical services towards achieving a sustainable building by reducing heating, cooling, and lighting loads through climate responsive designs and conservation practices, PU follows CPWD guidelines, which are as follows:

3. Energy Efficient Design and Processes

3.1: Adopt passive architectural design strategies to create climate sensitive buildings with higher thermal comfort and lower energy consumption. In addition to achieving the optimum energy performance, the building should also provide desirable thermal and visual comfort to its occupants, etc.

However, there is no evidence of verifying these requirements before the approval of the design.

PU has incorporated solar passive techniques like landscaping, optimum building orientation, and surface to volume ratio in building designs to optimize building performance. This is verified by design documents showing areas for landscaping (Drawing of Students Amenities Center developed by RM Architects).

For doing a thorough assessment of natural versus mechanical ventilation strategy to minimize the need for artificial cooling, CPWD guidelines address the following:

4.3: A well planned and optimally oriented building relates well to its site and the climate. This maximizes opportunities for:

4.3.1: Passive solar heating when heating is needed.

4.3.2: Solar heat gain during winters.

4.3.3: Natural ventilation as needed.

4.3.4: High quality daylighting throughout the year.

However, there is no evidence of designing considering these guidelines.

Pondicherry University has implemented several sustainable practices and technologies in its building and infrastructure projects:

Passive Cooling Systems: New buildings, such as the Library Annexe constructed by RITES, utilize cavity walls for passive cooling without relying on electrical energy. Additionally, natural cooling is achieved through the extensive use of greenery and trees on the campus, eliminating the need for precooling of ventilation air.

Low Energy Mechanical Cooling Techniques: The university is transitioning from earlier 3star air conditioners to more energy efficient invertertype air conditioners. The shift includes the adoption of refrigerants with zero Ozone Depleting Potential (ODP) and low Global Warming Potential (GWP), moving from R22 to R32, R134A, and R410 refrigerants.

Energy Efficient Electrical Installations: To enhance energy efficiency, LED fixtures have been installed in all new buildings, and approximately 50% of lighting in old buildings has been replaced with LED fixtures. This effort also focuses on providing a high quality visual environment with an emphasis on energy efficiency.

Optimal Use of Daylight: New classrooms and verandas are equipped with sensor lights to optimize the use of natural daylight and reduce the dependency on electric lighting systems.

Monitoring Energy Consumption: All buildings are equipped with multifunction meters to monitor power consumption, and all substations can be monitored from a central desktop, ensuring effective energy management.

Recyclable and NonHazardous Lift Materials: CPWD approved lifts are used, although there are no specific conditions mentioned regarding the materials and energy consumption for these lifts.

Pondicherry University has made efforts to utilize renewable energy in its buildings through various applications. Here are the specific details:

Solar Energy Utilization: The university harnesses solar energy, including the use of solar photovoltaic systems, which are connected to the grid.

Solar Photovoltaic Systems: Implemented, with energy wheeling to the grid.

Solid Waste Utilization: Composting tests have been completed, and largescale implementation is being planned.

BioFuels: The use of biodiesel or biofuels, which are obtained from plant species and not from fossil based sources like crude oil, is being explored. Diesel generator (DG) sets may use a blend of biodiesel and diesel or operate on 100% biodiesel.

Other Renewable Energy Sources: The possibility of exploiting other renewable energy sources, such as geothermal heating and cooling systems, Wind Energy, Waste Heat utilization etc currently not applicable.

CLAUSE 12 CONSTRUCTIONAL PRACTICES

The purpose of this clause is to ensure that sustainable construction is taken into account, which entails developing a design proposal that is not only functionally efficient but also includes meticulous planning to optimize the use of materials and construction technologies throughout the building process. To facilitate this, architectural design should be detailed in advance to enable planning of materials and technologies. Furthermore, feasibility reports should incorporate the necessary considerations for sustainable construction. It is also recommended to use digital models to develop construction methodologies, allowing for simulations of physical developments under working conditions onsite

Pondicherry University has incorporated several sustainable construction practices as part of its infrastructure projects:

Preconstruction Prerequisites and Planning: The university follows CPWD guidelines for sustainable construction, which include planning for sustainable construction and preparation of a sustainable construction management plan. However, there is no system of PU monitoring and control of environmental descriptors comprehensively.

