

# GREEN AUDIT REPORT



## SONAPUR COLLEGE

Sonapur, Kamrup

Estd: 1991



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# Contents

<b>1. Introduction</b>	
<b>1.1 Green Audit</b>	01
1.1.2 Objectives of green audit	01
1.1.3 Process of green audit	02
1.1.4 General steps involved in Green audit	03
<b>2. Institution</b>	04
2.1 Overview	04
2.2 Vision of the college	04
2.3 Mission of the college	05
2.4 Objective of the college	05
2.5 Geography	06
2.6 Societies and Forum	06
2.7 Role of Management in Green Management	08
<b>3. Audit Preparations</b>	09
3.1 Management	09
3.2 Teaching staff and student	09
3.3 The Green Audit Process	11
3.4 Onsite activities	11
<b>4. Green Audit</b>	13
4.1 Inspection	13
4.2 Evaluation of documents and reports	13
4.3 Finding and Analysis	13
4.3.1 Water and Wastewater Audit	13
4.3.2 Energy Audit	15
4.3.3 Environmental Quality Audit	17
4.3.3.1 Gardens and Greeneries	17
4.3.3.2 Awareness Program	19
4.3.3.3 Air Quality Report	20
4.3.3.4 Noise Level	21
4.3.3.5 Water Quality	22
4.3.3.6 Solid Waste Management	23
4.3.3.7 Suggestions	23
4.3.4 Health Audit	24
4.3.5 Carbon Accounting	24

4.3.5.1 Suggestions	25
<b>5. Recommendations</b>	26
5.1 General Recommendations	26
5.2 Water Managements	26
5.3 Energy Managements	27
5.4 Environmental Management	27
5.5 Health Management	27
5.6 Carbon Emission	28
<b>6. Future Action Plans</b>	29
<b>7. Conclusion</b>	30-35
Annexure	

# INTRODUCTION

## 1.1 Green Audit

The green audit had started from 1970s. The sole purpose of this is to find out the activities that are taking place in the institution concerned. Our world is constantly changing with globalisation, modernisation and technical advancement. During the period of late twentieth century the rapid climate change had attracted people's concern towards the changes. Green audit is a way to put forward what type of carbon footprint they are leaving on the planet and it provides solution to reduce it. It can be also defined as a method or a function to diagnose the environmental impact and evaluate their acquiescence with already available law and regulations regarding it while also fulfilling the expectations of stakeholders. The organisation is responsible to carry out Green audits to make sure their process in compliance with the relevant rules and regulations, to improve the procedures and materials.

### 1.1.2 Objectives of Green Audit

Now a days most of the government and nongovernment organisations are conducting green audit for the activity taking place in their respective organisations. The basic objective of these to

- To certify that the activity in the organisation which are related to environment is following existing laws and regulations available.
- To certify that the development and activities in the organisation is not harsh to environment.
- Green audit provides insight of the energy consumption in the activities of the institution. Hence it is a tool to reduce energy consumption.
- To measure the performance of each green related activity and in the campus.

- To reduce pollution, use of modern devices is demanded in the institutions and green audit aims to ensure the installation and to determine the authenticity of such devices.
- To determine ways to reduce the expenses and maintenance and running cost on equipment, tools and appliances.
- To generate a database of green activities for continuous monitoring to assess the success of each of them.
- To ensure the finest utilisation of resources.
- To verify that enough precautions has been taken by the institution to protect personals of the institution from pollution and other health hazard caused by the environment damaging constituents.
- To determine the potential future liabilities.
- To provide suggestions for improvement and to provide safe and clean environment.

### **1.1.3 Process of Green Audit**

The process of green audit depends upon the activities that takes place in the institution. Many institutions have now realised that they could provide a healthy environment to stakeholders along with the improvement in operational activities and management of cost. As it is based on awareness and institution's concern on performance of the activities it enhances the social responsibility of the organisation. But there must be proper plan to carry out a green audit.

- To understand the activities in the institution and its effect to environment.
- To equate the statements of the institution with standard laws and regulations.
- To check the clearance certificates obtained from different departments and ministries. If not, why not. Example: Environment clearance from Pollution control Boards, Ministry of Environment and forest, water drawls permission etc.

- To check the energy consumption and determination of any loss that is occurring.
- To determine and assess inefficiency and the determining probable solution for the problem.

#### **1.1.4 General steps involved in Green audit**

1. Systematic and exhaustive data collection
2. Evidence based documentation of activities.
3. Regular monitoring.
4. provide standard and method for improvement by establishing cost-effective green action plan.

# INSTITUTION

## 2.1 Overview

The Sonapur College is one of the most prestigious and leading higher education institution in Assam. It was established in the year 1991 with



Fig. 2.1: Location of Sonapur College

an aim to provide quality education to the youths near the capital city of the state. The college offers higher secondary, B.A, B.COM degree courses in 13 major discipline. It is a UGC granted DDU KAUSHAL Kendra and accredited by NAAC. Total number of student enrolled is 1592 and total faculty is of 59. It is located 20 km outskirts of Guwahati city, in a hilly region surrounded by agricultural farm lands and adopts a healthy culture of keeping tradition as well as modern green practices.

