GREEN AND ENVIRONMENT AUDIT REPORT

[2021 – 2022]

FOR

SILAPATHAR COLLEGE

SILAPATHAR, DHEMAJI-787059, ASSAM, INDIA

AFFILIATED TO DIBRUGARH UNIVERSITY, ASSAM

Conducted By

ENVIRO-TESTING-SERVICES

BIJAY NAGAR, NOONMATI, GUWAHATI-781020, ASSAM

AUGUST-2022

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01	*28-08-2022*	***Issued For*** **Silapathar College Silapathar, Dhemaji-787059, Assam, India**	ENVIRO TESTING SERVICES ★ GUWAHATI, ASSAM ★
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ETS-GUWAHATI
ENVIRO-TESTING-SERVICES
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We would like to convey our sincere thanks to all the Heads of the various Departments of Silapathar College for giving us necessary inputs to carry out this very vital exercise of Green Audit.

Our special thanks go to the faculty of Silapathar College:

Dr. Upen Deka, Department of Botany

Dr. Upasana Barthakur, Department of Chemistry

Dr.Merina Narah, Department of Zoology

Dr.Abdul Mutalib, Department of Sociology

Dr.Junali Chetia, Department of Botany

Mr. Kalyan Malakar, Department of Physics

We are also thankful to other staff members who were actively involved while collecting the data and conducting field survey

For Enviro Testing Services

Date: 28.08.2022

(Dr. Hrishikesh Sarma)
Ex. Director, ETS, Guwahati

Contents

1.0 Introduction of the Institute

1.1 Brief Introduction

The Silapathar College was established in 1979 as a result of concerted efforts made by generous local public who were led by a group of academically ambitious leaders. It is the second oldest college in the district of Dhemaji. The history of establishment of institutions for higher learning in the district of Dhemaji, in fact, began with the inception of Dhemaji College followed by Silapathar College. It is located in the heart of the rapidly growing small township of Silapathar which is surrounded by villages of tribal and backward communities. Thus, the college pledges to underline its target groups at the young men and women belonging to economically poor and socially excluded section of the society. The college, thus, established with the goal of spreading the web of higher education in geographically northern Assam, has been endlessly attempting to provide quality education to the young generation. The world is undergoing rapid changes in every perceivable aspect and as such the college believes that the need of the hour is to create human resource that is able to keep track with latest developments in academics by develop a humanitarian outlook as well. The college understands that the major life blood of any educational institution is the teaching-learning process. Without dedicated and well trained teachers and enthusiastic students the process can never be interesting and fruitful. The college at present has two streams both Arts and Science (The Science Stream was introduced from the Academic Session 2020 – 2021 onwards by the creation of newly sanctioned post, Govt. of Assam) in the undergraduate level. The college follows the syllabus and curriculums of the Assam Higher secondary Education Council (A.H.S.E.C.) and Dibrugarh University. The institution is permanently affiliated to the Dibrugarh University. It was brought under deficit system of grant-in-aid in 1992 and was subsequently provincialised in 2005 by the Government of Assam. The college registered under 2(f) and 12(b) of UGC Act 1956 was first accredited by NAAC in 2005 with ‘B’ Grade. It applied for Re-accreditation and accordingly, the college was accredited and awarded Grade with 2.62 points (CGPA) in the month of November, 2015

1.2 Location of the College Campus

Location	:	Urban
Campus Area	:	46208.10 sq. mts
Built Up Area	:	7561.16 sq.mts

1.3 Student, Teacher & Employees Strength

Total No of Students	:	1406
Total No of Teachers	:	39
Total No. of Non Teaching staff	:	09

2.0 Brief Outlines of Green Audit

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of organization. It aims to analyse environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere.

Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more predominant. The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises.

On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO_2 from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher

Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

3.0 Objective of Green Audit

(i) Landuse & Built-up Environment

(ii) Geographical Location with Campus Map

(iii) Present status of Ambient air, Noise, Soil quality and Water quality

(iv) Illumination Study

(v) Floral and Faunal diversity

(vi) Management Practices with respect to Water, Waste and Energy

(vii) Carbon footprint

(viii) Organizational Level Efforts

4.0 Methodology

Methodology includes

(i) Physical inspection of the campus

(ii) Collection of Primary & Secondary Data

(iii) Observation and review of the documentation

(iv) Data analysis

5.0 Objective wise Analysis

5.1 Landuse & Built-up Environment

. It encompasses area about 46208.10 sq. mts. Total built-up area is 7561.16 sq.mts. out of the total 46208.10 sq. mts of the campus. Both Assam type and multi-storied RRC construction are found within the campus. The water bodies inside the college campus covering an area of about 858 sq mts. provide support in maintaining a good ecological habitat for a wide variety of flora and fauna. The presence of garden inside the campus augments the aesthetic value of the college.

Physical Structure

Sl no.	Name of building	Length	Breath	Total (Sq. meter)
1	Old Indoor Stadium	17	13.15	223.55
2	IQAC and Education department	20.9	16	334.4
3	College Canteen	12.19	16.15	196.86
4	Multy Gym			409.79
5	Drinking water	6.37	6.37	40.57
6	Union room	8.2	4.6	37.72
7	Cycle stand	21.76	3.13	68.10
8	Car parking	4.3	23.8	102.34
9	Practical room	22.2	7.8	173.16
10	Teacher's Toilet (Ladies)	3.07	3.59	11.02
11	Administrative Building P-1	36.57	10.48	383.25
12	Computer lab	20	7.92	158.4
13	Class room	113.1	8.2	927.42
14	Lavatory Female	5.8	2.6	15.08
15	Lavatory Male	6.8	2.6	17.68
16	Tribal study	17.8	7.1	126.38
17	New Indoor Stadium	21.1	30.3	639.33
18	Department RCC2	19.6	9.6	188.16
19	VP Office	6	9.6	57.6
20	Departmental room	14.1	9.6	57.6
21	Old library building	17	7.8	132.6
22	Women hostel	48.3	14.8	714.84
23	Gandhi statue	4.87	5.18	25.22
24	New indoor stadium front area	12.6	16	201.6
25	New Girls hostel	16.8	8.53	143.304
26	New car parking	24.71	7.1	175.44
27	Science block	45.6	9.82	447.792
28	Campus Development			1474.16
			Grand total	**7561.16**

5.2 Geographical Location with Campus Map

The geographical coordinates of Silapathar are 27.594^0 latitude, 94.724^0 longitude, and 390 ft elevation. The topography within *2 miles* of Silapathar is *essentially flat*, with a maximum elevation change of *82 feet* and an average elevation above sea level of *382 feet*. Within *10 miles* is *essentially flat (2,579 feet)*. Within *50 miles* contains *large* variations in elevation *(11,037 feet).* The area within *2 miles* of Silapathar is covered by *cropland (100%),* within *10 miles* by *cropland (66%)* and *trees (20%),* and within *50 miles* by *cropland (43%)* and *trees (40%).*

Silapathar College is situated at Dhemaji district of Assam, within the geo-position latitude 27.591668^0 longitude 94. 726609^0