Effective Use of Water: Addressed in tender conditions, ensuring water conservation practices are followed by contractors during construction stage.

Construction Waste Management: There are procedures for managing construction waste. Green Protocol PDF outlines specific procedures such as reusing paver blocks for parking lots and utilizing construction debris for filling pits and leveling grounds.

There is no practice of Monitoring of air quality and noise levels during construction stage, PU has to carried out these studies.

Architectural Design and Materials: The university uses CPWD recommended materials, though selection is not based on thermal massing and embodied energy. The design proposals are approved by the Building Committee, ensuring efficient use of resources and technologies.

PU has to develop list of materials selected based on thermal massing and embodied energy.

Construction Methodology: The execution of works starts only after the construction methodology is established and reviewed for reliability. However, digital models like BIM are not currently used, though exploring their use is recommended.

Environmental Risk Assessments: Environmental risk assessments have been conducted for specific sites, such as the construction site of the Girls Hostel, though not for all sites. There is an Environmental Impact Assessment (EIA) report for these sites, recommending mitigation measures.

Social Impacts: There are no villages or settlers at the construction sites, so social impact issues are not applicable.

Soil and Water Quality Monitoring: Soil testing and water quality monitoring are conducted, with reports from analytical laboratories available for review.

Construction Waste Management Procedures: Detailed in the Green Protocol, including the reuse, recycling, and disposal of waste materials.

Heritage Buildings: No heritage buildings are in close vicinity to the construction sites, so specific architectural compliance is not applicable.

Disaster Risk Mitigation: Disaster risk mitigation is covered in the DRA document, ensuring preparedness and safety during construction activities.

Development and regular monitoring of benchmarks are essential for assessing and managing environmental factors associated with energy consumption, water utilization, waste generation, and reuse of waste throughout the construction and operation phases.

PU may do analysis/ potability tests of Drinking Water Quality from Approved Labs and also Ambient Air Quality monitoring may be done once in a year.

13 COMMISSIONING, OPERATION, MAINTENANCE AND BUILDING PERFORMANCE TRACKING

The objective of implementing a structured Commissioning and handover process for building services encompasses a range of elements including but not limited to natural ventilation, renewable energy systems, metering installation, plumbing, lifts, and HVAC systems commissioning. During the Commissioning phase, it is imperative to document the energy consumption of various systems, water usage etc. These records can be used to analyse and enhance the performance of these systems to optimize their efficiency. Furthermore, Operation and Maintenance (O&M) programs are designed to improve the energy efficiency of building systems without incurring significant capital investments.

Pondicherry University has established various guidelines and systems for commissioning, operation, maintenance, and building performance tracking as follows:

Guidelines for Commissioning and Handing Over: The university follows the CPWD maintenance manual on building and services (Volume 1 and 2), which includes checklists and formats for civil and partial electrical systems.

Energy and Water Consumption Recording: Work is performed according to approved drawings, with procedures in place for confirmation and preparation of each item, including the building handover procedure.

Staff Participation in O&M: Participation is mandated by office orders PU/ESTT/NT4/20122013/158 dated 05/09/2012 and PU/P&S/CPP/202021/201 dated 23122020, ensuring involvement from operations, maintenance, engineering, training, and administration staff.

O&M Plan: An operation and maintenance shift chart for May 2024 has been reviewed, and the O&M document is periodically revised based on new experiences and technologies.

Monitoring Technical and Energy Performance: Building wise electricity consumption is monitored, though water consumption monitoring is not currently performed for different buildings. This monitoring could be expanded to include water usage.