## 2.2 Vision of the college

- To strengthen the communities with the spirit of Higher Education by upholding the ethos of intellectuality and value orientations for a sustainable society.

## **2.3 Mission of the college**

- Sonapur College was established with a mission to impart higher education among the students of the locality and to create an environment for the intellectual, ethical, moral and physical upliftment of the people, belonging to tribal communities, by preserving their heritages and exposing the students to modern technologies to make them aware of their rights and duties for the betterment of the society.

## **2.4 Objective of the college**

1. To impart education for the attainment of a degree in the streams of Arts and Commerce.
2. To encourage the students for participation in the extra-curricular activities like games and sports, cultural programmes etc.
3. To encourage the students for spiritual development and to train them in social responsibility, healthy living condition etc.
4. To serve the rural people through extension education by the application of scientific knowledge and technique in solving rural problems.
5. To create an environment of the development for human virtues among the students like spirit of co-operation, discipline, love & feeling of brotherhood.
6. To undertake programmes for preservation and development of the tribal language and culture that constitutes a major component of the population of the locality.
7. To spread the feeling of national integration among the new generation.





**Fig. 2.2: Aerial View of Sonapur College**

## **2.5 Geography**

The coordinates of the college is  $26^{\circ} 7'29.52''\text{N}$  and  $91^{\circ}57'30.28''\text{E}$ . The total area covered by the institution is of nearly 50 acre. The nearest railway station is Digaru railway station which is in process to become a new junction. The present nearest railway junction is Kamakhya railway junction and bus depot is Khanapara, which is 38km and 24km away respectively. The campus size is nearly 50 acres.

## **2.6 Societies and Forum**

The students of the college are entitled to join a variety of societies and forums for their socio-economic and spiritual development along with the academic one. The students can avail the facilities rendered by the different forums and societies.

### **2.6.1 Sonapur College Geographical Society**

To make geography a popular subject among the students and public, the Sonapur College Geographical Society was formed. The objective of this society is to create awareness in environmental preservation. Effort is also made to find remedies through various projects on socio-economic and environmental problems of the locality. This society has organized a number of seminars and workshops, related to Geography and environment in various schools.

### **2.6.2 Sonapur College Literary Society**

The objective of the society is to raise consciousness among students to pursue study and research in the literary field. It also aims at increasing students' concern regarding the rich folk culture and tradition of the locality.

### **2.6.3 Dr. Dhanjit Medhi Foundation**

Dr. Dhanjit Medhi Foundation, a registered trust, established to devote exclusively for the promotion and patronage of all kind of activities that upholds the very ethos of education, literature and culture, more specifically those pertaining to the folk culture, traditional knowledge etc. and to play a catalytic role for encouraging the future generations for the excellence of their academic pursuits in the above mentioned disciplines.

### **2.6.4 Sonapur College Economic Forum**

Under the supervision of the department of Economics, this forum aims at raising consciousness among students towards economic issues relevant to the regional socio-cultural milieu by encouraging them to collect economy based data and analyze the same for further study.

### **2.6.5 Sonapur College Philosophical Forum**

With a view to make students aware of the various trends and issues in Philosophy, the forum has an annual agenda of organizing seminars, workshops and extension programmes in the college and outside in the aegis of Philosophy Department.

### **2.6.6 Sonapur College Women's Cell (SCWC)**

This cell tries to address different issues of women and sensitize the teachers and students of the college as well as of the women belonging to the neighbouring areas about their rights and duties by organising various programmes. It aims at women empowerment and freedom through its various progressive activities.

### **2.6.7 Manuram Karkun Teaching and Research Centre for Tribal Language and Culture**

The centre aims at teaching different tribal languages of the locality and undertakes different research works in relevant topics. It also encourages the students of the college to conduct studies in the rich cultural heritage of the locality.

### **2.6.8 Kalabhumi**

This centre offers a platform to the hidden talents of the students in dance, music and acting. It also organizes workshops on drama during the summer vacation and these are open for all. The performances made by Kalabhumi have received acclaim outside the state also.

### **2.6.9 Sonapur College Museum**

The college takes the pride of having a well maintained, rich College Museum. It aims in preserving the antique resources scattered in Greater Dimoria through its museum and also attempts to make the students know the socio-cultural background and history of the locality. The students are also encouraged to collect and contribute various items to the museum.

### **2.6.10 Blood Donors Association**

The college has a voluntary Blood Donors Association where students, teachers and staff are members. The objective of the association is to provide service to the needy and deserving people.

## **2.7 Role of Management in Green Management**

The management of Sonapur College remains committed towards conservation of green environment and has taken several initiatives towards it. The management has been instrumental in setting up a solar power facility and a rainwater harvesting facility in the college campus. The management provides full support to National Service Scheme (NSS) unit of the college for its various projects related to environment. NSS unit of the college regularly organises activities such as cleanliness drive, tree-plantation etc. It also monitors the overall cleanliness of the campus. The College has been organising World Environment Day every year to spread the awareness on protection of environment and also to aware the public about the dangers of climate change. The management encourages the departments to organise workshops and webinars on topics related to conservation of environment to create awareness among the students.

