

Report of Green and Soil & Water Audits



Submitted to

**CHRIST (DEEMED TO BE UNIVERSITY)
BANGALORE-560 029, KARNATAKA
INDIA**

Date of Audit: 09.01.2024

Date of Issue: 17.01.2024



Submitted by

NATURE SCIENCE FOUNDATION

[A Unique Research and Development Centre for Society Improvement]

No. 2669, LIG-II, Gandhi Managar, Peelamedu

Coimbatore 641 004, Tamil Nadu, India

Phone: 0422 2510006, Mobile: 9566777255, 9566777258

Email: director@nsfonline.org.in

Report Number : NSF/PR/AR/71

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NATURE SCIENCE FOUNDATION

(A Unique Research and Development Centre for Society Improvement)
ISO 9001:2015, 14001:2015, 45001:2018 & 50001:2018 Certified and Ministry of MSME Registered Organization
No. 2669, LIG - II, Gandhi Managar, Peelamedu, Coimbatore - 641 004, Tamil Nadu, India.
Email : directornsf@gmail.com, director@nsfonline.org.in, Website : www.nsfonline.org.in
Office : 0422 - 2510006, Mobile : 95667 77255, 95667 77258.



Dr. S. RAJALAKSHMI, M.B.A., Ph.D., FNSF.,
Chairman

Mr. P. KANAGARAJ, FNSF.,
Secretary

Certificate of Declaration

The **Office of Nature Science Foundation**, Coimbatore, Tamil Nadu declare that

1. Nature Science Foundation has conducted onsite green audit at ***Christ (Deemed to Be University), Bangalore-560 029, Karnataka, India*** by deputing certified Lead Auditors and Technical Experts.
2. On the basis of audit observations by the auditors and pertinent data collected from the Auditee, the Technical Report has been prepared and being submitted.
3. Data presented in the Technical Report are verified and to best of our knowledge, the data are authentic and reliable.
4. Nature Science Foundation declares that data generated were not shared with any third parties and the soft copy of the report is available with Nature Science Foundation's Office.
5. Provided the Auditee desired to publish or share the data with other agencies, Nature Science Foundation has no conflict of interest.
6. We at Nature Science Foundation express our deep sense of gratitude to the Management for given an opportunity to conduct green audit at their premises in compliance with NAAC criteria in line with ISO/IEC 17020:2012 standards and NABCB guidelines and for whole hearted support extended at the time of onsite audit. Our sincere thanks to NAAC, IQAC Coordinators and Head of the Departments of the Organization for their intangible assistance and cooperation extended to the audit team at the time of physical facility verification.

Date:
Place: Coimbatore

Authorized Signatory
Nature Science Foundation

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1. GENERAL INTRODUCTION

1.1. Introduction

Green campus is an area of the Organization or the Organization as a whole itself contributing to have an infrastructure or development that is structured/planned to incur less energy, less water, less or no CO₂ emission and less or pollution free environment. Green Audit is a tool to evaluate environment management system which is systematically executed to protect and preserve the environment. Green audit constitutes the environmental friendly practices and education combined to promote sustenance of green environment by adopting user-friendly technology within the campus. It creates awareness on environmental ethics, resolves environmental issues and offers solutions to various social and economic needs. It strengthens the concept of 'Green Building' and 'Oxygenated Building' which in turn provides a healthy atmosphere to the stakeholders.

1.2. Importance of National Building Code (NBC)

National Building Code (NBC) of India has a set of rules and guidelines that regulates construction of buildings and as well as ecofriendly activities of the campus without harming the environment. In order to achieve the minimum standards of welfare and safety of stakeholders of a campus, the Governing body of Central and State Governments lays down a set of guidelines to offer sustainable environment. In 1970, the National Building Code (NBC) was first published in India and the significant provisions of the Indian Building Code involve: 1. Structural safety of the building, 2. Earthquake-resistant building design, 3. Fire and life safety, 4. Solid waste management, 5. Accessibility for differently-abled and senior citizens, 6. Use of alternative building techniques and 7. Environmentally compatible building construction techniques like the use of solar power, rainwater harvesting, etc.

NBC is not only offer a standard uniform benchmark that constructors and environmentalists must meet, but they also establish safety standards along with ecofriendly atmosphere of a campus for years to come. As extreme weather conditions and fires are growing rapidly in the country, it becomes vital that buildings and structures be built and designed using the current building codes to allow for maximum safety sustainability and resilience to the stakeholders. For instance, new and updated building codes put much emphasis on conservation as energy and the degradable and non-degradable wastes are the most expensive byproduct of older regions. This will not only offer environmental benefits to future generations but will also regulate indoor air pollution and greenhouse gas emissions to protect the health of human beings.

Before the introduction of NBC in the construction industry, building commercial and residential properties used a lot of energy which adversely affected the sustainable environment. Thus, enforcing building codes to create low-energy buildings offers a tangible way for the company to help decrease the greenhouse gas emissions of the nation. While safety is the primary objective, new building codes are making significant contributions toward solving energy issues relating to the use of

environmentally compatible construction techniques like planting trees, landscaping, rainwater harvesting and renewable and non-renewable energy sources.

1.3. Environment Friendly Campus

As stated earlier, Organization is liable to provide an eco-friendly atmosphere along with good quality of drinking water facility to all the stakeholders. Manuring the cultivated plants/grown within the campus may applied with organic manure, cow dung, farmyard manure and vermicompost instead of using chemical fertilizers. All non-compostable and single-use disposable plastic items, plastic utensils, plastic straws and stirrers should be avoided. Demonstration / awareness programme on establishing plastic-free environment and utility of organic alternatives for all incoming and current students, staff and faculty should be organized. Reduction of use of papers alternated with e-services, e-circulars, etc., and proper disposal of wastes, recycling and suitable waste management system should be considered to establish environment friendly campus.

The term ‘auditing’ is to examine the management practices and to evaluate performance of an organization in relation to environmental issues. World along with Associated Chambers of Commerce and Industry of India (ASSOCHAM), Green Building Council (IGBC) and Green Ratings Systems (GBCRS), Green Rating for Integrated Habitat Assessment (GRIHA), Bureau of Energy Efficiency (BEE), Leadership in Energy and Environmental Design (LEED), CII-GreenCo –GreenCo Rating System (CII-GRS), Food Safety Management System & Occupational Safety & Health (FSMS), Swachh Bharath under India Clean Mission (SBICM) and International Standard Organization (ISO 2021) have formulated a series of standards in the field of environmental auditing. These standards are basically intended to guide organizations and auditors on the general principles common to the execution of environmental audits.

Green Audit (ISO/IEC 17020:2012) comprised green campus, environment, energy, waste management (solid, liquid, municipal sewage, biomedical, plastic and electronic wastes), water, soil, air quality and hygienic audits are playing important role in Academic Institutions, R&D Organizations and Industries towards the accreditation process as well as maintaining a hygienic eco-friendly environment to the stakeholders in their campus. All audits will be conducted as per the Government Law and Environmental and the concept of Swachh Bharath Abhiyan under Clean India Mission.

1.4. About Nature Science Foundation (NSF)

NSF is the ISO QMS (9001:2015), EMS (14001:2015), OHSMS (45001:2018) & EnMS (50001:2018) Certified and registered with Ministry of Micro, Small and Medium Enterprise (MSME), Government of India Organization functioning energetically towards the noble cause of nature conservation and environmental protection. NSF is managed by a Board of Trustees which is a Public Charitable Trust registered under the TN Societies registration Act 1975 (TN Act 27 of 1975) on 29th November, 2017 at Peelamedu, Coimbatore 641 004, Tamil Nadu, India with Certificate of Registration No. 114 / 2017. In addition, NSF has 12AA, 80G and Form 10AC certificates for income tax exemption and implanting various Government schemes. The main motto of the NSF is ‘Save the Nature to Save the Future’ and ‘Go Green to Save the Planet’.

1.5. About the Organization

CHRIST (Deemed to be University), established in 1969 as Christ College was granted Autonomy by the University Grants Commission (UGC) in 2005 and Institution with Potential for Excellence status in 2006. In 2008, the Ministry of Education (then Ministry of Human Resource Development) Government of India, declared the Institution a Deemed to be University, in the name and style of Christ University under Section 3 of UGC Act 1956.

The first institution in the state of Karnataka to be accredited in 1998 and one among the first 14 in India to be accredited by the National Assessment and Accreditation Council (NAAC). Currently CHRIST (Deemed to be University) is accredited with 'A+' Grade.

The University is also accredited by the National Board of Accreditation (NBA). In NIRF India Ranking 2023 Christ University was ranked as follows: University - 67, Overall - 100, Law - 13, Management - 60, Engineering – 101-150. Christ University is one among the 91 Universities in the country qualified for the Times Higher Education (THE) World University Rankings 2024. Christ University is also ranked in QS India University Rankings, QS-ASIA, and QS-BRICS. The University is also listed in the Times Higher Education Impact Ranking (THE) 2023.