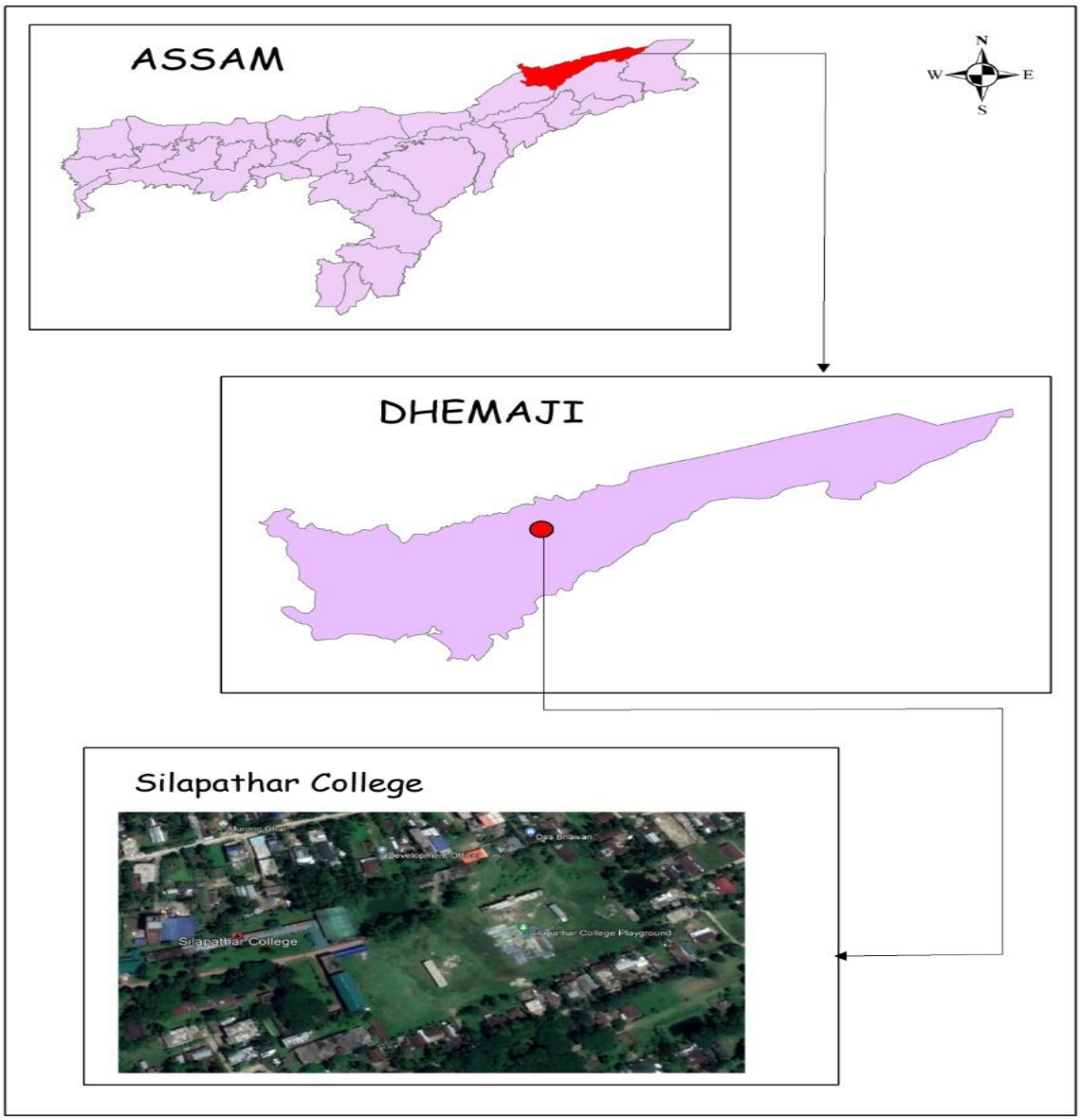


Fig 2: Map of the Silapathar College campus

Glimpses of Silapathar College

5.3 Present status of Ambient air, Water quality and Soil Quality

5.3.1 Ambient Air Quality

The average results obtained in the month of November 2021 at Lakhimpur are presented in Tables 2. All the results meet the National Ambient Air Quality (NAAC) standards.

Table 2: Results of Ambient Air Quality

AMBIENT AIR QUALITY						
Duration (24 Hour)			Average			
S/N	Parameters	Unit	Concentration	Limit	Weather Condition*	Test Method
1	Particulate Matter (PM10)	µg/m^3	58.4	100	Clear	IS5182(23)
2	Sulphur Dioxide (SO_2)	µg/m^3	7.6	80		IS5182(2)
3	Nitrogen Dioxide(NO_2)	µg/m^3	12.7	80		IS5182(vi)

5.3.2 Drinking Water Quality

Water samples were collected from various sources of Silapathar College such as Surface Water (SW) from the Pond, Ground Water from the Tube Well (GW) and Drinking water from Running Tap (TW).

Water Quality Source	GPS Co-ordinate
Tap water	N 27°35'30.95" E 94°43'35.94"
Pond water	N 27° 35'30.29" E 94°43'35.9"
Tube well water	N 27° 35'30.89" E 94°43'35.96"

Results of analysis of the most relevant water quality parameters are given in Tables 4. The test method for all the parameters along with tolerance limit as suggested by IS-10500 is presented in Table 3. All the parameters with respect to surface water, ground water and tap water are found to be within the tolerance limit as suggested by IS: 10500.

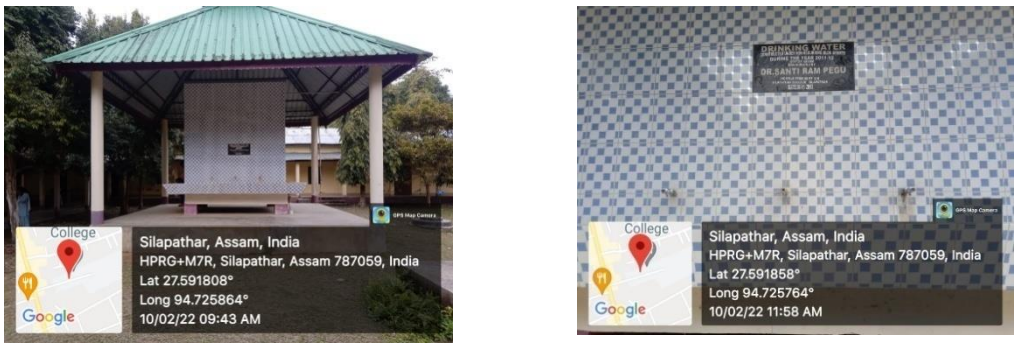
Table 3: Various Test Methods of Water Quality Monitoring at Silapathar College

S/N	Parameters	Test Methods	IS-10500
1	Odour	APHA 20th Edition, 2150 B	Unobjectionable
2	Temperature (^{0}C)	Thermometry Method	50
3	Turbidity (NTU)	APHA 20th Edition, 2130B	5
4	pH	APHA 20th Edition, 4500-H+B	6.5 – 8.5
5	Conductance (mS/cm)	APHA 20th Edition, 2510B	-
6	Total Dissolved Solid (mg/L)	APHA 20th Edition, 2540 B	500
7	DO	APHA 20th Edition, 4500 C	6.0
8	Free CO_2	APHA 20th Edition, 4500 CO_2 C	-
9	Salinity (mg/L)	APHA 20th Edition, 2520 B	250
10	Chloride (mg/L)	APHA 20th Edition, 4500-Cl-B/D	250
11	Hardness (mg/L)	APHA 20th Edition, 4500-Cl-B	0.2
12	Iron (mg/L)	APHA 20th Edition, 3111 B	0.3
13	Arsenic	APHA 20th Edition, 3112 B	0.01