# Audit Preparations

## 3.1 Management

The Sonapur College management was very keen in taking up the recommendation of conducting a green audit. There was a preliminary visit to the campus to set up different criteria and questions that are necessary for an updated green audit.

The following were different criteria set forth for the present green audit.

- a) Water Audit
- b) Waste Disposal Audit
- c) Energy Audit
- d) Environmental Quality Audit
- e) Health Audit
- f) Carbon Accounting

A detailed questionnaire for each aforementioned criteria was prepared based on the campus visit and thorough evaluation of the previous audit. The audit team in discussion with the college green cell has identified a team including teachers, non-teaching staff and students. The team has collected information that is addressed in the questionnaire.

## 3.2 Teaching staff and student

The internal audit team has following members who helped in various level of this audit process.

Table 1: List of faculties and students

<b>Sl. No</b>	<b>Name</b>	<b>Designation</b>	<b>Part Played</b>	<b>Audit involved</b>
1	Dr. Sinam Iboton Singh	Faculty Member	Data collection and compilation	All
2	Dr. Biman Patowary	Faculty Member	Data collection and compilation	All
3	Mr. Pradeep Kumar Dey	Faculty Member	Data collection and compilation	All
4	Mr. Lankeswar Boro	Non-Teaching Staff	Data collection	Energy Audit
5	Mr. Akan Tumung	Non-Teaching Staff	Data Collection	Energy Audit
6	Jubin Rabha	Student	Data collection	Water Audit
7	Simanta Ronghang	Student	Data collection	Environmental Quality Audit
8	Abhoy Bose	Student	Data collection	Health Audit
9	Chinmoy Das	Student	Data collection	Carbon Accounting
10	Mintu Dorjee	Student	Data collection	Carbon Accounting
11	Subham Das	Student	Data collection	Waste Disposal Audit
12	Subham Debnath	Student	Data collection	Water Audit

### 3.3 The Green Audit Process

1. Selection of area/activities/parts of the campus.
2. Planning of visit to campus to discuss about the audit process.
3. Scope of audit process was identified in consultation with the auditee.
4. A meticulous plan of action was designed.
5. A team consisting of teachers, non-teaching staff and students was constituted with specific tasks and a proper time schedule.
6. Data pertaining to identified parameters for green auditing of the campus were collected directly through an on-site visit.
7. Available background information on the identified activities and other parameters were collected.
8. The role of each stakeholder in green related activities has been collected.
9. Historical aspects of green activities in the campus including flora fauna, water usage and waste generation, etc. were collected.
10. A questionnaire based on the preliminary visits and other evaluations was communicated to the authorities who are involved in the in-house data collection.
11. Data collection based on questionnaire.
12. Visit to the campus by audit team.
13. Data analysis and evaluation.
14. Discussion on the findings.
15. Report preparation.

### **3.4 Onsite activities**

1. The preliminary visit and meeting with the campus authorities was the first step between the audit team and auditee.
2. Site inspection for determining parameters for audit.
3. Site visit and evaluation of collected information of the audit team.
4. Meeting with the Principal, teachers, non-teaching staff and students.
5. Meeting with the inhouse audit team for evaluation and clarifications

# Green Audit

### **4.1 Inspection**

The preliminary visit in connection with the pre-audit process to the campus has identified criteria for audit, parameters to be evaluated and time schedule of green audit of Sonapur College. It included meeting with the Principal, teachers in charge of different green activities of the campus and students representing different departments, clubs and fora. This enabled the auditing to gather all necessary preliminary information that is useful in preparing pre auditing questionnaire and data sheets. The on-site audit team collected information based on questionnaire and data sheet.

### **4.2 Evaluation of documents and reports**

The audit visit to the campus evaluated documents and reports (departments, clubs and fora) that are necessary for the audit process. This further strengthened the claims made by the campus authority on green operations in the campus. To generate future action plan, the audit team had a detailed discussion with different in-house team in the institute.

### **4.3 Finding and Analysis**

#### **4.3.1 Water and Wastewater Audit**

##### **4.3.1.1 Background**

At present, the total population (teaching and non-teaching staff and students) of Sonapur College is about 1670. Bureau of Indian standards recommends water requirement as 45L/person/day for day boarding and 135L/person/day for boarding institutions (IS: 1172-1993(2007)). About 60 students are residing in hostels, therefore, total water requirement for the college comes out to be 80,550 L/day. Water availability in the college campus is about 5000L/day. Therefore, the

college is a water deficit college. The main source of water is ground water supply with a deep bore well. Facilities for rain water harvesting with a capacity of 10,000 Litre is also available in the campus. Three overhead storage reservoirs of capacity 2500L are used for distribution of water in the campus. Figure 4.1 shows water storage and distribution system in the college campus. One electric motor is used to pump water to storage reservoirs and from them water is distributed to college building including toilets, canteen and hostel.



Fig. 4.1: Water storage and distribution system

The wastewater from toilet, washroom etc. are connected with drainage lines and finally joins natural streams. There is no system of wastewater treatment and recycling of water.