The multi-disciplinary Institution which focuses on teaching, research and service, offers UG, PG and Doctoral programmes in Humanities, Social Sciences, Science, Commerce, Management, Engineering, Architecture, Education and Law to students from all the States and Union Territories of India and about 77 other countries. The University, having four campus locations in Bangalore, and one-Off Campus each in Pune Lavasa and Delhi NCR is a living example for the harmonious multiculturalism.

The University publishes six peer-reviewed research journals and has published hundreds of books in Kannada and English. A promoter of sports, music and literary activities, it is a nurturing ground for creative excellence.

With 'Excellence and Service' as the Vision, the University is actively involved in community development through student involvement. The University has slum and rural development projects with a focus on women and children in the states of Karnataka, Kerala, Maharashtra, Uttar Pradesh and Chhattisgarh directly benefiting over 10,000 families in more than 124 villages and five Urban slums.

Vision

Excellence and Service

Mission

CHRIST (Deemed to be University) is a nurturing ground for an individual's holistic development to make effective contribution to the society in a dynamic environment.

1.6. Audit Team Details

1. **Date of Audit** : **09.01.2024**
2. **Audit Site** : **Christ (Deemed to Be University),**
Bangalore-560 029, Karnataka,
India
3. **Inspection Body** : **Nature Science Foundation**
Coimbatore, Tamil Nadu, India.
4. **Audit Scope** : **Green and Soil & Water Audits as per**
ISO/IEC 17020:2012
5. **Name of the Auditing** : **Dr. S. Rajalakshmi**
Chairman ISO QMS, EMS and EnMS Certified Lead
Auditor, Founder & Chairman of NSF.
6. **Name of the Auditing Team** : **Ms. V. Sri Santhya**
Leader ISO QMS, EMS and EnMS Certified Lead
Auditor & ISO 17020:2012 (Green Audit)
Joint Director & Programme Manager, NSF.
7. **Name of the Lead Auditor for** : **Dr. R. Mary Josephine**
Green Audit +Air Quality ISO EMS and EnMS Certified Lead Auditor.
Audit
8. **Name of the Lead Auditor for** : **Ar. N. M. Pradeep Kumar**
Environment Audit + Waste ISO EMS and IGBC Certified Lead Auditor.
Management Audit
9. **Name of the Lead Auditor for** : **Er. A. Karthick**
Energy Audit Bureau of Energy Efficiency Certified Auditor.
10. **List of Auditees** :
 1. **Dr Alex Joseph - Director, IQAC**
 2. **Dr D Sayantan - Assistant Professor of**
Life Sciences
 3. **Mr Trijo Joseph - Coordinator, Facility**
Management
 4. **Mr Anil P - Secretary, IQAC**

1.6.1. Audit Scope and Criteria

Green audits are conducted in line with National Building Code (NBC) Part 11 Approach to Sustainability as per the NAAC and NABCB advisory. NBC part 11 consists of 11 different types of clauses. In this report the eleven clauses of sustainability are differentiated into Green, Environment, Energy, Waste Management, Soil & Water, Air Quality and Hygiene audits.

S.No.	Name of the Audits	NBC covered clauses
1.	Green Audit	3. Approach to Sustainability (3.2 & 3.9), 6. Siting, Form and Design (6.2.4.), 7. External Development and Landscape (7.1.1.), 12. Constructional Practices (12.4.5. & 12.4.6.)
2.	Environment Audit	3. Approach to Sustainability (3.2, 3.7, 3.10 & 3.11), 4. Applicability of this part (4.1 and 4.2), 5. Implementation of this part (5), 6. Siting, Form and Design (6.2.1.), 7. External Development and Landscape (7.1.2, 7.2, 7.3, 7.4.), 9. Materials (9.1, 9.2, 9.3), 10. Water and Waste Management (10.1.), 12. Construction Practices (12.8. and 12.11.)
3.	Energy Audit	3. Approach to Sustainability (3.2, 3.5, 3.6 & 3.8), 6. Siting, Form and Design (6.2.2, 6.2.3, 6.2.5, 6.2.6, 6.2.7, 6.2.8, 6.2.9 & 6.2.10), 7. External Development and Landscape (7.5.), 8. Envelope Optimization (8.1, 8.2. & 8.3), 11. Building service Optimization (11.1 – 11.16), 12. Constructional Practices (12.3.4, 12.4.4 & 12.9.), 13. Commissioning, Operation, Maintenance and Building Performance Tracking (13.1, 13.2, 13.3, 13.4, 13.5 & 13.6.)
4.	Waste Management Audit	3. Approach to Sustainability (3.3 & 3.4), 10. Water and Waste Management (10.6.1. – 10.6.5.), 12. Construction Practices (12.1, 12.2, 12.3, 12.5, 12.7, 12.10.)
5.	Soil & Water Audit	7. External Development and Landscape (7.3.2), 10. Water and Waste Management (10.2. – 10.5.), 12. Construction Practices (12.4.1. and 12.4.2.)
6.	Air Quality Audit	12. Construction Practices (12.4.3.)
7.	Hygiene Audit	12. Construction Practices (12.3.6 & 12.3.7.)

1.6.2. Audit Checklist Observations

The audit checklist in line with National Building Code (NBC) Part 11 – Approach to Sustainability covers 163 checkpoints. During the onsite visit, respective auditors marks not applicable and write the reason for non-applicability and wherever its applicable, auditors verifies the records / practice / documents and physical observation to confirm the same.

There are two parameters such as meeting the requirements and not meeting the

requirements. Marking as meeting the requirements for the specific checkpoint reveals that the physical observation and documents are up to the mark. For some checkpoints OFI – Opportunity for Improvements will be given by the auditors. The physical observations and documents which are not up to the mark will be given as not meeting the requirements. The checkpoints under not meeting the requirements are up to the Management of the Organization to develop further.

1.7. List of Instruments used in the Inspection Process

During the on-site visit the below listed instruments are used by the Lead Auditors and Technical experts to check the specific parameters in the view of maintaining sustainability. All the instruments are calibrated by ISO 17025 accredited labs (JRTS Technical Services, Chennai, Tamil Nadu and Instruments Calibration and Test Centre, Coimbatore, TN). The frequency of calibration is six months once or 20 times after its use.

1.7.1. Oxygen Meter

Oxygen meter is used in the audit process to measure the oxygen level in the organization. The instrument is calibrated after using 20 times. Suitability of the instrument are range between 0 to 30% O₂, resolution of 0.1%, accuracy is $\pm (1\% \text{ reading} + 0.2\% \text{ O}_2)$, response time is ≤ 15 seconds, environment pressure range is 0.9 to 1.1 atmosphere, temperature range is 0 °C to 50°C, 32°F to 122°F, temperature resolution is 0.1°C, temperature accuracy is 25°C.



1.7.2. Carbon dioxide meter

Carbon dioxide meter is to measure the carbon level in the organization. The instrument is calibrated after using 20 times. Suitability of the instrument are range between 0 ~ 4000 ppm, resolution of CO₂ Meter is 1 ppm, accuracy is $\leq 1,000$ ppm, repeatability is ± 20 ppm, temperature range between 0°C to 50°C, 32°F to 122°F, temperature resolution is 0.1°C, temperature accuracy is at 25°C.



1.7.3. Light (LUX) Meter

Light meter is to calculate the light intensity in the organization. Suitability of the instruments are, 5 ranges. ie., 40.00, 400.0, 4,000, 40,000, 400,000 Lux, operating temperature is 0 to 50°C, Operating humidity is less than 80% RH, Power consumption is DC 8 mA approximately. This Instrument will be calibrated yearly once or during non-functioning.



1.7.4. Sound Level Meter

Sound level meter is to measure the noise level in the organization. This instrument is calibrated yearly once or after using 20 times. Suitability of the instruments are measurement range is 30 – 130 dB, resolution is 0.1 dB, accuracy is $(23 \pm 5^\circ\text{C})$, Frequency of the instrument is 31.5 to 8,000 Hz, Operating temperature is 0 to 50 $^\circ\text{C}$ (32 to 122 $^\circ\text{F}$), Operating humidity is less than 80% RH, Power consumption is DC 6 mA approximately.



1.7.5. pH Meter

pH meter is generally used to measure the pH level in water. It is calibrated 6 months once or after 20 times of its use. Suitability of the instrument are range of the pH meter is 0 – 14, accuracy is $\pm 2\%$, resolution of the instrument is 0.1 pH, operating temperature is 0 to 50 $^\circ\text{C}$ (32 to 122 $^\circ\text{F}$).



1.7.6. TDS Meter

TDS meter is generally used to measure the TDS level in water. Suitability of the meter are range of TDS meter is 0 – 9990 ppm (mg/L), operating temperature is 0 to 80 $^\circ\text{C}$ (32 to 176 $^\circ\text{F}$) and accuracy is $\pm 2\%$. This meter is calibrated six months once or 20 times after its use.



1.7.7. GPS Meter

GPS meter is subjected to know the latitude and altitude, location, etc., Suitability of the GPS meter are, dimension is 2.1" x 4.0" x 1.3" (5.4 x 10.3 x 3.3 cm), Display resolution is 128 x 160 pixels an GPS Map features included in Continental Europe. It is calibrated six months once or after 20 times of the usage.