Measurement and Verification (M&V): Ongoing monitoring of energy systems is conducted, but not for water systems across different buildings

Energy Metering Applications: Specific applications have separate energy meters, such as plant AC, building wise meters, shopping complex meters, commercial establishment meters, and auditorium AC plant meters.

Occupant Surveys: Surveys for quarters, hostels, guest houses, and transit hostels are conducted to monitor occupancy annually.

Energy Management and Control Systems (EMCS): There is no centralized system, but separate meters are used for each building to track energy performance.

Training for Operators and Maintenance Personnel: Training programs in electrical safety, O&M of ACs, solar plants, and electrical panels have been conducted. The Central Electricity Authority has also provided training, with photographs available as evidence.

Post Commissioning Maintenance of Control Systems: Maintenance records for plant AC, water purifier systems, and other equipment are maintained. Presently, SCADA is implemented for monitoring, and future plans include extending SCADA for electrical equipment and water supply operations.

These practices indicate the university's efforts towards efficient operation, maintenance, and sustainable building management.

STATUTORY AND LEGAL COMPLIANCES:

As part of Green Audit CICPL also verified applicable Key Legal Compliances and their summary is given below:

Statutory/ Legal Requirement	Documents Verified	Conclusion
Building Approval/ Permission	CPWD and Works Advisory Board approves building design	compliant
STP Approvals	Designed by Prof Nadeem Khalil Lead India Coordinator - PAVITR, AMU, Aligarh	compliant
Fire Safety Approval	Fire service department approval dtd 20/12/2023 for new buildings seen	compliant
MOUs for E Waste	MOU with Power One Micros for Buy-Back of Batteries All Computers and accessories are Auctioned by MSTC	compliant
FOOD SAFETY BY FSSAI	Sri Sai Hospitality Services FSSAI licence no 13522001000436 seen	compliant
Canteen Licences	NA in the University, it is managed by Food Safety Committee headed by Food Science Department	compliant
Permission document for connecting to the grid from the Government/ Electricity authority	Net-Metering Agreement with Supdt Engineer Cum HOD of Electricity dept Puducherry dtd 30th Dec 2021 seen. Valid for 25 Years	compliant
BioMedical Waste Authorisation	PPCC - DSTE Grant of Authorisation for Bio Medical Waste handling. Ref No Form III 9212/PPCC/BMW/Autho/JSA(PPCC)/ 2020/287 dtd 19th June 2020	compliant
Forest Department Clearence for Buildings	No. 03/DF&WL/AO/2021-22/249 dtd 26/5/2021 seen	compliant

8. Annexure 1: Audit Plan

AUDIT PLAN

Auditee Organisation	**Pondicherry University**		**Institute Type** University
Office Location	*Main Office*	**Pondicherry University**	
	Location Assessed	R.V. Nagar, Kalapet Puducherry	*Main / Branch*
Address	R.V. Nagar, Kalapet Puducherry		
Scope of Audit	*Combined Scope*	Green Audit	
	Location Assessed	Puducherry	
Audit Criteria *(Applicable Standard / Requirements & Documents*	Green Audit covering **Sustainability, Energy and Environmental Management** requirements, as per NBC Part 11, as per advisory of NAAC & guidelines of NABCB		
Audit Date(s)	14th May to 16th May 2024		
Audit Team	**Dr. Rama Dasu Pittala** **Dr. Ajaya Shankar Gupta Ainapur** **Mr.Raghu Veera Tadivada**		