Fig. 4.2 : Rainwater Harvesting System



### 4.3.1.2 Suggestions

- It is a water deficit college. The water availability should be increased as early as possible. Rain water harvesting has been adopted as one of the mechanisms and water from it has been used in toilets and gardens.
- There is no particular mechanism to find the water wastage. This must be dealt with utmost care without delay and has to be included in the future action plan.
- The college does not have wastewater treatment for wastewater generated from canteen, hostel kitchen, toilets, bathrooms and office rooms and hence not used for gardening. This has to be addressed and suitable action plans have to be evolved.

### 4.3.2 Energy Audit

An assessment of energy consumption, energy sources used, energy management, lighting devices used and other appliances used by the campus community is an important aspect of sustainability of the community. Hence this is a relevant aspect of the assessment. The audit team assessed the number of electrical appliances and their respective uses in terms of consumption of energy per month in KWh. This indicates the energy management of the campus. Based on the assessment we made suggestions and recommendations.

Table No. 2: List of Electrical Appliances used in the College.

Sl. No.	Item Name	Quantity	Power (per unit)	Power Consumed (kW)
1	Ceiling Fan	376	60	22.56
2	Table Fan	3	60	0.18
3	Wall Hanging Fan	2	60	0.12
4	Tube Light	177	20	3.54
5	Bulb	334	10	3.34
6	Computer (Desktop)	70	150	10.50

7	Computer (Laptop)	10	40	0.40
8	Punching Machine	1	50	0.05
9	Sanitizer Machine	2	40	0.08
10	Aqua Guard	6	60	0.36
11	AC Machine	21	2000	42.00
12	Projector Machine	4	60	0.24
13	Music System	1	100	0.10
14	CC Camera	26	200	5.20
15	Air Cooler	1	500	0.50
16	Printer (Computer)	8	50	0.40
17	Xerox Machine	1	1000	1.00
18	Hot Oven	1	1500	1.50
19	Solar Light	2		
20	Solar Inverter	1		
21	Money counting Machine	1	100	0.10
	Grand Total	1048 Nos.		92.17

If we assume that 40% of the appliances run simultaneously for an average duration of 4 hours, then amount of energy consumed per month will be 3686kWh. Out of this, a substantial amount of energy can be generated from solar energy. A small unit of solar plant has already been installed in the campus to lit up certain areas. However, this can be done to generate at least 50% of required energy as green energy, which again contribute immensely to the global climate scenario. Few suggestions are put forward here to conserve energy and increase the use of non-conventional energy.

### 4.3.2.1 Suggestions

- To use motion sensor light in class rooms, veranda and toilets for energy conservation.
- To use CFL bulb and tubes and BEE star rating appliances (For details, please visit <https://beeindia.gov.in/>).
- To organize different events like art competition, lecture series to aware college fraternity about energy conservation.
- Rooftop solar power plant can be installed with subsidy up to 40% from Central Government. For details, please visit <https://solarrooftop.gov.in/> and <https://mnre.gov.in/>.



Fig. 4.3 : Solar power plant

### 4.3.3 Environmental Quality Audit

#### 4.3.3.1 Gardens and Greeneries

Sonapur College is situated in a peri-urban area where farming and agriculture are still being practiced in and around the campus. The college management and authorities who are responsible for greening the campus is aptly adopting methods to preserve local flora and fauna. The botanical garden and different concept-based gardens are ideal for academic practices and learning while practicing.

Students of related subjects are actively involved in gardening, maintenance, etc. of gardens within the campus. Further, they find the garden an apt place for discussions, combined studies, projects, aesthetic

purposes, spending leisure time, etc. Students are learning garden techniques by working in the garden with the help of teachers concerned.

Table 3: List of plants at college campus

Scientific name	Family	Common name	Numbers of each species
<i>Terminalia chebula</i>	Combretaceae	Xilikha	21
<i>Saraca asoca</i>	Fabaceae	Axok (Ashoka)	3
<i>Psidium guajava</i>	Myrtaceae	Modhuriaam (Guava)	5
<i>Cynodon dactylon</i>	Poaceae	Common grass	120
<i>Dahlia pinnata</i>	Asteraceae	Dalia	200
<i>Tagetes sp.</i>	Asteraceae	Marigold (Gendhai)	250
<i>Petunia sp.</i>	Solanaceae	Petunia	200
<i>Artocarpus heterophyllus</i>	Moraceae	Jack fruit (Kathal)	11
<i>Delonix regia</i>	Fabaceae	Krishna sura	27
<i>Mangifera indica</i>	Magnoliaceae	Mango (Aam)	14
<i>Argemone maxicana</i>	Papaveraceae	Mexican prickly poppy	120
<i>Chromolaena sp.</i>	Asteraceae	Siam weed/Bitter bush	2
<i>Phyllanthus niruri</i>	Phyllanthaceae	Bhui aamlokhi	41

Table 4: List of medicinal plants at college campus

Scientific name	Family	Common name	Numbers of each species
<i>Terminalia chebula</i>	Combretaceae	Xilikha	21
<i>Saraca asoca</i>	Fabaceae	Axok (Ashoka)	3
<i>Psidium guajava</i>	Myrtaceae	Guava (Modhuriaam)	5
<i>Artocarpus heterophyllus</i>	Moraceae	Jack fruit (Kathal)	11
<i>Phyllanthus niruri</i>	Phyllanthaceae	Bhui aamlokhi	41

Table 5 : List of plants to be planted at college campus in the next three years. (Trees, vegetables, herbs, etc.)