1.7.8. Deluxe Water and Soil Analysis Kit

Deluxe water and soil analysis kit is used to analyze the pH, TDS, salinity, turbidity, alkalinity dissolved oxygen of water.



1.7.9. Digital Clamp (Voltage) Meter

It is used to check the input and output voltage between two points of an electrical circuit of Alternating Current (AC) and Direct Current (DC) by means of the high resistance of the voltage that impede the flow of current.



1.7.10. Calibration Certificates of Instruments used for the conduct of audits

JRTS Calibration Services

Calibration Certificate

Certificate No. : JRTS/23-24/316
 Customer's Name : M/S. Nature Science Foundation
 Customer's Address : No. 2659, LIG-II, Gandhi Managar
 Peelamedu, Coimbatore - 641 004
 Tamil Nadu, India.

Description of Instrument : Gas Analyzer

Make	Model No.	Sr. No.	Id. No.	Gas Ranges	Resolution
Lutron	PO2-250	NSF/RR/6.2.1/01(A)	O ₂	0 % to 30.0 %	0.1 %

Date of Receipt : 26 Oct 2023
 Date of Calibration : 27 Oct 2023
 Location of Calibration : At Lab
 Next Calibration Due Date : 26 April 2024
 Work Instruction No. : JRTS-WI-01

Master Instrument Detail

Description	Make	Canister No.	Report No.	Validity
Dry Gas Mixture	Effectech	536994	1214/23-24/01	13 Oct 2024

The Standards used are traceable to National Standards.

Calibration Result


Gas Type	Standard Value	DUC Reading	Status
O ₂ (%)	20.9	20.9	Pass

2) Performance Test @ 18%

Gas Type	Standard Value %	DUC Reading %	Deviation %
O ₂ (%)	18.0	18.3	0.3

Remarks:
 1) The calibration result reported in the certificate is valid at the time of and under the stated condition of measurement
 2) The calibration certificate shall not be reproduced, except in full without written approval of JRTS Calibration Services

Calibrated By: *[Signature]* Authorised By: *[Signature]*



Plot No. C-4 C-5, Door No. G-1, Royal Garden,
 Sai Nagar, Chikarapattanam, Chennai,
 Tamil Nadu, 600059

info@jrts.in | www.jrts.in
 +91 97875 23778

GSTIN: 33AAPFI6140D1ZK
 UAM No. TN08 000 66 100

JRTS Calibration Services

Calibration Certificate

Certificate No. : JRTS/23-24/317

Customer's Name : M/S. Nature Science Foundation
 Customer's Address : No. 2659, LIG-II, Gandhi Managar
 Peelamedu, Coimbatore - 641 004
 Tamil Nadu, India.

Description of Instrument : Gas Analyzer

Make	Model No.	Sr. No.	Id. No.	Gas Ranges	Resolution
Lutron	GCH-2018	S.007434	NA	CO ₂ 0 to 4000 ppm	1 ppm

Date of Receipt : 26 Oct 2023
 Date of Calibration : 27 Oct 2023
 Location of Calibration : At Lab
 Next Calibration Due Date : 26 April 2024
 Work Instruction No. : JRTS-WI-01

Master Instrument Detail

Description	Make	Canister No.	Report No.	Validity
Dry Gas Mixture	Effectech	1545969	1440/22-23/01	05 Dec 2023


The Standards used are traceable to National Standards.

Calibration Result

Gas Type	Standard Value (ppm)	DUC Reading (ppm)	Deviation (ppm)
CO ₂ (ppm)	1000	980	-20

Remarks:
 1) The calibration result reported in the certificate is valid at the time of and under the stated condition of measurement
 2) The calibration certificate shall not be reproduced, except in full without written approval of JRTS Calibration Services

Calibrated By: *[Signature]* Authorised By: *[Signature]*



Plot No. C-4 C-5, Door No. G-1, Royal Garden,
 Sai Nagar, Chikarapattanam, Chennai,
 Tamil Nadu, 600059

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 +91 97875 23778

GSTIN: 33AAPFI6140D1ZK
 UAM No. TN08 000 66 100

Calibration Certificate of O₂ Meter

Calibration Certificate of CO₂ Meter

CREST INSTRUMENTS

Certificate of Calibration

Certificate Number : 2304L083-O-02
 Date of Issue : 17 April 2023

Customer Name : M/s. Nature Science Foundation,
 Address : No. 2659, LIG-II, Gandhi Managar,
 Peelamedu, Coimbatore-641004

Calibrated by : D. Ravil
 Customer Ref. : Verbal
 ULR No. : CC34342300000243F
 Calibrated at : Electrical Lab

Unit Under Calibration

Description	Range	Resolution	CSF Number	Location	Accuracy	Calibration Date	Calibration Due Date	Condition on Receipt
Digital Light Meter	Multi-Range	Multi-Resolution	2304L083	Lab	Refer Manual	17 April 2023	16 April 2024	Satisfactory

Environmental Conditions

Temperature : 23 ± 2 °C Humidity : 30 to 70 % RH

Calibration Reference Standard

Description	Serial Number	Certificate No.	Due Date	Traceability
Digital Lux Meter	202110031357	2210L038-O-01	18 October 2023	NABL

Approved Signatory (Lab Manager): *[Signature]*

Reported expanded uncertainty (U) is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a Confidence level of approximately 95%. The uncertainty evaluation has been carried out in accordance with GUM guidelines.

ISO 17025:2017 NABL ACCREDITED LABS

No. 24, 2nd Street, Sri Venkateswara Nagar,
 Pallikarai, Chennai - 600 103, Tamil Nadu, India.

CREST TECHNICAL RADIO FREQUENCY PRESSURE-TEMPERATURE-HUMIDITY-MASS-WEIGHING BALANCE-VOLUME-SPEED-OPTICAL-FLUORIMETER

EQUATION
 Quality Begins With Us

CALIBRATION CERTIFICATE

EQN/FT/7.8/01 Page 1 of 1

CRF No. : EQN/CRF/2304093
 Certificate No. : 2023-24/EQN/2304093-02
 ULR No. : CC27602300000572F

Date of Calibration : 23-Apr-23
 Recd. Due Date : 24-Apr-24

CUSTOMER DETAILS :
 M/S. Nature Science Foundation,
 No. 2659, LIG-II, Gandhi Managar Peelamedu,
 Coimbatore-641 004,
 Tamilnadu, India.

Calibrated at : Lab
 Date of Receipt : 24-Apr-23
 Cond. On Receipt : Satisfactory
 Date of Issue : 25-Apr-23

DETAILS OF UUC :

Description	Range	Serial No.	Identification No.
Sound Level Meter	20 to 130 dB	81807063	81807063

DETAILS OF STANDARD USED :

Master Name	Lab ID No. / Sr No.	Valid upto	Certificate No.
Sound Level Calibrator	INS/PR/04 / 1284860	24-Nov-23	PCR/EQ/22-23/526

CP No. : EQN/CP/ML-06
 Environmental Details : Temperature: 23±1.0°C Relative Humidity: 40-60% RH


MECHANICAL CALIBRATION (Acoustics)

CALIBRATION RESULTS

Sl. No.	STD. READING (dB)	TEST READING (dB)	ERROR (dB)	UNCERTAINTY ±(dB)
1	94	93.3	-0.7	0.90
2	114	113.2	-0.8	0.90

Remark:
 1. The reported Expanded Uncertainty is calculated at 95% C.L. with coverage factor k=2
 2. Reading given was the average of 3 Measurements.

Issued by : *[Signature]* Authorised by : *[Signature]*
 Sr. Cal. Engineer S.B. RAJESH KUMAR Technical Manager K. YOGANATHAN



EQUATION CALIBRATION SERVICES PRIVATE LIMITED
 No. 7/13, Poonagudi Third Street, Ekkattuthangal, Ambal Nagar, Chennai - 12, Tamil Nadu, India. Tel: 91-9620808505, Email: eqn@equation-services.com, Web: www.equation-services.com

Calibration Certificate of LUX Meter

JRTS Calibration Services

Calibration Certificate

Certificate No. : JRTS/23-24/NN-001

Customer's Name : M/s. Nature Science Foundation,
Customer's Address : No 2965 LIG-II Gandhi Managar,
Peelamedu, Coimbatore-641 004.

Description of Instrument : pH Meter

Make	Model No.	Sr. No. / Id No.	Range	Resolution
HM Digital	PH-50	HTHXD00150	0.0 to 14.0 pH	0.1 pH
Date of Receipt	06 May 2023		Receipt Condition	Satisfactory

Duc Condition : Good
Date of Calibration : 06 May 2023
Location of Calibration : Lab
Next Calibration Due Date : 05 May 2024
Date of Issue : 05 May 2023
Work Instruction No. : JRTS-WI-01

Master Instrument Details


Description	Make	Product Code	Lot No.	Validity
4.01 Buffer Solution	Hanna Instruments	HI7004L	8179	Feb 2025
7.01 Buffer Solution	Hanna Instruments	HI7007L	8033	Jan 2025

Calibration Result

Standard Value	DUC Reading	Deviation
4.01	pH	
7.01	4.1	0.09
	7.1	0.09

Remarks
1 The calibration result reported in the certificate is valid at the time of and under the stated condition of measurement.
2 The calibration certificate shall not be reproduced, except in full without written approval of JRTS Technical Services.