Drinking water facilities at Silapathar College

Table 4: Results of Water Quality Monitoring at Silapathar College

S/N	Parameters	Unit	SW1	GW2	TW3
1	Odour	--	NS	NS	NS
2	Temperature (^{0}C)	^{0}C	15	17	16
3	Turbidity (NTU)		25	<10	<10
4	pH	-	8.2	6.4	7.6
5	Conductance (mS/cm)	µS/cm	33	139.2	142
6	Total Dissolved Solid (mg/L)	mg/L	140	80.2	67.7
7	DO	mg/L	6.3	2.1	3.3
8	Free CO_2	mg/L	4.3	3.2	3.4
9	Salinity	mg/L	68	62	83
10	Chloride (mg/L)	mg/L	20	10	10
11	Hardness (mg/L)	mg/L	105	120	75
12	Iron (mg/L)	mg/L	0.2	0.05	0.05
13	Arsenic	mg/L	<0.001	<0.001	<0.001



Various drinking water facilities at Silapathar College

5.3.4 Quality of Soil in the Study Area

Soil samples were collected from 3 different locations of the study area such as follows.

Sl. No.	Soil Collection site	GPS Co-ordinate
[S1]	Proposed Botanical garden	N 27°35'30.95" E 94°43'35.94"
[S2]	Arts building	N 27°35'30.95" E 94°43'35.94"
[S3]	Pond water area	N 27° 35'30.29" E 94°43'35.9"

It was analyzed for the most relevant physical and chemical parameters. It may be noted from the results of analysis that many of the soil samples have acidic pH . The presence of N, P, K and organic matter content is considerable for all the locations.

Table 5: Results of Soil Quality Monitoring at Silapathar College

S/N	Parameters	[S1]	[S2]	[S3]
1	PH (1: 2)	6.7	5.9	5.8
7	Nitrogen (Kg/Ha)	702	623	278
8	Potassium (Kg/Ha)	262	141	228
12	Phosphorous (Kg/Ha)	61.5	51.3	11.5
13	Organic Carbon (%)	2.11	1.87	0.84

5.4 Floral and Faunal diversity

5.4.1 Floral Biodiversity

The survey was conducted in the month of February and March 2021 following the Quadrat sampling procedure. In the study area the vegetation is a complex of plant communities with considerable diversities. Since the plants showed normal and very good growth, there appears to be no adverse environmental factors prevailing in the area.

Plants of all types, in general, showed healthy and luxuriant growth in terrestrial, aquatic and aerial habitats in the study areas. Leaf diseases (leaf spot and shot-holes) on the aerial parts of the plants were very infrequently observed and did not show any adverse effect on the growth of the plants.

In this present study, different types of flora along with the total of species of the respective flora identified in the college campus are as follows.

Different types of flora		Total number of species
Tree	:	49
Shrubs	:	08
Herbs	:	26

Tree species:

During the survey, 49 species belonging to 44 genera and 34 families were recorded from the Silapathar College Campus. Of these species, monocotyledons are represented by 5 species under 4 genera and 2 families while dicotyledons are represented by 44 species under 40 genera and 32 families. *Ziziphus jujuba* and *Polyalthia longifolia* are the dominant species among the dicotyledonous plants and *Bambusa pallusida* and *Areca catechu* are the dominant species among the monocotyledons plants. List of tress are presented in Table- 6

Table 6 : List of Trees

Sl. No	Scientific name of the plant species	Local Name	Family	No. of Indivisual	Habit
1	*Alstonia scholaris* (L.) R.Br	Chationa	Apocynaceae	10	Dicot
2	*Areca catechu* L.	Tamul	Arecaceae	6	Monocot
3	*Artocarpus chama* Buch-Ham.	Chamkothal	Moraceae	2	Dicot.
4	*Artocarpus heterophyllus* Lamk.	Kothal	Moraceae	1	Dicot
5	*Aurocaria heterophylla*	Christmas tree	Araucariaceae	6	Dicot
6	*Azadirachta indica* A.Juss.	Moha-neem	Meliaceae	3	Dicot
7	*Bambusa pallida* Munro.	Bijuli Baah	Poaceae	153	Monocot
8	*Bambusa tulda* Roxb.	Jati Baah	Poaceae	86	Monocot
9	*Bauhinia variegat*a L.	Boga Kanchan	Caesalpiniaceae	2	Dicot
10	*Bischofia javanica* Bl	Urium	Euphorbiaceae	1	Dicot
11	*Brunfelsia pauciflora*	Brunfelsia	Solanaceae	1	Dicot
12	*Callistemon citrinus*(Curtis) Stapff.	Bottle brush	Myrtaceae	1	Dicot
13	*Michelia champaca*	Titachopa	Magnoliaceae	1	Dicot
14	*Canarium strictum* Roxb.	Dhuna gos	Burseraceae	3	Dicot
15	*Cassia fistula* L.	Sonaru	Caesalpiniaceae	1	Dicot
16	Caesalpinia pulcherima	Radhachura	Caesalpiniaceae	2	Dicot
17	*Citrus grandis* (L.) Osbeck	Robab tenga	Rutaceae	1	Dicot
18	*Cocos nucifera* L.	Narikol	Arecaceae	2	Monocot
19	*Dalbergia sisso* Roxb.	Sisso	Papilionaceae	1	Dicot
20	*Delonix regia* (Bojr.) Raf.	Krishna sura	Caesalpiniaceae	3	Dicot
21	*Dillenia indica* L.	Ow tenga	Dilleniaceae	1	Dicot
22	*Ehretia acuminata* R.Br	Gowal	Ehretiaceae	2	Dicot
23	*Elaeocarpus floribundus* BI.	Jolfai	Elaeocarpaceae	1	Dicot
24	*Ficus racemosa L.*	Dimoru	Moraceae	3	Dicot
25	*Ficus religiosa* L.	Aahot	Moraceae	1	Dicot
26	*Gmelina arborea* Roxb.	Gomari	Verbenaceae	8	Dicot
27	*Grevillea robusta*	Silver oak	Proteaceae	1	Dicot