Trees (Medicinal)	Herbs	Orchids [Orchidaceae]
<i>Azadirachta indica</i> [Meliaceae]	<i>Aloe vera</i> (Liliaceae)	<i>Dendrobium aphyllum</i>
<i>Clerodendrum paniculatum</i> [Verbenaceae]	<i>Rhoeo discolor</i> (Liliaceae)	<i>Rhynchosyilis retusa</i>
<i>Rauwolfia serpentina</i> [Apocynaceae]	<i>Bryophyllum</i> (Crassulaceae)	

<i>Phyllanthus emblica</i> [Phyllanthaceae]	<i>Hydrilla</i> (Hydrocharitaceae)	
<i>Terminalia arjuna</i> [Combretaceae]	<i>Ocimum sanctum</i> (Lamiaceae)	
<i>Cycas</i> [Cycadaceae]	<i>Dracaena</i> (Asparagaceae)	
	<i>Amaranthus</i> (Amaranthaceae)	
	<i>Mirabilis</i> (Nyctaginaceae)	
	<i>Thuja</i> (Cupressaceae)	
	<i>Hibiscus rosa-sinensis</i> (Malvaceae)	
	<i>Adiantum</i> (Pteridaceae)	

#### 4.3.3.2 Awareness Programs

Sonapur College is indulge with many fruitful awareness programs. Staffs and students had participated many awareness programs in past. Reflection from students is evident how effective and their involvement in those programs.

Major programs conducted in the campus were

1. Plantation programme at Sankardev Sishu Vidya Niketan by Sonapur college extension cell.
2. Plantation programme at Jagganath Mondir, Mitoni by NCC 1<sup>st</sup> Battalion, Sonapur College.
3. Cleanliness Drive at Sonapur Public Cremation on Gandhi Jayanti by NSS unit.
4. Swachh Bharat Programme for five Primary Schools on the post Saraswati puja celebration.



Fig. 4.4: Awareness programs on environment

### 4.3.3.3 Air Quality Report

To assess ambient air quality, testing of various air quality parameters were done within the Sonapur College Campus. RDS and ADS sampler were used **for the same**. The sampling location was near the canteen of the college. The weather was a clear and calm and temperature ranging from maximum 27.4°C to minimum 21.4°C. The test results are tabulated in Table 6 below.

Table 6 : Test results on air quality

Sl. No	Parameter	Unit	Result	Limits	Test Method
1	Particulate matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	50	100	IS 5182(23)
2	Particulate matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	34	60	
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	<5	80	IS 5182 (2)
4	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	<5	80	IS 5182 (6)



Fig.4.5: Air quality monitoring

#### 4.3.3.4 Noise Level

The institution is located within a very serene environment covered with lots of greenery. It is approximately 1.5 km away from the busy national highway no. 37 and away from any busy area like markets, busy bus stands and railway station. The location for determining noise level is well inside college campus. The weather condition was calm. Test results are tabulated in Table no. 7 below.

Table 7: Test result on Noise Level

Sl. No	Time	Sound parameter (dBA)		
		Leq	Lmin	Lmax
1	11:58:05 Am to 3:49:40 Pm	54.6	39.2	71.8
Limits	<55 dB(A) Leq as per schedule Ambient air quality standards in respect of Noise. The noise pollution (Regulation and control) Rules,2000			

### 4.3.3.5 Water Quality

Water quality analysis was conducted for the water used by all types of population of Sonapur College. For this purpose, tap water was collected from canteen as test sample in sealed container. The source of water was ground water. The results of the test are shown in Table No. 8 below.

Table 8: Test result on water quality

Sl. No.	Description	Method	Unit	Results	IS-10500:2012	
					Acceptable limit	Permissible Limit in the absence of alternative source
1.	Alkalinity	IS 3025 part 23 1986(RA: 2019)	mg/l	<1	200	600
2.	Calcium	IS 3025 part 40 1991(RA: 2014)	mg/l	2	75	200
3.	Chloride	IS 3025 part 32 1988(RA: 2014)	mg/l	<2	250	100
4.	Chromium	IS 3025 part 52 2003(RA: 2014)	mg/l	<0.05	0.05	No relaxation
5.	Colour	IS 3025 part 4 1983(RA: 2017)	Hazen	1	5	15
6.	Conductivity	IS 3025 part 14 1984(RA: 2013)	µs/cm	0.16	–	–
7.	Copper	IS 3025 part 42 1992(RA: 2014)	mg/l	<0.05	0.05	1.5
8.	Iron	IS 3025 part 53 2003(RA: 2014)	mg/l	0.10	0.30	No relaxation
9.	Lead	IS 3025 part 47 1994(RA: 2014)	mg/l	<0.01	0.01	No relaxation
10.	pH	IS 3025 part 11 1983(RA: 2017)	–	6.58	6.5-8.5	No relaxation
11.	Sulphate	IS 3025 part 24 1986(RA: 2019)	mg/l	5	200	400
12.	TDS	IS 3025 part 16 1984(RA: 2017)	mg/l	118	500	2000
13.	Turbidity	IS 3025 part 10 1984(RA: 2017)		<1	1	5
14.	Hardness	IS 3025 part 21 2009 (RA: 2019)	mg/l	36		
15.	Temperature		°C	22.5		
16.	Total coliform	HiMedia Kit	MPN/100ml	Absent	Absent	Absent
17.	E. coil	APHA 23 <sup>rd</sup> Edition ;2017	MPN/100ml	Absent	Absent	Absent