Calibrated By: *[Signature]* Authorised By: *[Signature]*



Plot No. C-4 C-5, Door No. G-1, Royal Garden,
Sai Nagar, Chikkarapuram, Chennai,
Tamil Nadu, 600069

info@jrts.in | www.jrts.in GSTIN: 33AAP06148012X
+91 97873 23778 UAM No: 17008 DPO 66 100

Calibration Certificate of Sound Level Meter

JRTS Calibration Services

Calibration Certificate

Certificate No. : JRTS/23-24/NN-002

Customer's Name : M/s. Nature Science Foundation,
Customer's Address : No 2965 LIG-II Gandhi Managar,
Peelamedu, Coimbatore-641 004.

Description of Instrument : TDS Meter

Make	Model No.	Sr. No.	Range	Resolution
HM Digital	TDS-3	NSP-TDS-1	0 to 9990 ppm	1 / 10 ppm
Date of Receipt	06 May 2023		Receipt Condition	Satisfactory

Duc Condition : Good
Date of Calibration : 06 May 2023
Location of Calibration : Lab
Next Calibration Due Date : 05 May 2024
Date of Issue : 06 May 2023
Work Instruction No. : JRTS-WI-01

Master Instrument Details


Description	Make	Product Code	Lot No.	Validity
Conductivity Solution	ThermoFisher Scientific	EC44210000T	221.01	Jun 2025

Calibration Result

Standard Value	DUC Reading	Deviation
1000	ppm	11

Remarks
1 The calibration result reported in the certificate is valid at the time of and under the stated condition of measurement.
2 The calibration certificate shall not be reproduced, except in full without written approval of JRTS Technical Services.

Calibrated By: *[Signature]* Authorised By: *[Signature]*



Plot No. C-4 C-5, Door No. G-1, Royal Garden,
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+91 97873 23778 UAM No: 17008 DPO 66 100

Calibration Certificate of pH Meter

ictc MEASUREMENTS WITH CONFIDENCE

INSTRUMENTS CALIBRATION AND TEST CENTRE
88-C, 5th Cross, Lal Bahadur Colony, Peelamedu, Coimbatore - 641 004, India
Phone : 0422-2564457, 2561730, Mobile : 0936-3057676
E-mail : ictcbe@gmail.com, marketing@ictcbe.com

CALIBRATION CERTIFICATE

Certificate No. : CC2302014/1

SRF No. : SR2302014

Service Requested By : Nature Science Foundation (NSF)
No. 2965, LIG-II, Gandhi Managar, Peelamedu, Coimbatore - 641004

ULR No. : CC24462300009756F

Received Date : 07-10-2023

Calibrated Date : 09-10-2023

Calib. Due Date : 08-10-2024

Issue Date : 10-10-2023

Calibrated At : Lab

Procedure No. : ICTC/NE/ANA DIG DCM/01

Description of UUC

Instrument Name	Make	Model	SNo.	ID
Digital AC Clamp Meter	WHD2	266		

Standards / Calibrators used

Nomenclature	Make / Model	SNo. / ID	Certificate No.	Traceability To / Validity
Current Coil	Fluke / 5500A	20092255 / ICS-CC-01	22572-04	Wavecal / 16-12-2024
Multi Product Calibrator	FLUKE / 5522A	4856901 / ICS-MPC-03	CC22022691/1	ICTC/CBE / 26-12-2023

Environmental Condition of Measurement
Temperature: 25 ± 4 °C Relative Humidity: 30 to 75 %

Calibration Results

Parameter / Range	Std Reading	UUC Reading	Error Observed	Measurement Uncertainty
AC CURRENT / 0 to 200 A at 50 Hz				
	20.00	20.1	0.1	0.99074
	100.00	100.3	0.3	0.35473
	180.00	180.2	0.2	0.63294
AC CURRENT / 0 to 1000 A at 50 Hz				
	100.00	100	0	0.87516
	500.00	500	0	1.84278
	900.00	901	1	3.20247
AC VOLTAGE / 0 to 750 V at 50Hz				
	75.00	73	-2	0.57658
	375.00	374	-1	0.91538
	675.00	678	3	0.89303

ictc / FM-16

Calibration Certificate of Digital Clamp Meter

Calibration Certificate of TDS Meter

GPS calibration at North Railway Station
(Coimbatore - 641012, Tamil Nadu)



Coimbatore, Tamil Nadu, India
North railway station, Vandhanchangar Railway, Seth Narang Das Layout, Tatabad, Coimbatore, Tamil Nadu 641012, India
Lat 11.0162°
Long 76.955417°
20/10/23 09:37 AM GMT +05:30



GPS Calibration at North Railway Station
Coimbatore, Tamil Nadu - 641012

[Signature]
20/10/23



In-service check of GPS Meter

1.8. Use of Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) refers to protective clothing for the eyes, head, ears, hands, respiratory system, body, and feet. It is utilized to protect individuals from the risks of injury while minimizing exposure to chemical, biological, and physical hazards. PPE serves as the final line of defense when engineering and administrative controls are insufficient in reducing risks. Nature Science Foundation safeguards all the auditors by supplying PPE during the conduct of audits. PPE used are safety jackets, ear plugs, goggles, face shield, hand gloves, shoes, etc.,

1.8.1. Safety jackets:

PPE includes safety vests and suits that can be used for inspection process which will protect body injuries from extreme temperatures, flames and sparks, toxic chemicals, insect bites and radiation.



1.8.2. Goggles and Face shield:

Goggles and face shield are used in the inspection process while inspecting items which would cause eye damage or loss of vision, spray or toxic liquids especially in chemistry labs, nearing the electric and electronic item.



1.8.3. Helmet:

PPE includes hard hats and headgears which will be required for tasks that can cause any force or object falling to the head. It also helps to resist penetration.



1.8.4. Hand gloves:

PPE includes safety gloves and should be used for tasks that can cause hand and skin burns, absorption of harmful substances, cuts, fractures or amputations. Selection of hand gloves is based on the application of use.



1.8.5. Safety Boots:

Foot protection is one of the most commonly used PPE and can differ depending upon the environment. Safety boots are used for tasks that can cause serious foot and leg injuries from falling or rolling objects, hot substances, electrical hazards, and slippery surfaces.



1.8.6. Ear Plug:

Ear plugs are used for tasks that can cause hearing problems and loss of hearing. Hearing protection devices reduces the noise energy reaching and causing damage to the inner ear. This ear plug is mostly used near sound producing devices like power motors, genets, generators, etc.,



Opening and closing meetings with the Head of the Organization, NAAC / IQAC Coordinators and NSF Inspection Team

[illegible]

Opening and closing meeting attendance sheets

2. GREEN AUDIT

2.1. Introduction

Green audit ensures the Organization's campus should have greenish with large diversity of trees, herbs, shrubs, climbers and lawns to reduce the environmental pollution and soil erosion; it is also useful in relation to biodiversity conservation, landscape management, irrigation/economic water utilization and maintenance of natural topography besides vegetation. For the benefit of stakeholders, solid waste management, recycling of water, disposal of sewage and waste materials (electronic and biomedical wastes), 'zero' use of plastics, single use plastic items, etc. should be followed consistently in the organization campus. Green Audit procedures includes the definition of green audit, methodology on how to conduct green audit at Educational Institutions and Industrial sectors as per the checklist based on National Building Code (NBC) Part 11 - Approach to sustainability and assessment of risk at 360° view.

2.2. Importance of green audit

The Management of the Organization (Auditee) should be exposed their inherent commitment towards making ecofriendly atmosphere through the green auditing and ready to encourage/follow all types of green activities. A clean and healthy environment will enhance an effective teaching/learning process. They should create the awareness on the importance of greenish initiatives through environmental education among the student members and research scholars. Green audit is the most effective, ecological approach to manage environmental complications (Rajalakshmi *et al.*, 2023). Green audit is a kind of professional care and a simple indigenized system about the environment monitoring in terms of planting more number of trees which is a duty of each and every individual who are the part of economical, financial, social and environmental factors. Green audit is a professional and useful measure for an organization to determine how and where they are retaining the campus eco-friendly manner. It can also be used to implement the alleviation measures at win-win situation for the stakeholders and the planet. It provides an opportunity to the stakeholders for the development of ownership, personal and social responsibility.