	A.Curn.ex.R.Br.				
28	*Hibiscus mutabilis* L.	Stala padma	Malvaceae	1	Dicot
29	*Lagerstroemia speciosa* (L.) Pers.	Ajar	Lythraceae	4	Dicot
30	*Litchi chinensis* Sonner	Litchi	Sapindaceae	1	Dicot
31	*Litsea monopepetala* (Roxb.) Pers	Sowalu	Lauraceae	2	Dicot
32	*Macaranga indica Wight.*	Jagalu	Euphorbiaceae	14	Dicot
33	*Mangifera indica* L.	Aam	Anacardiaceae	1	Dicot
34	*Mesua ferrea* L.	Nahor	Clusiaceae	25	Dicot
35	*Mimusops elengi* Roxb.	Bokul	Sapotaceae	12	Dicot
36	*Moringa oleifera* Lamk.	Sajina	Moringaceae	1	Dicot
37	*Neolamarkia cadamba* Miq.	Kadom	Rubiaceae	9	Dicot
38	*Persea bombycina* (King ex Hoof.f)	Chom	Lauraceae	1	Dicot
39	*Phyllanthus emblica* L.	Amlokhi	Euphorbiaceae	1	Dicot
40	*Polyalthia longifolia* (Sonner) Thw.	Debodaru	Annonaceae	61	Dicot
41	*Pongamia glabra* Vent.	Koros	Papilionaceae	10	Dicot
42	*Psidium guajava* L.	Modhuri aam	Myrtaceae	1	Dicot
43	*Roystonea regia* (Kuntez. O.F.Cook)	Royal palm	Arecaceae	1	Monocot
44	*Samanea saman* (Jacq.) Merr.	Siris	Mimosaceae	12	Dicot
45	*Tectona grandis* L.f	Chegun	Verbenaceae	16	Dicot
46	*Terminalia arjuna* (DC) W.&A	Arjun	Combretaceae	8	Dicot
47	*T. chebula* Retz.	Hilikha	Combretaceae	4	Dicot
48	*T. myriocarpa* Heurck et Muell.	Holokh	Combretaceae	2	Dicot
49	*Ziziphus jujuba* Lamk.	Bogori	Rhammnaceae	109	Dicot
Total number of individuals of all the plant species				**599**	

Shrub Species:

During the survey, 8 species belonging to 5 genera and 5 families were recorded from the Silapathar College Campus. Among the plant species, *Clerodendrum serratum* and *Murrya paniculata* are the dominant species among the dicotyledonous plant (Table:7)

Table 7: List of Shrubs

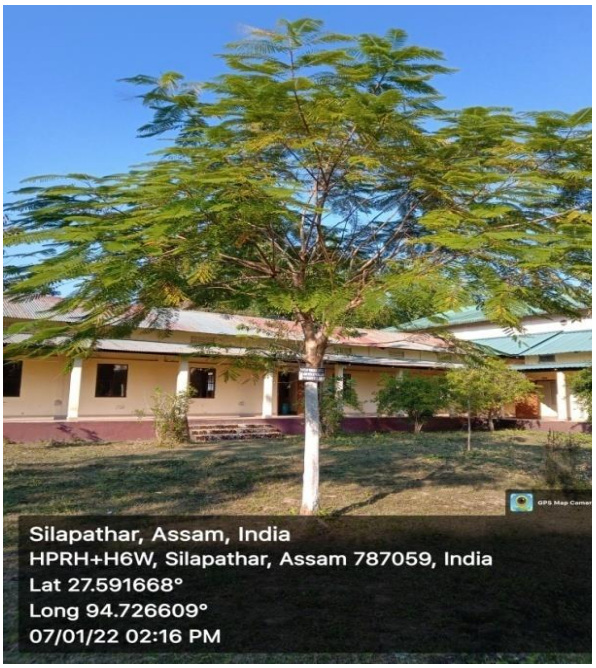
Sl. No	Scientific name of the plant species	Local Name	Family	No. of Individual	Habit
1	*Asclepias curassavica* L.	Vadoi tita	Asclepiadaceae	2	Dicot
2	*Clerodendrum colebrookianum* Walp.	Nefafu	Verbenaceae	2	Dicot
3	*C.viscosum* Vent.	Dhopat tita	Verbenaceae	9	Dicot
4	*C. serratum* (L.) Spreng	Nangol bhonga	Verbenaceae	14	Dicot
5	*Hibiscus rosa sinensis L.*	China rose	Malvaceae	1	Dicot
6	*M. paniculata* (L.) Jack	Kaminikanchan	Rutaceae	13	Dicot
7	*Murrya koenzii* (L.) Spreng	Narasingha	Rutaceae	6	Dicot
8	*Tabernaemontana diveericata* (L.) R.Br.	Kathonda	Apocynaceae	1	Dicot
Total number of individuals of all the plant species				**48**	

Herb Species:

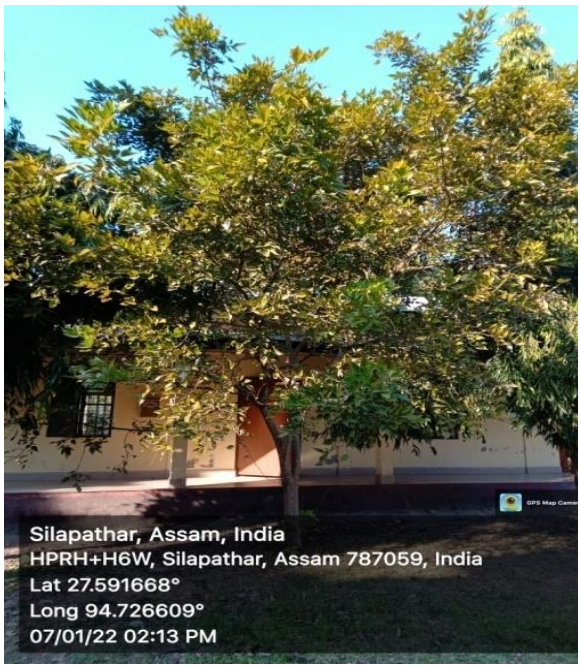
College campus possesses 28 species of herbs including 26 genus and 20 families. Most of the plant *Hydrocotyle sibthorpioides, Ocimum scantum, Oxalis corniculata, Paedaria scandens* and *Curcuma aromatic* have medicinal and aromatic properties that can be used to cure several diseases. Not only herbs several tree species found inside the college campus such as *Azadirachta indica, Terninalia chebula,T. arjuna, Phyllanthus emblica* have great medicinal properties.

Table 8 : List of Herb Species

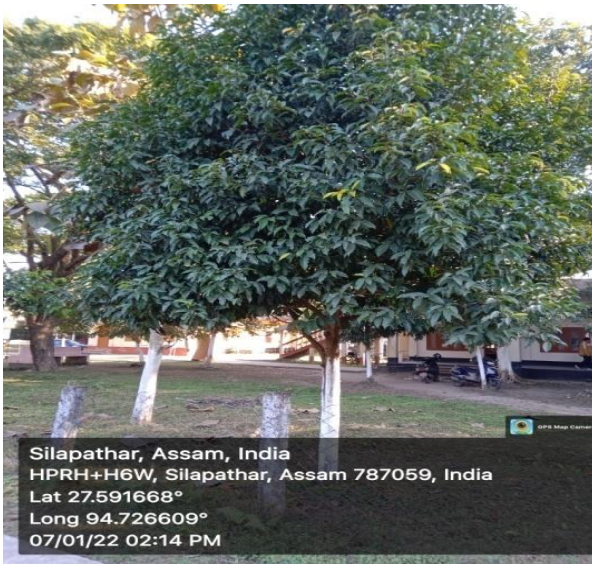
Sl. No	Name of the plant species	Family
1	*Ageratum conizoides*	Asteraceae
2	*Alocasia esculenta*	Aracaceae
3	*Angiopteris sp*	Marattiaceae
4	*Auxonopus sp.*	Poaceae
5	*Calotropis procera*	Asclepiadaceae
6	*Clerodendron seratum*	Verbenaceae
7	*Commelina benghalensis*	Poaceae
8	*Curcuma aromatic*	Zingiberaceae
9	*Cynadon dactylon*	Poaceae
10	*Cyperus rotandus*	Cyperaceae
11	*Diplazium esculantum*	Polypodiaceae
12	*Eclipta alba*	Asteraceae
13	*Eupatorium odoratum*	Asteraceae
14	*Hedyotis corybosa*	Rubiaceae
15	*Hydrocotyle sibthorpioides*	Apiaceae
16	*Lantana camera*	Verbenaceae
17	*Lipia nudiflora*	Verbenaceae
18	*Lygodium sp*	Lygodiaceae
19	*Mikenia scandens*	Asteraceae
20	*Mimosa invesa*	Mimosaceae
21	*Mimosa pudica*	Mimosaceae
22	*Ocimum scantum*	Lamiaceae
23	*Oxalis corniculata*	Oxalidaceae
24	*Paedaria scandens*	Rubiaceae
25	*Polygonum barbatum*	Polygonaceae
26	*polygonum hydropiper*	Polygonaceae
27	*Rungia parviflora*	Acanthaceae
28	*Urena lobata*	Malvaceae