\*AS PER ANNEXURE 1



### 4.3.3.6 Solid Waste Management

The solid waste generated in the campus including hostel and canteen are segregated into bio-degradable, recyclable and non-recyclable category. Recyclable and non-recyclable category is collected by municipal garbage collector, while bio-degradable wastes go to a composting plant. The vermicompost product is used for the plants within the campus. Sanitary napkin incinerator has been installed in ladies staff bathroom, library and girls' common room.



**Fig. 4.6: Composting plant and Sanitary Napkin Incinerator.**

### 4.3.3.7 Suggestions

Environmental parameters related to water, air and noise are well within the prescribed limit. The college authority is doing good work in management of solid waste. The college management shall draw up such action plans which keeps this environmental condition always in good conditions. Few of them may be

- To hold plantation programs in conjunction with various environmental programs like world environment day etc.
- To hold environmental awareness programs amongst students and staff periodically.
- To sign MoUs with various government organizations and NGOs to work for sustainable development goals.

- Issues related to environmental awareness and climate change may be dissipated to the nearby villagers by organizing awareness camps.

#### 4.3.4 Health Audit

The Sonapur College is located near to many medical facilities like Apollo Diagnostics, Guwahati Psychiatric hospital, Kamarkuchi Sub Hospital, Sonapur block PHC and District Hospital, Kamrup. Presence of this much of health institutions around the college makes health facilities accessible as soon as possible. The college and the surrounding is clean and no finding of stagnant water from where disease like Malaria, Dengue and Japanese Encephalitis could cause health hazard. Water quality also as per drinking requirement and no finding of any hazardous mineral and contamination. As per data and consultation with nearby people there was no record of health hazard.

#### 4.3.5 Carbon Accounting

It is a measure of release of carbon (CO<sub>2</sub>) emission from an organisation. It is also called as “**Carbon Footprint**”. This includes direct power usage (from fuel-Powered sources) fuel-Powered transport (haulage and travel). The “Wider footprint” may include waste and recycling policy, Carbon saving arrangement with supply chain partners, carbon saving arrangement with employees. However, detail carbon accounting is beyond the scope of this study.

**Table No. 9: Carbon emitting sources**

<b>Item/ Work</b>	<b>Number of Carbon sources</b>	<b>Running hour/distance (average per person)</b>
Power generating Unit	01	1.0 hour
College transport	00	00
Public transport	1250 persons	18 km

Waste and Recycling Policy	Nil	
Private vehicle (4 wheeler)	27 (1250cc)	50 km
Private vehicle (2 wheeler)	56 (110cc)	20 km
Hostels/Canteens	2.8 Kg LPG/Day	
Other fossil fuel	12L/day	

Carbon emission from the college campus seems to be very low. Moreover, concentrations of other indirect greenhouse gases in ambient air are very low (ref. Table no.5)

#### 4.3.5.1 Suggestions

1. Plant more trees to absorb GHGs.
2. Encourage stakeholders/students/teachers/non-teaching staff of the college to reduce the quantity of fuel used by using bicycle, public transport etc.
3. College should take initiative to encourage students to respect environment and conserve it through plantations. Increasing plantation area also helps in reducing the Carbon dioxide emission.

## Recommendations

### 5.1. General recommendations

1. All the lists of plants shall be uploaded in the college site.
2. There shall be a digital platform where students and staff shall get details about plants in the campus. This may include name, information as per standard classifications, usage, value, further references, etc.
3. The name boards shall be updated with QR code technology that enable the students and staff to scan the QR code to access relevant information of the taxa.
4. There shall be a discussion forum in the campus where discussion on green activities conducted by students, alumni, staff, etc. are undertaken and the moderator of the group shall update the information in the digital repository accordingly.
5. Students and staff shall take initiative to start live campus discussion groups where green conservation and awareness shall be the main agenda.
6. The deliberations shall be shared among students and other stakeholders through campus/social media.

### 5.2. Water Management

1. Strengthening awareness on water conservation among student and teacher communities.
2. Observe 'world water day' on March 22nd with different programmes (cycle rally, street play, flash-mob, poster, elocution etc. can be conducted).
3. 'Save Water' posters to be affixed in the classrooms, hand washing areas.
4. Repair water leaks and leaky toilets (if any) immediately.
5. Install automatic shut-off devices on faucets.
6. Set up an efficient water recycling system in the college canteen.
7. Regular maintenance is required for storage and service reservoirs.