2.3. Green audit observations

- It is observed that the Organization has facilities (ramp walk, lift, wheel chair, rest rooms, etc.) for disabled and different age group people.
- Monitoring plan is available for the periodic checking at proper time interval to maintain sustainability.
- Adequate training and awareness programmes are conducted to the Stakeholders for sustainable development at all stages of building life cycle.
- More than 30% of open space is maintained as soft scapes (vegetation) to lower the energy conservation in the campus.
- Land scape design are planned to maintain the natural capacity of the site.
- Land scape irrigation are performed as per the microclimatic condition like during humid through irrigation is observed.
- Vegetation are available around the building to reduce energy consumption and maintain indoor climates.

- Soil health is maintained well without using any chemical fertilizers.
- Ecological design such as Transplantation, climate and design in accordance with bio diversity, reduced pesticides and other activities are not applicable because no new construction is planned and raised.
- Terrace garden and green roof system are available to maintain sustainability.
- Plant and animal species are monitored by conducting the periodic survey in the Organization.
- Traffic survey is conducted to measure the number and type of vehicles passing on the existing main roads giving access to the campus

2.3.1. Facilities for Human Comforts (NBC checkpoint 3.2. and 3.9.)

As per the National Building Code part 11 (Approach to Sustainability) under elements of sustainability quality of plumbing services and buildings are maintained in line with the standard. Ramp walk are implemented for the benefit of disabled and different age group people.



Ramp walk facilities designed for the comfort of person with disability.

2.3.2. Natural topography, vegetation and monitoring (NBC checkpoint 6.2.4.)

Natural topography means the original geographical features and natural resources of the Site. It is observed that the organization has the natural features like rocks, water resources, slopes, landscape, pathways, etc. Vegetation is the cultivation of a bunch of plants irrespective of the plant *taxa* for the covering of the area or ground topography. The observation at the campus indicated that there are more than 40% natural topography and vegetation. Monitoring plan for maintaining the vegetation and sustainability are evident through separate operation and maintenance team & their records for regular watering as per the micro climatic condition through irrigation.



Natural Topography and Vegetation at the Campus

2.3.3. Landscape design and soil erosion control (NBC Checkpoint 7.1.1. – 7.1.3.)

Landscape design is an important feature for any disasters to control especially with respect to the soil erosion. In general, soil erosion occurs if the design of the land is not altered so as to prevent the slope features by strong vegetation and use of a plant buffer zone as safe for escape of nutrients or fertilizers entering the streams. Observation revealed that the audited site has very good landscape design without disturbing the natural vegetation. Contour ploughing is being done at right angles to the slope wherever possible and ridges and furrows are properly maintained to break the flow of water down to the empty land. These activities are widely adopted to control soil erosion in the campus. Microclimatic conditions are considered, during winter season irrigation and watering to plants are controlled as per the water management plan. External landscapes are designed based on the shading pattern of the building. Green vegetation are available around the building to reduce the energy consumption.



Landscape design and soil erosion control in the Campus

2.3.4. Establishment of different gardens, vertical landscaping and roof gardens (NBC Checkpoint 7.1.1. – 7.1.3.)

It is observed that Organization has implemented and maintaining terrace gardens to lower the energy consumption. To maintain certain biomass critical for human health and also to reduce the bio-retention through water flow rates different types of gardens like ornamental garden is implemented in the campus.



Vertical and Herbal Gardens observed in the Campus

2.3.5. Survey of Flora and Fauna (NBC Checkpoint 12.4.5. and 12.4.6.)

Ensuring the rich biodiversity in the green campus is an important parameter which reflects the real-time ecosystem. In general, plants improve the outdoor air quality with increased oxygen levels and reduced temperature and carbon dioxide. The record on maintenance of the plant biomass and its management are important with respect to green campus initiatives. The existence of such plants and birds in the green campus are recorded for the rich flora and fauna which are being considered as a value addition to the campus.



Delonix regia



Colvillea racemosa



Spathodea campanulata

2.4. Air quality audit observations (NBC Checkpoint 12.4.3.)

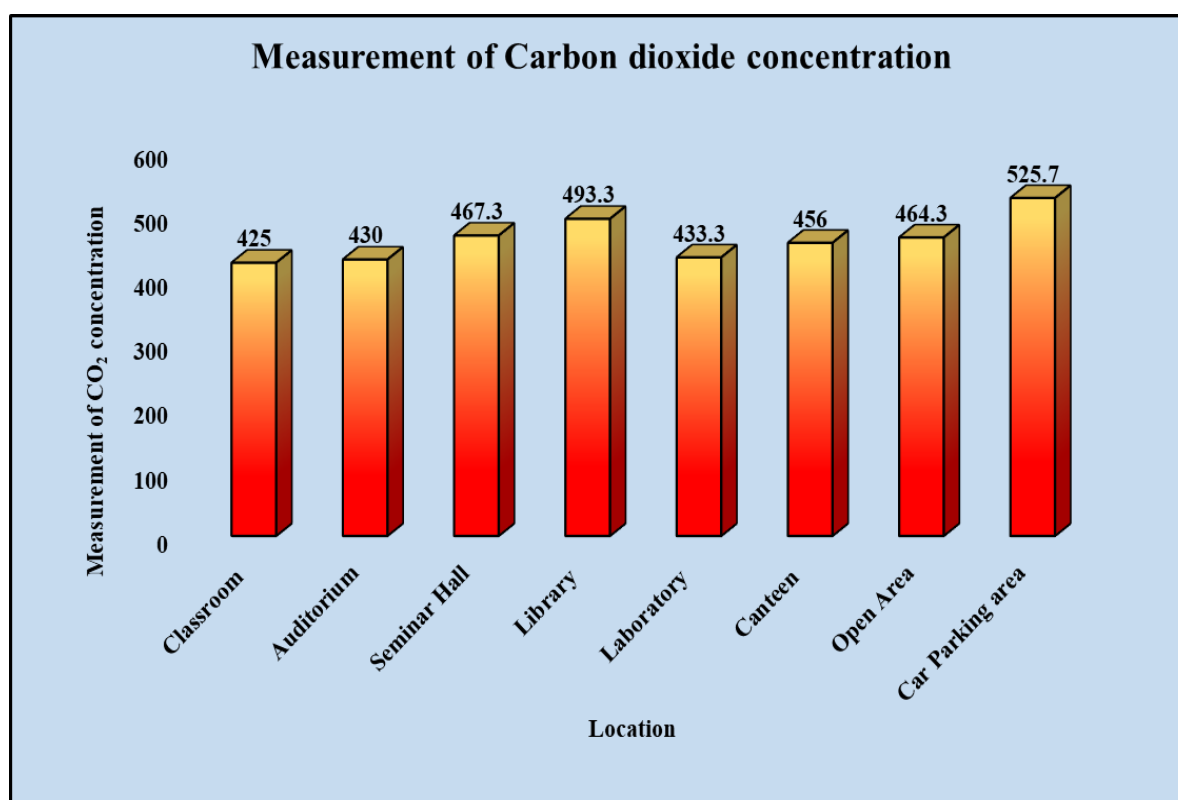
It is observed that carbon dioxide and oxygen values are acceptable range. The air circulation is very good in all the places which in turn useful to give pure air to the stakeholders. The observation showed that the concentration of CO₂ in the atmosphere is

found to be optimal which did not exceed the critical limit of CO₂. It is further revealed that all the selected locations are having pure air without any air contaminants with good air exchange/circulation in the campus. Some of the places like Canteen and Class Rooms are recorded with high level of carbon dioxide level due to student mobilization and the maximum number of electrical items fixed from which the carbon dioxide emission was observed followed by all laboratories and seminar and auditorium halls (Table 1).

Table 1. Measurement of CO₂ concentration in the Organization

S. No.	Different locations of the Organization's Campus	Carbon dioxide level (ppm)*	Remarks
1.	Classroom	425.0	Within permissible limits
2.	Auditorium	430.0	Within permissible limits
3.	Seminar Hall	467.3	Within permissible limits
4.	Library	493.3	Within permissible limits
5.	Laboratory	433.3	Within permissible limits
6.	Canteen	456.0	Within permissible limits
7.	Open Area	464.3	Within permissible limits
8.	Car Parking area	525.7	Within permissible limits
Mean		410.56 %	
SEC ±		2.16	
CD at P=0.05%		3.84	