Audit Plan		
Time	*Activity (Day 1)*	*Responsibility*
11:30	Arrival of the Audit Team	
11:45	**Opening Meeting**- Introductions, purpose, scope, criteria, methodology of Audit and review of Audit plan	Audit Team VC/Principal
12:00	**Presentation by the Auditee:** Details of the Institute covering Campus location, campus area, number of buildings, organization chart / number of departments, Labs (Physics, Chemistry, Civil Engineering Computer Lab etc), Generators, Sewage Treatment Facilities etc. Green Campus Initiatives Deciding the people to be audited for different clauses	VC/Principal PU Green Audit Team
12:30-13:30	Audit Team Campus visit covering different departments, Labs, Facilities etc.	PU GA Team
13:30	**Lunch**	
14:30 to 17:00	Audit for requirements against NBC Part 11- Clause 3 APPROACH TO SUSTAINABILITY Clause 4: APPLICABILITY OF THIS PART Clause 5: IMPLEMENTATION OF THIS PART	**Auditor** Dr Gupta **Auditees:** **PU GA Team**
14:30 to 17:00	Audit for requirements against NBC Part 11- Clause 6 SITING, FORM AND DESIGN Clause 7 EXTERNAL DEVELOPMENT AND LANDSCAPE	Dr Rama Dasu Mr Raghu Veera
17:00 to 17:15	Audit Team discussion and preparing for briefing	Dr Gupta Dr Rama Dasu Mr Raghu Veera

	Green Audit Schedule	CIC/GAS/01 31.01.2023 Issue:00, Rev: 01

Audit Plan		
Time	*Activity (Day 1)*	*Responsibility*
17:15 to 17:30	Day-end briefing to Auditee Team	Dr Gupta, Mr Raghu Veera & Dr Rama Dasu

Audit Plan		
Time	*Activity (Day 2)*	*Responsibility*
9:30-13:00	Audit for requirements against NBC Part 11- Clause 8 ENVELOPE OPTIMIZATION Clause 9 MATERIALS	Dr Rama Dasu Mr Raghu Veera
9:30-13:00	Audit for requirements against NBC Part 11- Clause 10 WATER AND WASTE MANAGEMENT Clause 11 BUILDING SERVICES OPTIMIZATION	Dr Gupta
1300	**Lunch**	
13:45 to 16:45	Audit for requirements against NBC Part 11- Clause 12 CONSTRUCTIONAL PRACTICES	Dr Gupta
13:45 to 16:45	Audit for requirements against NBC Part 11- **Clause** 13 COMMISSIONING, OPERATION, MAINTENANCE AND BUILDING PERFORMANCE TRACKING	Dr Rama Dasu Mr Raghu Veera
16:45 to 17:00	Audit Team discussion and preparing for briefing	Dr Gupta Dr Rama Dasu Mr Raghu Veera
17:00 to 17:15	Day-end briefing to Auditee Team	Dr Gupta, Dr Rama Dasu Mr Raghu Veera

Audit Plan			
Time	*Activity (Day 3)*		*Responsibility*
9:30 to 12:00	Compilation Audit Checklists, Preparation of NCR report		Dr Gupta & Mr Raghu Veera
12:00-13:00	**Closing Meeting explaining all NCs & OFIs**		All
1300	**LUNCH**		
14:00	**Review of NCR Corrective Action Plan prepared by Auditee**		All
14:30	**Close of Audit**		
Remarks	1. Make arrangements for Meeting Room for Auditors 2. All relevant documents & records should be made available during audit. 3. All relevant / key personnel should be available during audit 4. **Timings are flexible and subject to change based on actual situation during audit.**		
Date	**08-05-2024**	**Lead Auditor**	**Dr Ajaya Shankar Gupta Ainapur**