### **5.3 Energy Management**

1. The on grid solar power plant can bring down electricity costs and might prove to bring in financial benefits in the long run. Being at a relatively high lying area of the town, there would be no issues with sunshine, particularly in summer.
2. Gradual replacement of existing non-LED based lights to LEDs can further bring down costs for lighting.
3. Replacement of existing electric fans with BLDC (Brushless Direct Current Motor) fans can significantly reduce power consumption and help in a good reduction in electricity charges.
4. Organize different events like art competition, lecture series to aware college fraternity about energy conservation.

### **5.4 Environmental Management**

1. Increase the green coverage of the college campus.
2. Awareness programs on environmental conservation should be held more frequently and preferably include all stake holder of the college.
3. Avoid unnecessary burning and combustion within the college campus.

### **5.5 Health Management**

1. Take appropriate safety measures for the students while doing laboratory work.
2. Periodic health camps should be organised particularly for girls students.

### **5.6 Carbon Emission**

1. Plant more trees to absorb GHGs. World Environment Day should be observed with campus plantation program.
2. Encourage students/teachers/non-teaching staff of the college to use bicycle or public transport to reduce carbon emission.

## Future Action Plans

1. Year wise internal audit on green, water and energy to be conducted by respected teachers.
2. Proper management and month wise mapping of water and energy usage to be conducted by monitoring the same in the records.
3. Department wise awareness programs to be organised by department staff representative to each committee.
4. Proper water and wastewater management policy should be adopted.
5. Proper monitoring and disposal of solid and liquid waste discharge.
6. Implementation of sign boards and indications of water and energy usage.
7. Vegetable and tree plantation has to be increased using advanced technologies.
8. Installation of solar power plants.

The students and staff who are active in green related activities have a clear vision about how and what should be planned for a greener campus. They think that planting of more saplings during the world environment day would create more awareness and enthusiasm in students who join afresh each year. The college is also planning to initiate plant a tree/adopt a tree program where each student will be planting a sapling and taking care of it during his or her stay in the college. Although the college follow a university curriculum by implementing several such awareness program in their academic and non-academic activities, promote more students to turn to green activist.

## Conclusion

1. The administration and other authorities are eager to turn the campus into a green campus.
2. Sonapur College facilitates learning through a hands-on approach. This is accomplished by establishing various types of gardens, an arboretum concept-based garden, and water and energy conservation.
3. Staff and students are aware of the institute's social responsibility.
4. Green auditing sometimes causes campus authorities to understand the impact of implications for greenness and water and energy conservation.
5. The evaluation process demonstrated that the authorities implemented the recommendations made in the previous audit.
6. The campus community functions are oriented with an eco-friendly approach, allowing the student community to develop a genuine approach to nature conservation and natural resource management.
7. The findings presented in this report will assist authorities in developing future action plans to incorporate more sophisticated ideas in future efforts to conserve biodiversity, water, and energy.
8. We, the Audit team, are submitting the comprehensive audit report to the Sonapur College Campus authorities. We hope that the audit findings will assist them in implementing a better management plan to achieve a completely green campus and save as much water and energy as possible for a better future.

# Annexure



## গ্ৰীণটেক এনভাইৰনমেন্টেল ইঞ্জিনিয়াৰ এণ্ড কন্সালটেন্টছ GREEN TECH ENVIRONMENTAL ENGINEER & CONSULTANTS

House No-11, Champkragar, Narsyan Path, Bhatapara, Guwahati-781028. www.greentecheec.in  
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TC-5591

Formet No.: GEEC/FM48

### TEST REPORT

ULR Number: TC599121000001078F					
Test Report No.:	GEEC/FL/22/2021/12/11	Date:	23/12/2021		
Customer Name	Sonapur College	Lab. ID No.:	GEEC/AA/2021/12/11		
Address:	Sonapur College, P.O. Sonapur, Kamrup (M), Pin-782402	Date of Sampling:	18/12/2021		
Sampling Location:	Near Canteen	Ambient Temperature:	Max.	Min.	
Weather Condition:	Calm and Clear		27.4°C	11.4°C	
Sampling Condition:	In GF/A, PTFE Filter Paper & Plastic Bottle	Date of Sample Receipt:	18/12/2021		
Monitored By:	Mr.Dilip Kr Deka	Test Start Date:	20/12/2021		
Equipments Details:	RDS & ADS Sampler	Test End Date:	21/12/2021		
AMBIENT AIR QUALITY					
Sampling and Analysis carried out as per GEEC/SOP/01					
Sl. No.	Parameters	Unit	Results	Limits	Test Method
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	50	100	IS 5182(23)
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	34	60	GEEC/SOP/01 USEPA FRM 40CFR
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	< 5	80	IS 5182(2)
4	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	< 5	80	IS 5182(5)
*****End of Report*****					
Checked by:  Dr. Belinda Lahon Quality Manager				Reviewed by:  Pranjal Buragohain Authorised Signatory	