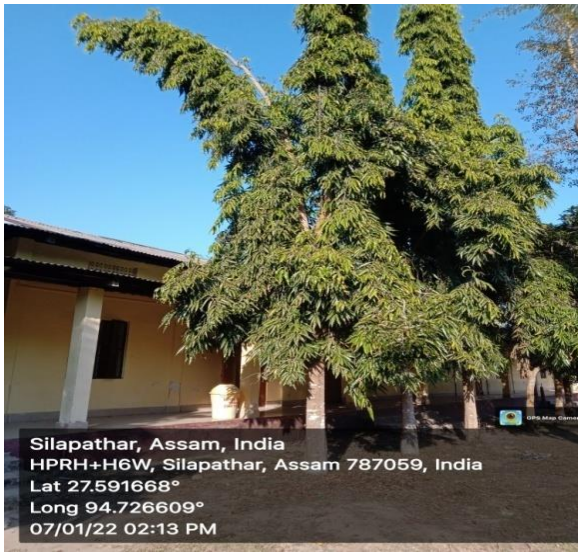
A. *Delonix regia*



B. *Pongamia glabra*



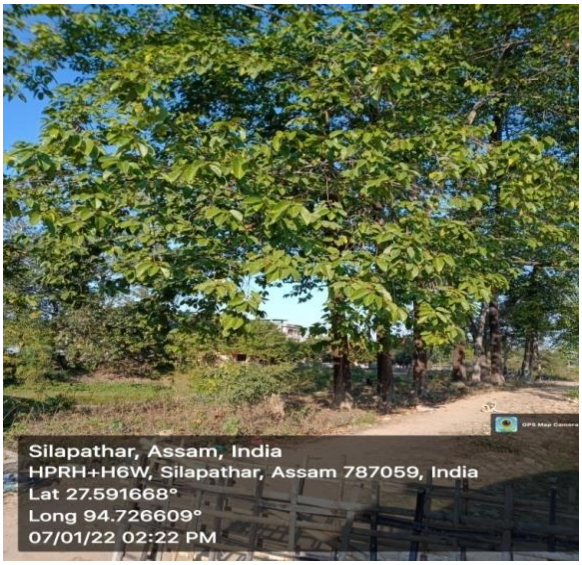
C. *Mimusops elengi*



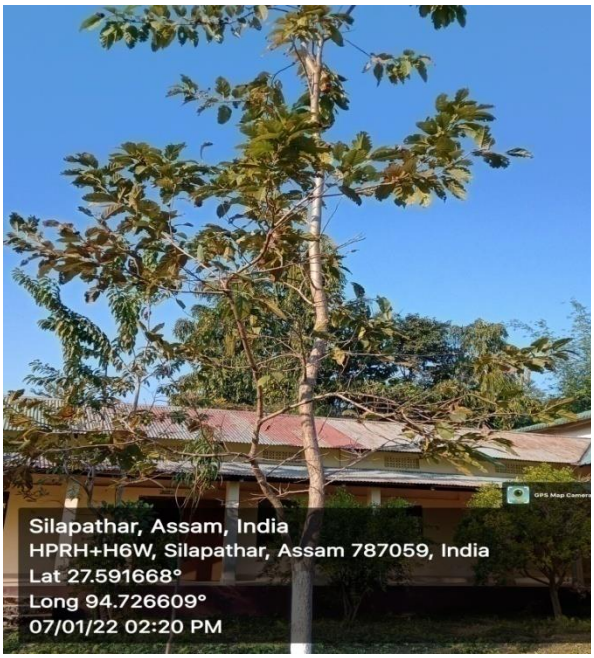
D. *Polyalthia longifolia*

Few Photographs of Flora at Silapathar College

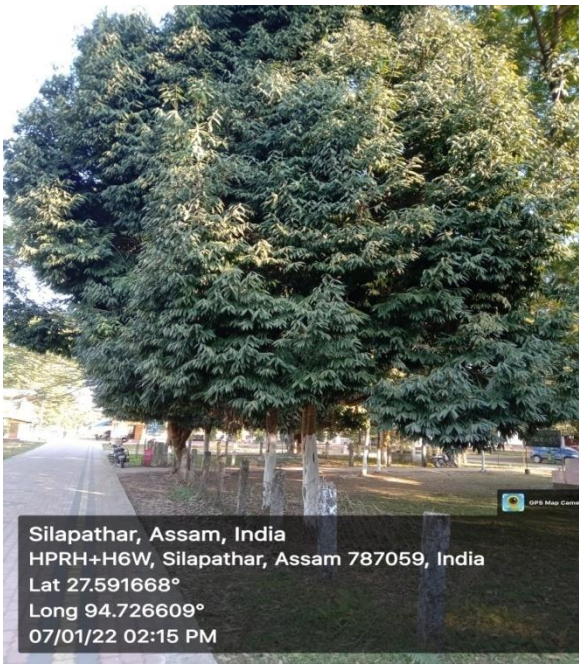
E. *Roystonea regia*



F. *Neolamarkia cadamba*

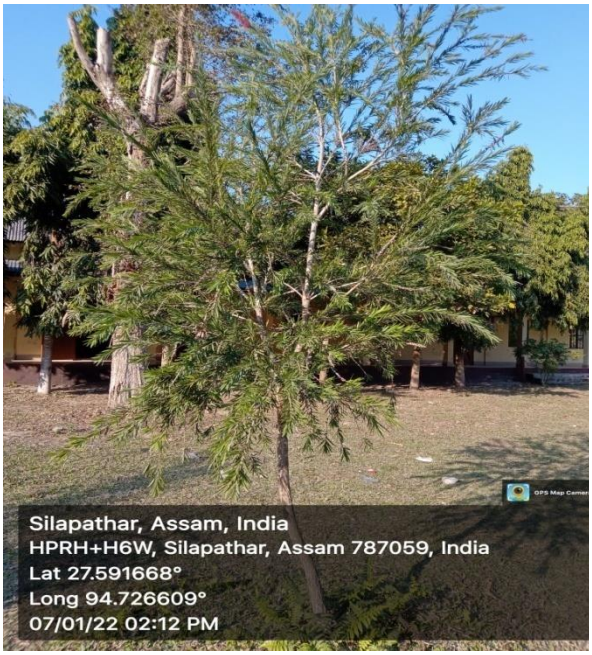


G. *Ehretia acuminata*

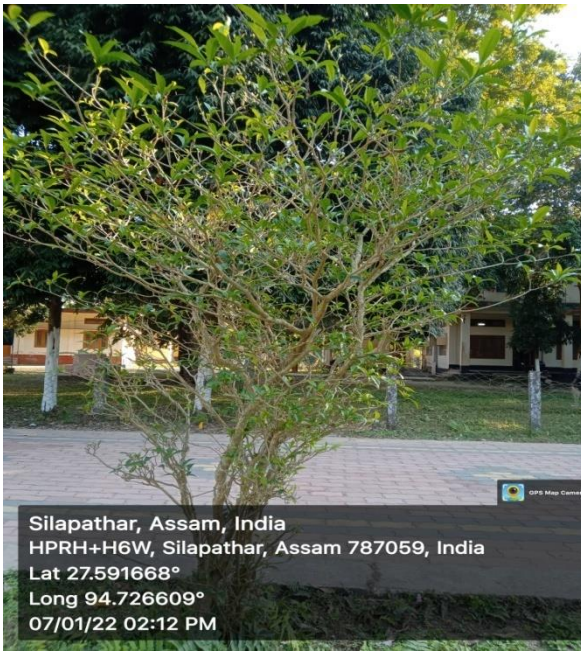


H. *Mesua ferrea*

Few Photographs of Flora at Silapathar College

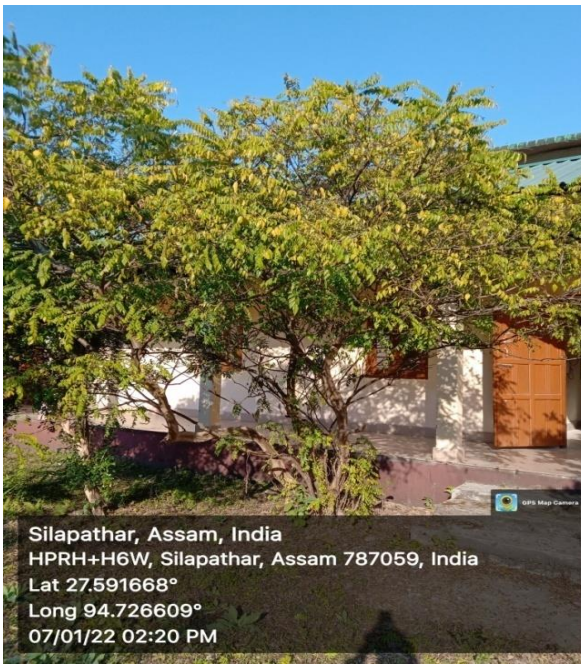


I. Callistemon citrinus



J. *Tabernaemontana divericata*

K. *Murrya paniculata*



L. *Murrya koenzii*

Few Photographs of Flora at Silapathar College

5.4.2 Faunal Biodiversity

In view of the need to determine the faunal characteristics of the study areas within the constraints of time, a checklist survey method was followed .Checklist surveys are employed primarily to confirm the presence of species, and sometimes the number of individuals of species in a surveyed area.

Either invertebrates or vertebrates, the variety of animals enriched the region with its ecological significance and balancing the ecosystem. Silapathar college campus has variety of faunal species including different kinds of aquatic organisms (Phytoplankton and zooplanktons), insects, molluscs, annelids, reptiles, birds and mammals. Pink necked green pigeon (*Treron vernans*) and Indian Ring- Necked Parakeet (*Psittacula krameria*) are two important birds found in the campus of Silapathar College. They have beautified the natural environment with their visits during the months of spring season. As Silapathar College is enriched with varities of flora, the birds feed on the seeds and fruits that are being available during spring seasons. They come in flocks and rest on the big peepal tree (*Ficus relegiosa*) found at the central area of the college near the Mahatma Gandhi statue. This signifies the biodiversity rich area of Silapathar College which is an abode of numerous flora and fauna.

The survey was conducted during February – March 2021. A total number of thirty-five different species were found in the Silapathar College Campus. Species belonging to phylum Arthropoda were found in highest number. This was followed by species belonging toaves, aquatic organisms, mammals, reptiles, amphibia and mollusca. The faunal biodiversity recorded in the college campus is presented in the Table 9 .