Figure 2. Measurement of CO₂ concentration in the Organization



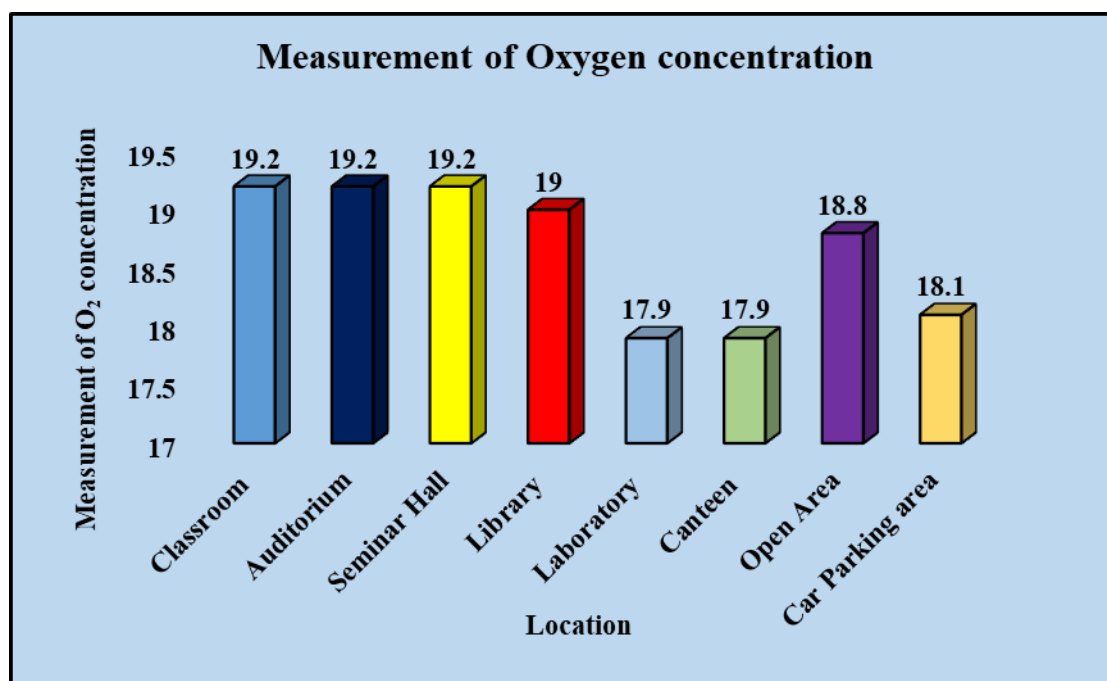
2.5. Atmospheric oxygen level measurements analysis and interpretation

Oxygen level refers to the amount of oxygen available within the atmosphere or water bodies. Oxygen is produced/released as a by-product of photosynthesis, the metabolic activity of all green plants besides certain microbes. Oxygen plays a paramount role in metabolic activities like respiration and the energy-producing chemistry of all living organisms. In order to quantify the oxygen level, Oxygen Meter is used. The atmosphere contains 18-21% oxygen concentration, 75-78.5% nitrogen and 2-3% other gases like carbon dioxide, neon and hydrogen. The amount of oxygen level in the atmosphere is determined by abiotic factors like altitude, latitude and longitude and biotic factors like plantations in the surroundings. If it excess, it causes oxygen toxicity and oxygen poisoning by creating coughing, breathing trouble and damage the lungs to human beings. The oxygen level of different places at the campus are monitored and presented (Table 2).

Table 2. The oxygen concentration at different places of audited organization

S. No	Location	Oxygen Level (%) *	Remarks
1.	Classroom	19.2	O ₂ level is good
2.	Auditorium	19.2	O ₂ level is good
3.	Seminar Hall	19.2	O ₂ level is good
4.	Library	19.0	O ₂ level is good
5.	Laboratory	17.9	O ₂ level is good
6.	Canteen	17.9	O ₂ level is good
7.	Open Area	18.8	O ₂ level is good
8.	Car Parking area	18.1	O ₂ level is good
Mean		16.6%	
SEC \pm		0.22	
CD at P=0.05%		0.39	

Figure 8. The oxygen concentration in the Organization





Measurement of Carbon dioxide and oxygen concentration in the Campus

3. SOIL AND WATER AUDIT

3.1. Introduction

Soil and water are inequitable natural resources of India at global level. Soil are naturally occurring loose covering on the earth's surface. Weathering altered the rock particles of soil into mixtures of mineral and organic constituents. Soil is rich in microorganisms such as bacteria, fungi, actinomycetes, algae, protozoa and nematodes. The microorganism of the soil helps in enzymatic degradation of organic matter, energy storage and conversion of nutrients in available form in their biomass. Water the other natural resource constituting with 97% of salt water and 3% of fresh water. The use of water is inevitable in our daily needs. Water is used in agriculture, industrial, household, recreational and environmental activities. The natural source of fresh water are surface water and ground water.

Soil and water are natural resources of the organization that has to be structured, planned and developed from the point of entry to end users the stakeholders in such a way with contamination free soil and water, sustainable use of land and water and suitable measures for their conservation. Soil and water audit is a tool to improve the quality of the land and water to provide a healthy environment for the stakeholder directly and indirectly of the campus. It creates awareness on environmental ethics, resolves environmental issues and offers solutions to various social and economic needs. It strengthens the concept of 'Jal Jeevan Mission' and 'Sustainable Land Management' among stakeholders of India for the protection of natural ecosystems for future prospects.

Soil and water audit helps the educational institutions/ industries to maintain eco-friendly environment, assures personal hygiene to various stakeholders and supports the nation; on the whole for the noble cause of environmental protection and nature conservation which in turn enhances the quality of life of all living beings.

Most of the soil in India are well drained, deep, fairly loamy, slightly acidic to alkaline and lime-free soils and they are ideal for variety of plant cultivation. The Indian soils are mainly derived from gneissic rock containing large amount of mica with good behavior of water holding capacity with abundance of micro and macro elements. Some of the soils are characterized by clay loam type, classified as latosols with good organic matter contents along with sufficient amount of nitrogen, potassium and phosphorous contents all tea soils are distinctly acidic, rich in nitrogen content.

3.2. Soil and Water audit observations

1. The campus has well established rainwater harvesting models, percolation pond to recharge the bore wells by collecting rainwaters from the building roofs, open areas and playgrounds including unexplored areas which are channelized properly.
2. The physic-chemical properties of soils revealed that the soil health is good towards the construction of building and the cultivation of various native and wild type plant species.

3. The water quality parameters revealed that the quality of water is good in terms of domestic and irrigation purposes.
4. It is observed that the Organization is created massive facilities for wastewater treatment to purify the wastewaters to manage the wastewaters effectively.
5. A well-established rainwater harvesting system to recharge water ground status by collecting rainwaters from the campus coinciding with the contour of the terrain and natural drains.
6. Solar water heater are available to serve hot water for domestic purpose.
7. Low flow fittings, low cisterns and bath faucet are available to conserve water.

3.2.1. Geology, topography and soil condition (NBC Checkpoint 12.4.1)

The Organization is located in the Bangalore District of Karnataka, India. Bangalore is situated in the southeast of the South Indian. It is positioned at 12.97° N 77.56° E and covers an area of 2,190 square kilometres (850 sq mi). A landlocked city, Bangalore is located in the heart of the Mysore Plateau (a region of the larger Deccan Plateau) at an average elevation of 920 metres (3,020 ft). Bangalore district borders with Kolar and Chikkaballapur in the northeast, Tumkur in the northwest, and Mandya and Ramanagaram in the southeast. The topography of Bangalore is undulating with a central ridge running NNE-SSW. The highest point is Doddabettahalli, which is 962 m (3,156 ft) and lies on this ridge.[4] No major rivers run through the city, though the Arkavathi and [Dakshin Pinakini river] cross paths at the Nandi Hills, 60 km (37 mi.) to the north. River Vrishabhavathi, a minor tributary of the Arkavathi, arises within the city at Basavanagudi and flows through the city. In most parts of the city the soil is of thin veneer soil. Most of the soil is black clayey soil, while some parts of the Dindigul town have the red soil in it.

3.2.2. Assessment of Physico-chemical property of Soil samples

Soil physic-chemical properties influence the behaviour of soil and hence, knowledge of soil property is important. Soil testing is the only way to understand the soil health and to determine the available nutrient status in soil. The fertility of the soil depends on the concentration of N, P, K, organic and inorganic materials, conductivity. The results on soil samples analysis revealed that the pH, Electrical conductivity, total organic carbon, total nitrogen, available phosphorous and exchangeable potassium were found to be within the range and suitable for building constructions and cultivating the plants corresponding to the soil health. Bangalore has a handful of freshwater lakes and water tanks, the largest of which are Madivala tank, Hebbal Lake, Ulsoor Lake and Sankey Tank. Groundwater occurs in silty to sandy layers of the alluvial sediments. The Peninsular Gneissic Complex (PGC) is the most dominant rock unit in the area and includes granites, gneisses and migmatites, while the soils of Bangalore consist of red laterite and red, fine loamy to clayey soils.