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PAGE 1 of 1





**ADS Sampler**



**RDS Sampler**

AMBIENT AIR MONITORING



গ্ৰীনটেক্ এনভাইৰনমেন্টল ইঞ্জিনিয়াৰ এণ্ড কন্সালটেন্টছ  
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TC-5991

Format No: GEEC/FM/47/B

ULR No: TC599121000001080F				
Report No:GEEC/FL/22/SLM/2021/12/15		Date:	23/12/2021	
Name of the Industry	Sonapur College	Lab Id:	GEEC-NLM/2021/12/15	
Address:	Sonapur College, P.O. Sonapur, Kamrup (M), Pin-782402			
<b>Noise Level Report</b>				
Monitoring Location	College Campus	Date of Monitoring:	18/12/2021	
Weather / Wind	Calm	Sound Level Meter Model	4023 SD	
Monitored by:	Mr.Dilip Kr. Deka	Sl.No.	Q656054	
Measurement Results				
Sl. No.	Time	Sound Parameters (dBA)		
		Leq	Lmin	Lmax
1	11:58:05 AM to 3:49:40 PM	54.6	39.2	71.8
Limits	< 55 dB(A) Leq as per SCHEDULE (see rule 3(1) and 4(1)) Ambient Air Quality Standards in respect of Noise THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000			
Checked by:			Reviewed by:	
Dr. Beinda Lahon Quality Manager			Pranjal Buragohain Authorised Signatory	

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Page 01/01



## NOISE LEVEL MONITORING



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Formal No: GEECFM/50

## TEST REPORT

ULR NO: TC599121000001079F			
Ref. No: GEEC/FL/23/2021/12/27		Date of Reporting:	23/12/2021
Customer Name	Sonapur College	Lab. ID No:	GEEC/WS/ 2021/12/27
Customer Address:	Sonapur College PO Sonapur, Kamrup (M) PIN 782402	Date of Sampling:	18/12/2021
Sampling Location:	Wash Basin Tap of Canteen	Sample Receipt Date:	18/12/2021
Sample Description:	Ground Water	Test Start Date:	18/12/2021
Sample Drawn By:	Mr. Dilip Deka	Test Completion Date:	23/12/2021
Sample Condition:	Sealed	Sampling Method:	GEEC/SOP/02

Sl. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	Alkalinity	IS 3025 Part 23 1988(RA:2019)	mg/l	< 1	200	600
2	Calcium	IS 3025 Part 40 1991(RA:2014)	mg/l	2	75	200
3	Chloride	IS 3025 Part 32 1988(RA:2014)	mg/l	< 2	250	100
4	Chromium	IS 3025 Part 52 2003(RA:2014)	mg/l	< 0.05	0.05	No relaxation
5	Colour	IS 3025 Part 4 1983(RA:2017)	Hazen	1	5	15
6	Conductivity	IS 3025 Part 14 1984(RA:2013)	µs/cm	0.16	-	-
7	Copper	IS 3025 Part 42 1992(RA:2014)	mg/l	< 0.05	0.05	1.5
8	Iron	IS 3025 Part 53 2003(RA:2014)	mg/l	0.10	0.30	No relaxation
9	Lead	IS 3025 Part 47 1994(RA:2014)	mg/l	< 0.01	0.01	No relaxation
10	pH	IS 3025 Part 11 1983(RA:2017)	-	6.58	6.5 - 8.5	No relaxation
11	Sulphate	IS 3025 Part 24 1986(RA:2019)	mg/l	5	200	400
12	TDS	IS 3025 Part 16 1984(RA:2017)	mg/l	118	500	2000
13	Turbidity	IS 3025 Part 10 1984(RA:2017)	NTU	< 1	1	5

End of Report

Checked by:

*Blahon*

Dr. Belinda Lahon  
Quality Manager



Reviewed by:

*Pranjal Buregochain*  
Mr. Pranjal Buregochain  
Authorised Signatory

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Format No.: GEEC/FM50

**TEST REPORT**

Ref. No.: GEEC/MISC/WS/2021/12/27	Date of Reporting:	23/12/2021
Customer Name: Sonapur College	Lab. ID No.:	GEEC/WS/ 2021/12/27
Customer Address: Sonapur College PO Sonapur, Kamrup (M) PIN 782402	Date of Sampling:	18/12/2021
Sampling Location: Wash Basin Tap of Canteen	Sample Receipt Date:	18/12/2021
Sample Description: Ground Water	Test Start Date:	18/12/2021
Sample Drawn By: Mr. Dilip Deka	Test Completion Date:	23/12/2021
Sample Condition: Sealed	Sampling Method:	GEEC/SOP/02

Sl. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	Hardness	IS 3025 Part 21 2009 (RA:2019)	mg/l	36	200	600
2	Temperature	---	°C	22.5	---	---
3	Total coliform	HiMedia Kit	MPN/100ml	Absent	Absent	Absent
4	E. coli	APHA 23rd Edition, 2017	MPN/100ml	Absent	Absent	Absent

\*\*\*\*\* End of Report \*\*\*\*\*

Checked by  Dr. Belinda Lahon Quality Manager		Reviewed by  Mr. Pranjal Buragohain Authorised Signatory
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