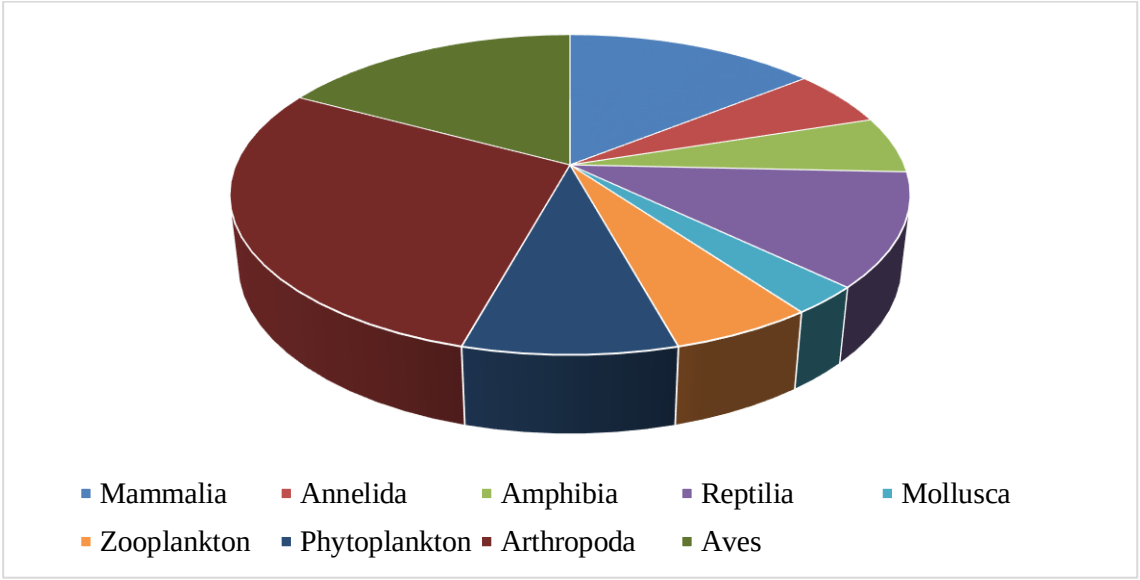


Table 9 : faunal biodiversity recorded in the Silapathar College Campus

Sl. No.	Name	Scientific name	Phylum/class/ Aquatic organism
1.	Amoeba	***Amoeba proteus***	Zooplankton
2.	Volvox	***Volvox tertius***	Phytoplankton
3.	Paramecium	***Paramecium caudatum. Ehr.***	Zooplankton
4.	Euglena	***Euglena gracilis***	Phytoplankton
5.	Chlamydomonas	***Chlamydomonas reinhardtii. P.A. Dang***	Phytoplankton
6.	Land Snail	***Cornuaspersum***	Mollusca
7.	Earthworm	***Pheretimaposthuma***	Annelida
8.	Leech	***Hirudinaria granulosa***	Annelida
9.	Black Ant	***Lasiusniger***	Arthropoda
10.	Butterfly	***Euploeaalgea***	Arthropoda
11.	Cockroach	***Periplanata americana***	Arthropoda
12.	Grasshopper	***Melanoplusdifferentialis***	Arthropoda
13.	Cricket	***Gryllustexensis***	Arthropoda
14.	Common house Spider	***Parasteatodatepidariorum***	Arthropoda
15.	Housefly	***Musca domestica***	Arthropoda
16.	Praying mantis	***Mantis religiosa***	Arthropoda
17.	Green tree ant	***Oecophyllasmaragdina***	Arthropoda
18.	Mole cricket	***Gryllotalpa gryllotalpa***	Arthropoda
19.	Frog	***Rana tigrina***	Amphibia
20.	Toad	***Bufo bufo***	Amphibia
21.	Chameleon	***Chameleolaurenti***	Reptilia
22.	Calotes	***Calotescalotes***	Reptilia
23.	Common water Snake	***Nerodiasipedon***	Reptilia
24.	House Lizard	***Hemidactylus frenatus***	Reptilia
25.	Common Kingfisher	***Alcedoatthis***	Aves
26.	House Sparrow	***Passer domesticus***	Aves
27.	Pink necked green pigeon	***Treron vernans***	Aves
28.	Indian Ring Necked Parakeet	***Psittacula krameria***	Aves
29.	Crow	***Corvus corax***	Aves
30.	Tree Sparrow	***Passer montanus***	Aves
31.	Common Myna	***Acridotheres tristis***	Aves
32.	Cattle egret	***Bubulcus ibis***	Aves
33.	Mouse	***Mus musculus***	Mammalia
34.	Squirrel	***Funambulus palmarum***	Mammalia
35.	Goat	***Capra aegagrus hircus***	Mammalia
36.	Dog	***Canis lupus familiaris***	Mammalia
37.	Cow	***Bos indicus***	Mammalia

Photo 1. Red Ant (***Solenopsis invicta*** Buren)

Photo 2. Tree Sparrow (***Passer mantatus***)

Photo 3. Common Mynah (*Acridotheres tristis*)

Photo 4. Butterfly *(Euploea algea)*

Few Photographs of Fauna at Silapathar College

5.5 Management Practices with respect to Water, Waste and Energy

5.5.1 Water Management Practices

- Water Storage per day = 10000 Lit
- Water Tank Cleaning = Twice per Annum
- Daily Consumption of water = 7000 Lit.

Department	Wise use of water	Water Leakage Repair	Use of push Tap	Use of Water purification	Rain Water Harvest	Water Use Per Day(L)	Water Management Practices
Assamese	✓	-	-	-	X	5	✓
Botany	✓	-	✓	-	X	500	✓
Chemistry	✓	-	✓	-	X	200	✓
English	✓	-	-	-	X	5	✓
Economics	✓	-	-	-	X	5	✓
Education	✓	-	-	-	X	5	✓
History	✓	-	-	-	X	3	✓
Mathematics	✓	-	-	-	X	3	✓
Physics	✓	-	✓	-	X	250	✓
Political Science	✓	-	-	-	X	10	✓
Philosophy	✓	-	-	-	X	5	✓
Sociology	✓	-	-	-	X	3	✓
Zoology	✓	-	✓	-	X	200	✓
Library	✓	-	✓	-	X	25	✓
Administrative Office and Science faculty (Toilet)	✓	-	✓	✓	✓	400	✓
Boys Common Room	✓	-	✓	-	X	300	✓
Girls Common Room	✓	-	✓	-	X	200	✓
Teaching staff room	✓	-	✓	✓	X	100	✓
Arts Departmental block (LadiesToilet)	✓	-	✓	-	✓	100	✓
Arts Departmental block (GentsToilet)	✓	-	✓	-	✓	100	✓
Student Toilet	✓	-	✓	-	X	500	✓
Canteen	✓	✓	✓	✓	X	1000	✓
Hostel	✓	-	✓	✓	X	1200	✓
Boy's Toilet	✓	-	✓	-	✓	310	✓
Gardening	✓	-	✓	-	X	1000	✓

Observations

(i) One water leakage from tap was identified in the college canteen. No leaking taps, pipes, valves were identified in the college premise.

(ii) Maintenance is needed for above case.

(iii) The college Management installs many low - flow faucets, as the replacement for the existing conventional taps.

(iv) The toilet and wash room are mostly equipped with push button

(v) Drip irrigation system used for gardening

(vi) Further, rainwater pits has been observed and restoration activities initiated to sustain the health of ponds in the campus

(vii) The college has set-up total four rain water harvesting units. 3 (Three) units are installed at i) Administrative Office and Science faculty toilet, (1000Lt.) ii) Students boy's toilet (2000 Lt.) and iii). at Arts Departmental Block (Ladies toilet) (1000 Lt.) respectively. The fourth unit having 500 Lt. is installed at Arts Departmental block (Gents toilet) for niches within the college campus. The stored water is used in lavatory and gardening purposes.

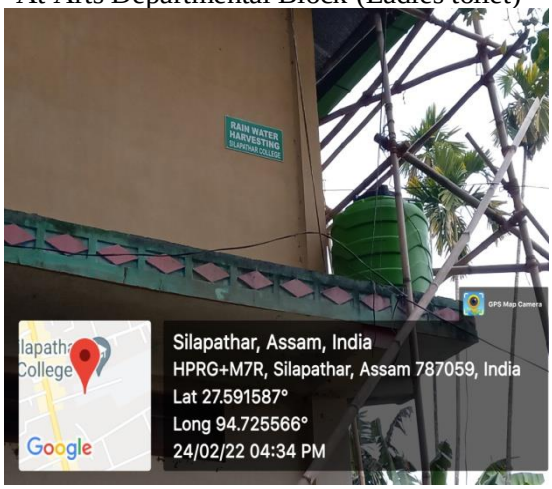
(viii) Rain water from roof of the Assam Type Building is collected through proper drainage system in the pond located near the playground and collected water is used in the garden and cleaning purpose.

Rainwater harvesting units different locations of Silapathar college

At Administrative block

At Arts Departmental Block (Ladies toilet)

At Students Toilet



At Arts Departmental Block (Gents toilet)

5.5.2 Waste Management Practices

In general, waste can be defined as the unwanted or unusable materials that include solid as well as liquid. Further, solid waste can be divided into-

(i) Biodegradable

(ii) Non-biodegradable

Biodegradable waste consists of food waste, waste from toilets etc. and non-biodegradable waste contains plastics, tins, glassware etc. Besides, there are some hazardous wastes generated from laboratories, and E-waste (Computers, electric and electronic parts).

The institute has over 1500 stakeholders which includes students, teaching staff and non-teaching staffs. Thus a huge amount of waste is generated on a daily basis. Therefore, to quantify and segregate the daily waste, the College has adopted proper management strategies within the college campus to reduce its hazardous effect.

Sl/No.	Source	Type of waste	Approximate amount of waste generated per day
1.	Classroom, staff room, Library	Paper, pen, wrappers, plastic bottles etc	17 kg (Total) Biodegradable waste = 15.5 kg Non-biodegradable waste = 1.5 kg.
2.	Laboratories	Chemicals, glassware, waste water and solvents	
3.	Toilets	Sanitary napkins, waste water etc.	
4.	Canteen	Disposable plates, leftover food and water, wrappers, plastic bottles etc.	
5.	Office and computer centre	Papers, wrappers, plastics, paper pins, E-waste etc.	