Soil Sample Test Result:

S.No	Test Parameters	Value	Unit	Test Protocols	Comments
1.	pH @ 25 °C	5.52	-	IS 2720: (Part 26)	Sufficient
2.	Specific Electrical Conductivity	0.97	ms / cm	IS 14767	Sufficient
3.	Organic Carbon	1.09	%	IS 2720: (PART 22)	High
4.	Total Nitrogen	0.014	%	IS 14684	Sufficient
5.	Available Phosphorus as P	6.18	mg / kg	ATL/SOIL/SOP – 03 Issue No / Date: 01/02.02.2018	Sufficient
6.	Soluble Potassium as K	31	mg / kg	ATL/SOIL/SOP – 05 Issue No / Date: 01/02.02.2018 (Based on FAO Manual)	Sufficient

Range:

S.No.	Soil Nutrients	Soil Fertility Ratings (%) *		
		Low	Medium	High
1.	Organic carbon as a measure of available Nitrogen (%)	< 0.5	0.5-0.75	>0.75
2.	Available N as per alkaline permanganate method (kg/ha)	<0.2	2.0 – 5.0	>5.0
3.	Available P by Olsen's method (kg/ha) in Alkaline soil	<5	5-10	>10
4.	Available K by Neutral N, ammonia acetate method (kg/ha)	<25	25-35	>35

ALPHA LABS & TECHNOLOGIES
FOOD / WATER / SOIL TESTING
ISO 17025:2017 Certified (NABL) member company
281-C, Thadagan Road, Amutha Surala Upstairs, Opp. Aulia Convent, Vengalpet, Chennai-641025
Tel: 0422-2441499 Mobile: 96294 45642 E-mail: alphalabstech@gmail.com | www.alphalabstech.in

TEST REPORT
REPORT NO: ALT/TRE/18/1032 REPORT DATE: 19.01.2024

Customer Name & Address: M/s. NATURE SCIENCE FOUNDATION.
Sample Details: SOIL SAMPLE - 09.01.2024
Sample reference no: ALT/JAN/24/SA-032 Sample Received on: 16.01.2024
Analysis started on: 16.01.2024 Report Issue Date: 19.01.2024
ULR No: TC357323100000994F

RESULTS OF THE ANALYSIS

S.NO	TEST PARAMETERS	UNIT	TEST PROTOCOL	VALUE
1.	pH @ 25 °C	-	IS 2720: (Part 26)	5.52
2.	Specific Electrical Conductivity	ms/cm	IS 14767	0.97
3.	Organic Carbon	%	IS 2720: (Part 22)	1.09
4.	Total Nitrogen	%	IS 14684	0.014
5.	Available Phosphorus as P	mg/kg	ATL/SOIL/SOP - 03 Issue No / Date: 01/02.02.2018	6.18
6.	Soluble Potassium as K	mg/kg	ATL/SOIL/SOP - 05 Issue No / Date: 01/02.02.2018 (Based on FAO Manual)	31
7.	Moisture	%	IS 15106	13.9

Comments: Refer the Methods Manual Soil Testing in India, Ministry of Agriculture, Government of India, January 2011.

*** End of Report ***

Reviewed & Approved: *[Signature]*
S. S. Senthil Kumar
Senior Chemist
Authorized Signatory

ALPHA LABS & TECHNOLOGIES
FOOD / WATER / SOIL TESTING
ISO 17025:2017 Certified (NABL) member company
281-C, Thadagan Road, Amutha Surala Upstairs, Opp. Aulia Convent, Vengalpet, Chennai-641025
Tel: 0422-2441499 Mobile: 96294 45642 E-mail: alphalabstech@gmail.com | www.alphalabstech.in

Range:

S.No.	Soil Nutrients	Low	Medium	High
1.	Organic carbon as a measure of available Nitrogen (%)	< 0.5	0.5-0.75	>0.75
2.	Available N as per alkaline permanganate method (kg/ha)	<0.2	2.0 – 5.0	>5.0
3.	Available P by Olsen's method (kg/ha) in Alkaline soil	<5	5-10	>10
4.	Available K by Neutral N, ammonia acetate method (kg/ha)	<25	25-35	>35

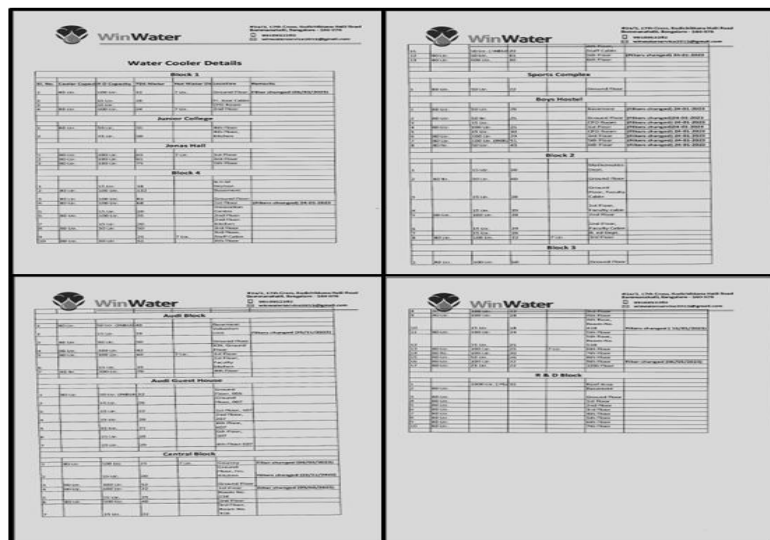
* Soil fertility ratings has been calculated kg/ha into percentage

Standards referred from 'Soil Testing Methods in India' published by the Ministry of Agriculture, Government of India and Methods of Analysis of Soils, Plants, Waters and Fertilizers by Fertiliser Development and Consultation Organization.

Soil Sample Test Report obtained from ISO 17025 certified lab

3.3. Water management activities (NBC Checkpoint 7.3, 10.2 – 10.5 and 12.4.2.)

In order to conserve water resources, it is essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the appraisal of facilities of raw water intake and determining the facilities for water treatment and reuse. Auditor concerned investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. The Organization is taking enough attempt to manage wastewater that are coming out from various Department laboratories, hostels and canteens as per the water management plan. Solar water heaters are available for the domestic use of water. Chemicals like bromine and chlorine are avoided to maintain the water quality and to maintain hygienic environment to the stakeholders. Low flow fitting are implemented in the recently constructed building to conserve water.



The image displays four WinWater water cooler detail sheets, each for a different campus block. Each sheet contains a table with columns for Block, Cooler ID, Cooler Type, Cooler Size, Cooler Location, Cooler Status, and Cooler Remarks. The sheets are for Block 1, Block 2, Block 3, and Block 4.

Water Cooler details available at the Campus



Sewage Treatment Plant available in the Campus

3.3.1. Operational water supply thro' drip and sprinkler systems

Maintaining the green campus, water conservation mechanisms should be applied efficiently in the campus. Well planned water irrigation systems like sprinkler and drip should be implemented in the entire green area of the campus for an effective water management system. This can be implemented only when the plantations are well planned. Vegetative area of the audited organization has taken sufficient efforts to maintain the plants greenish and frequency of watering to the plants.



Irrigation Facilities, Borewell Units and RO Units observed in the Campus

3.3.2. Rainwater harvesting system and percolation pond

Rainwater harvesting system is a traditional old practice not only in drought prone areas and also in areas having seasonal rainfall. Indian traditional rainwater harvesting systems are constructed based on three modes either direct pumped, indirect pumped or by both modes. In addition, lakes, ponds, water channels and any other water reservoir methods are considered as the rainwater harvesting system. During the audit it has been observed that the organization has well developed and maintained rain water harvesting system. Rainwater harvesting structures have been commissioned at different locations of the audited organization's campus



Rainwater harvesting units in the Campus

3.3.3. Water quality

After air, water is the second most critical element for life to exist. As a result, the scientific literature has numerous descriptions of water quality. It is the physical, chemical and biological characteristics of water, is the most frequently used definition of water quality. Water quality is a measurement of the state of water in relation to the needs of one or more biotic species and/or to any human need or purpose.

- One of the most crucial aspects of water quality is pH. It is described as the hydrogen ion concentration's negative logarithm. It is an arbitrary number that expresses how acidic or basic a solution is. Actually, water's pH is a gauge of how acidic or basic it is. Both basic and acidic water have more hydrogen (H^+) and hydroxyl (OH) ions than usual.
- Total dissolved solids is referred to as TDS. It calculates the overall concentration of soluble salts and minerals in water. One mg/L of dissolved minerals, for instance, means that the water pitcher contains one mg/L of TDS.
- The salinity of a body of water, commonly known as saline water (also see soil salinity), is the degree to which salt is present. It is often measured in grams per litre (g/L)., Water that is cloudy is referred to as turbid. It gauges how well light can travel through water. It is brought on by particulate matter suspended in water, including clay, silt, organic matter, plankton and other particles.
- One of the most crucial indicators of the water quality in streams, rivers and lakes is dissolved oxygen (DO) which is regarded as one of the factors. It is an important indicator of water pollution. The water quality improves as the dissolved oxygen concentration does.



Water samples for Test Analysis using pH and TDS Meters

3.3.4. Standards for physico-chemical properties of water

The water samples collected from various sources, i.e., RO water, tap water, bore well water, wastewater and treated water samples were subjected to analyze for its physico-chemical parameters. The results showed that all the parameters were found to be appreciable and no harmful effect was recorded (Table 9). These parameters were observed to be within the limit of Indian Standards of drinking water quality. The observed pH values were found to be 6.5 - 8.5 ranges. Similarly, observed TDS and salinity were 0 - 900 mg/L and 300 - 380 mg/L, respectively. Turbidity and dissolved oxygen were 4.5 – 5.5 NTU and 6.5 - 8.0 mg/L, respectively which are compliance with ISI standards.