9. Annexure 2: Linkage to 31 Points in NAAC's Self-Assessment Criteria as detailed below:

Green Audit covers these points

Metric No.	NAAC Requirement Metric	Weightage	Where addressed in NBC 11
Environmental Consciousness and Sustainability			
7.1.2 QnM	***The Institution has facilities for alternate sources of energy and energy conservation measures*** • 1. Solar energy • 2. Biogas plant • 3. Wheeling to the Grid • 4. Sensor-based energy conservation • 5. Use of LED bulbs/ power efficient equipment • 6. Wind mill or any other clean green energy Options: A. Any 4 or more of the above B. Any 3 of the above C. Any 2 of the above D. Any 1of the above E. None of the above **Upload the specific document as per description given below**	**6**	**8.3 Renewable Energy Integration in Envelop** **8.3.1 Integration of Solar Thermal Technologies** **11.4 Passive Heating Techniques** **11.10.1 Daylighting and Controls** **11.16 Renewable Energy** **Solar Energy** **Wind Energy** **Bio-fuels** **Waste heat utilization**
Geo-tagged photographs of the facilities. • Bills for the purchase of equipment's for the facilities created under this metric. • Permission document for connecting to the grid from the Government/ Electricity authority **Apart from the above:** Provide Links for any other relevant document to support the claim (if any)			Refer Third party Audit Report by NABCB Approved Inspection Body CICPL **Pages 30 -32, 39-41**

Metric No.	NAAC Requirement Metric	Weightage	Where addressed in NBC 11
Environmental Consciousness and Sustainability			
7.1.3 QIM	***Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)*** • Solid waste management • Liquid waste management • Biomedical waste management • e-Waste management • Waste recycling system • Hazardous chemicals and radioactive waste management **Provide web link to** • Relevant documents like agreements/MoUs with Government and other approved agencies • Geo-tagged photographs of the facilities • Any other relevant information	**6**	10 WATER AND WASTE MANAGEMENT 10.6 Planning and Design of Solid Waste Management System 10.6.1 Documentation of Nature of Waste and Quantification 10.6.2 Identification of Strategies for Solid Waste Management 10.6.3Solid Waste System Planning 10.6.5 Provisions for Waste(s) Requiring Special Management - Biomedical waste - e- Waste - Management of radioactive waste 10. Zero anthropogenic waste design solution 10.1.2 Liquid Waste Management 10.1.3 Sustainable approach to water and waste management 3.7 Integrated Water Management water conserving fixtures, landscaping, rainwater harvesting, aquifer recharging and waste water recycling P Refer Third party Audit Report by NABCB Approved Inspection Body CICPL **Pages 16-21,34-39**
7.1.4 QnM	***Water conservation facilities available in the Institution:*** 1. Rain water harvesting 2. Borewell /Open well recharge 3. Construction of tanks and bunds 4. Waste water recycling 5. Maintenance of water bodies and distribution system in the campus **Options:**	**5**	3.7 Integrated Water Management water conserving fixtures, landscaping, rainwater harvesting, aquifer recharging and waste water recycling 7.2 Rainwater Harvesting 7.3.1 Design and Post Occupancy Maintenance of Water Features- The site maintenance plan 7.3.2 Water Conservation and Irrigation Practices

Metric No.	NAAC Requirement Metric	Weightage	Where addressed in NBC 11
Environmental Consciousness and Sustainability			
	A. Any 4 or more of the above B. Any 3 of the above C. Any 2 of the above D. Any 1of the above E. None of the above **Upload the specific document as per description given below** • Geo-tagged photographs of the facilities. • Bills for the purchase of equipment's for the facilities created under this metric. • Green audit reports on water conservation by recognised bodies		7.4.1 Reduced Environmental Impacts from Parking Facilities 10.0 zero anthropogenic waste design solution 10.2.1 Planning and Design of Water Supply System 10.2.4Strategiesfor Water Efficiency 10.2.5 Strategies for Water Conservation 10.3 Planning and Design of Waste Water System 10.4 Water and Waste Management During Construction? Refer Third party Audit Report by NABCB Approved Inspection Body CICPL **Pages 16-21, 26-30, 34-38**
Apart from the above: Provide Links for any other relevant document to support the claim (if any)			
7.1.5 QIM	***Green campus initiatives include*** Describer the Green campus initiative of the institution including Restricted entry of automobiles, Use of Bicycles/ Battery powered vehicles , Pedestrian Friendly pathways , Ban on use of Plastic, landscaping with trees and plants etc in 500 words **Upload the specific document as per description given below** • Policy document on the green campus/plastic free campus. • Geo-tagged photographs/videos of the facilities. • Circulars and report of activities for the implementation of the initiatives document **Apart from the above:** Provide Links for any other relevant document to support the claim (if any)	**4**	**7 EXTERNAL DEVELOPMENT AND LANDSCAPE** **7.4.3 Landscape planning and design** **7.4.3** Bicycle Lanes and Pedestrian Access 9.2.1.6 Plastics Use of plastics should be limited as far as possible or preference given to plastic products made with recycled content or renewable resources **11.2 Concept Development** **- solar passive techniques like Landscaping** Refer Third party Audit Report by NABCB Approved Inspection Body CICPL **Pages 26-29,33, 39-40**