Table 9. Physico-chemical properties of various water sources

S.No.	Water source	pH	TDS (mg/L)	Salinity (mg/L)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
1.	RO water	6.9	73.3	320.0	4.5	6.7
2.	Tap water	8.0	124.7	352.3	4.6	7.3
3.	Pond water	8.2	279.7	321.0	5.0	7.7
4.	Waste water	7.2	274.7	311.0	5.1	6.7
5.	Treated water	8.3	387.0	307.0	5.4	7.6
Mean		7.71	254.24	322.2	4.92	7.3
SEC \pm		0.06	3.10	1.37	0.11	0.09
CD at P = 0.05:		0.10	5.52	2.45	0.19	0.17

Source: IS 10500: 2012

3.3.5. Water consumption rate

Since several variables are influenced water consumption by various stakeholders of an organization; it is hard enough to precisely assess the water quantity demanded by the public. Water is an immense requirement of any living organism. Though it is a natural resource, we are exploiting water for various purposes in day-to-day activities. As an educational institution, water requirement for various activities may differ. Per capita Domestic Consumption in Hostels combined with Canteen ranges between 90 - 125 litres. Industrial or laboratory demand for water is estimated ranges between 100 - 300 litres. Losses as leakages and routine consumption accounts approximately 30 - 50 litres (per capita) and other uses daily usage uses accounts another 50 litres.

Table 10. Water consumption for various purposes

S.No.	Types of consumption	Normal range (L/capita/day)	Average
1.	Per capita domestic consumption at hostel and canteen	95-125	110
2.	Industrial and commercial demand at laboratories	140 - 260	175
3.	Public uses including fire demand, transport washes	2600-3600	2800

4.	Losses and waste as routine consumption	35-50	35
5.	Daily use (day-to-day use)	60	32

4. Conclusion

Considering the fact that the organization is a well-established academic institution and there is significant scope for conserving green, environment, energy, waste management, soil & water management, air quality and hygiene which in turn make the campus as self-sustained. The organization has taken enormous efforts to maintain green campus in a sustainable manner. It has conducting a large number of activities for the benefit of rural and tribal community people without disturbing the natural environment. The installation of a rainwater harvesting system and irrigation system to conserve rainwater and improve the ground water levels are noteworthy. The Organization has created medicinal, herbal and ornamental gardens at small scale level for establishing a massive reforestation / afforestation programme in which a large number of trees and shrubs species were planted together for providing an eco-friendly atmosphere to the stakeholders in a sustainable manner.

The energy conservation initiatives taken by the organization are substantial. Water and Soil conservation activities are also implemented and practiced. Proper facilities and procedures are followed for waste collection, segregation, disposal, recycle and reuse. Quality of soil and water observed to be good. Hygienic practices are monitored and maintained considering the health and sustainability of the stakeholders at canteen and hostel premises. Tree plantation at appropriate locations are maintained to resist the indoor climate and conserve energy as per the National Building Code (Part 11 – Approach to Sustainability). The organization has made significant progressive contributions with respect to teaching learning, research and consultancy, innovation and transfer of technology, community service and value education, in toto. It imparts quality education to rural, tribal and urban people across the nation which is excellent in terms of academic activities and providing an eco-friendly atmosphere to the stakeholders.

5. References

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6. Certificates of Lead Auditors

1. Bureau of Energy Efficiency (BEE), LEED AP and GRIHA Certificates of Er. D. Dineshkumar, Energy and Environment Auditor of NSF.
2. Indian Green Building Council (IGBC AP) Accredited Professional of Dr. B. Mythili Gnanamangai, Vice-Chairman of NSF.
3. Tamil Nadu Fire and Rescue Service Certificate of Er. S. Srinivash, Energy Auditors of NSF.
4. Energy Management System ISO 50001:2018 Certificate of Dr. D. Vinoth Kumar, Joint Director of NSF.
5. ISO 17020:2012 certificate of Ms. V. Sri Santhya, Assistant Director of NSF.



BUREAU OF ENERGY EFFICIENCY



Examination Registration No. : **EA-14056** Serial Number **9176**

Certificate Registration No. : **9176**

[Signature]

Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. **Dinesh Kumar D**
 Son/Daughter of Mr./Mrs. **R M Dhanasekaran** who has passed the National
 Examination for certification of energy manager held in the month of **October 2011** is
 qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency
 (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate
 and shall be renewable subject to attending the prescribed refresher training course once in every
 five years.

His /Her name has been entered in the Register of certified energy manager
 at Serial Number **9176** being maintained by the Bureau of Energy Efficiency under the
 aforesaid regulations.

Mr./Mrs./Ms. **Dinesh Kumar D** is deemed to have qualified
 for appointment or designation as energy manager under clause (i) of Section 14 of the Energy
 Conservation Act, 2001 (Act No.52 of 2001).

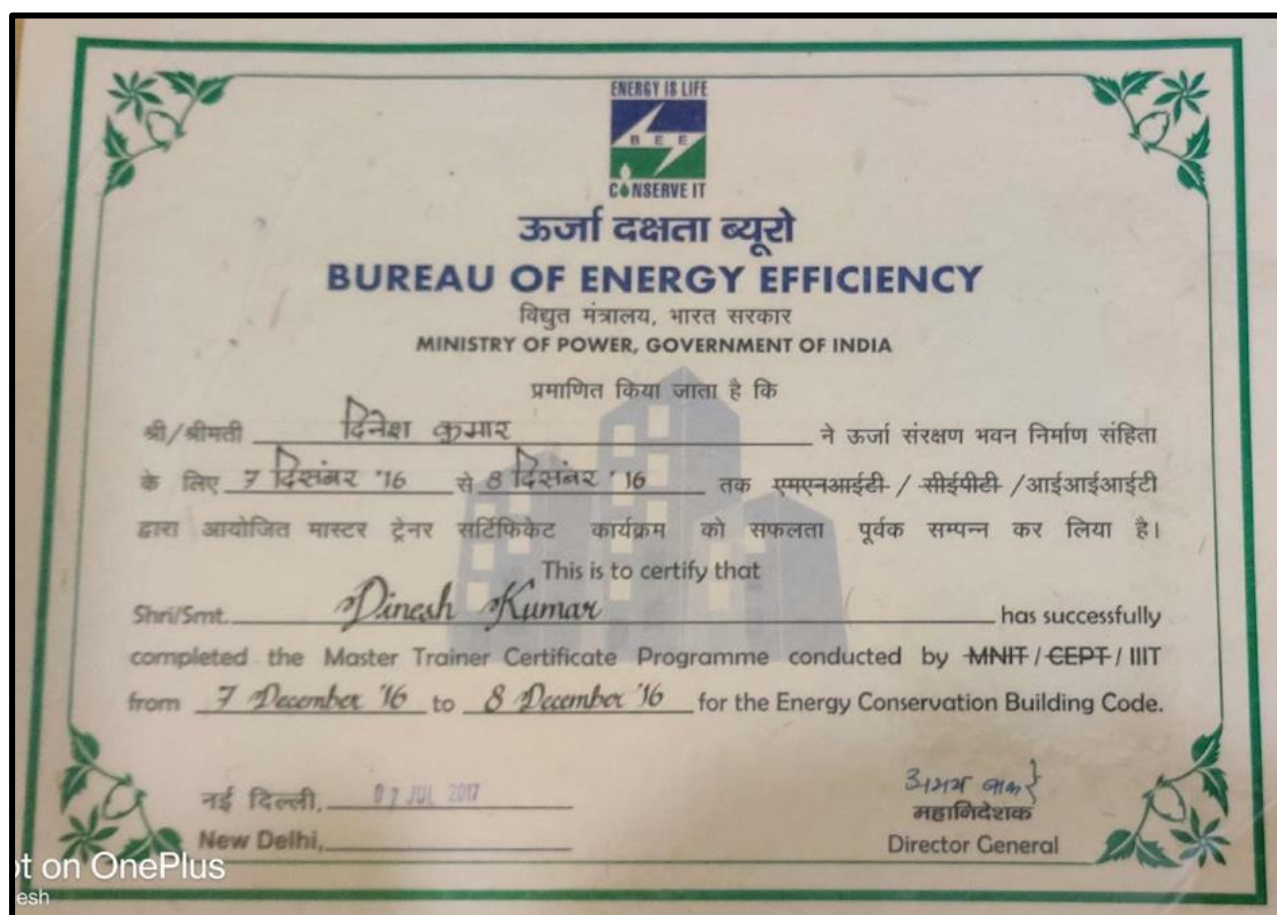
Given under the seal of the Bureau of Energy Efficiency, this **7th** day
 of **February, 2013**

[Signature]

Digitally Signed: RAKESH KUMAR RAI
 Sun Mar 01 10:58:55 IST 2020
 Secretary, BEE New Delhi

Secretary
 Bureau of Energy Efficiency
 New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
22.12.2019	<i>[Signature]</i>		



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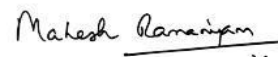
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