Metric No.	NAAC Requirement Metric	Weightage	Where addressed in NBC 11
Environmental Consciousness and Sustainability			
7.1.6 QnM	***Quality audits on environment and energy are regularly undertaken by the institution*** 7.1.6.1.The institutional environment and energy initiatives are confirmed through the following 1. Green audit / Environmental audit 2. Energy audit 3.Clean and green campus recognitions/awards 4. Beyond the campus environmental promotion and sustainability activities **Options:** A. All of the above B. Any 3 of the above C. Any 2 of the above D. Any 1of the above E. None of the above **Upload the specific document as per description given below** • Institutional data in the prescribed format (data template) • Policy document on environment and energy usage Certificate from the auditing agency. • Certificates of the awards received from recognized agency (if any). • Report on environmental promotion and sustainability activities conducted beyond the campus with geo-tagged photographs with	**5**	**Total Green Audit addresses this** **3 APPROACH TO SUSTAINABILITY:** Sustainability **4 APPLICABILITY OF THIS PART :**Sustainability **5 IMPLEMENTATION OF THIS PART:**Sustainability **6 SITING, FORM AND DESIGN :** Environmental **7 EXTERNAL DEVELOPMENT AND LANDSCAPE:** Environmental **8 ENVELOPE OPTIMIZATION :** Environmental **9 MATERIALS :** Sustainability **10 WATER AND WASTE MANAGEMENT:** Environmental **11 BUILDING SERVICES OPTIMIZATION :**Energy Efficiency **12 CONSTRUCTIONAL PRACTICES :**Sustainability **13 COMMISSIONING, OPERATION, MAINTENANCE AND BUILDING PERFORMANCE TRACKING:** Energy Efficiency **Pages: Total report**
caption and date. • Green audit/environmental audit report from recognized bodies **Apart from the above:** Provide Links for any other relevant document to support the claim (if any)			Refer Third party Audit Report by NABCB Approved Inspection Body CICPL Audit Report

Metric No.	NAAC Requirement Metric	Weightage	Where addressed in NBC 11
Environmental Consciousness and Sustainability			
7.1.7 QIM	***The Institution has Differently-abled (Divyangjan) friendly, barrier free environment*** ***Write description covering the various components of barrier free environment in your institution in maximum of 500 words*** • Ramps/lifts for easy access to classrooms • Divyangjan friendly washrooms • Signage including tactile path, lights, display boards and signposts • Assistive technology and facilities for Divyangjan accessible website, screen-reading software, mechanized equipment • Provision for enquiry and information: Human assistance, reader, scribe, soft copies of reading material, screen reading **File Description** • Provide the link for additional information • Upload any additional information	**5**	3.2 Elements of Sustainability c) -- needs of persons with disabilities and of different age groups, 7.5.2 External Signage Design Refer Third party Audit Report by NABCB Approved Inspection Body CICPL **Pages 16-21,26-29**

10. Annexure 3: NCRs Report Excel File Attached separately