Waste management practices adopted by the College

Total waste produced in the campus of Silapathar College is measured with proper guidelines and the total weight of waste produced was found to be a) Food Waste 2880 Kg/year b) Paper Waste 840 Kg/year and c) Plastic Waste 360 Kg/year. Inappropriate management/disposing of this waste destroys the sanity of the environment. Dumping of litter without proper planning makes the area unpleasant for living. Further it destroys the

soil and water quality. Some hazardous waste poses a serious threat to health. Thus, it is very important for an institute to properly discard the waste without affecting the environment.

1. Solid waste generated in the campus
    - To collect dry and wet waste, dustbins with two chambers are placed 1(one) in IQAC office, 2 (two) in the arts faculty building, 2 (two) each in front of lecture halls, science building, science faculty room and office.
    - Beside this, usual dustbins are placed in the library, laboratory, staff room, teachers' common room, canteen, gymnasium, classroom etc. and handmade dustbins in front of classroom, teachers' common room to collect rest of the dry solid waste
    - Segregation of solid waste into dry and wet waste in different bins.
    - Handmade dustbins are placed in front of almost every classroom, teacher's common room and canteen to collect the dry waste like food wrappers, pens, plastic bottles etc. These are subjected to direct selling.
    - Specific waste management plans e adopted to manage solid waste in the campus and College also creates a plastic free zone.
    - E-waste generated from campus is subjected to direct selling.
2. Wet waste generated from campus
    - The institute has started vermicomposting. The institute has three vermin-compost units. 1(One) near IQAC office, 1 (one) near the canteen backyard and another 1(one) near the science laboratory to manage the organic waste generated within the college campus. This compost is further used as manure for gardening.
3. Toilet waste
    - The institute has total 31 toilets. Out of these, 7 toilets are in the girls' hostel and 2 toilets are in the boys' hostel. Toilet ramp facilities are there in front of three toilets (two for gents and one for ladies) for people with physical disabilities.
    - Soak pits are available in toilets
    - Toilet waste is connected to large tanks. These tanks are cleaned periodically.
    - Separate toilet facilities are available for differently abled students
4. Other waste
    - Sanitary napkins are subjected to burn in the incinerator. The institute has 3 (three) incinerators. 1(One) in girls' common room, 1 (one) in girls' hostel and another 1(one) inside the staff toilet in the administrative building.

- The institute has also two napkin vending machines, 1(one) in girls' common room and another 1 (one) at administrative office and science faculty toilet. Further, one sanitary pad box has also been placed in girl's common room donated by a NGO- named "Youth will".
- Leaf litters are used for vermicomposting.

5. Laboratory waste

- Solid waste (chemicals) and waste solvent generated in the lab are neutralized with water and thrown into a sink filled up with sand. The sand bed is changed periodically. This sink is connected to a cemented tank which is dug4 feet below the ground level. An outlet is placed on the top of the tank to evacuate the gas.
- 2 (Two) dustbins are placed in each department's laboratory to collect biodegradable and non-biodegradable waste separately.
- Broken glassware is collected in a separate bin and is subjected either for repairing or direct selling
- For hazardous chemicals, as per the guidelines (SOP) of Public Health Engineering, Govt. of Assam, cemented ring has been constructed behind the chemistry laboratory. The ring is filled up with sand and covered with a removable cover. Hazardous waste after dilution is thrown directly inside the ring. Towards the bottom of the ring solid pipe is connected directly to the tank. The sand inside the ring is changed periodically

6. E- waste

- E-waste includes malfunctioning computer monitors, printers, scanners, calculators, keyboards, mouse, cables, circuit boards, bulbs etc. In order to reduce such waste, proper maintenance of appliances are done regularly like upgradation of software, repairment of defective parts at the earliest.

- Waste like broken bulbs, tubes etc. which cannot be repaired are dumped temporarily at the dumping bin and later on disposed of to the municipality collection van.

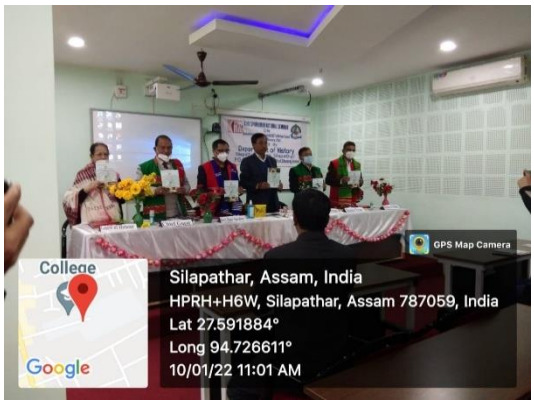
7. Moving towards plastic free zone

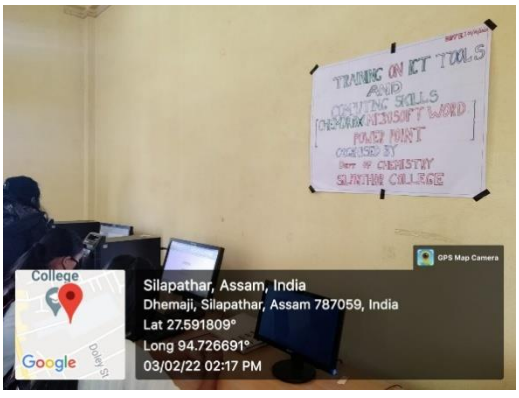
- To reduce plastic consumption, the institute has avoided the use of plastic in almost all gatherings, meetings, etc. Measures like the use of non-plastic banners, non-plastic disposables, etc. have been adopted to make the campus a plastic free zone.
- Students are encouraged to use minimum plastic materials. The awareness among the students has been created through lectures, displaying slogans and street play etc.
- Observation of world environment day, national science day, wetland day etc. is also organized to raise the environmental awareness.
- If some plastic wastes are generated like left over plastic bottles, then such bottles are used for vertical gardening

Dry and wet dustbins in different locations

Dumping bin for Temporary collection of dry waste

Vermi-compost unit near Science lab



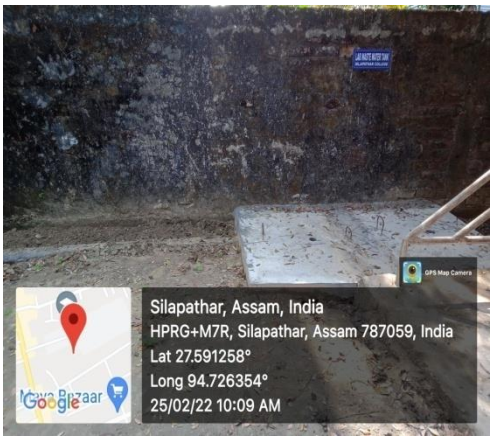


Use of biodegradable banner to beat plastic pollution

Incinerator in staff toilet

Biodegradable and non-biodegradable dustbins in the laboratories

Sand bed for Hazardous chemicals



Connection of sand bed to tank

Toilet ramp for boys

Toilet ramp for girls

5.5.3 Energy Management Practices

Energy Sources: Transformer capacity of 63kva (11/.4 kv Step down) was installed in the campus for distribution of power to different consuming centres of college.In the event of power cut a diesel generator of 20kvarating was available as stand by source of power. As power supply system in standby mode the DG set has to be run to keep the battery charged. Proper log book should be maintained to record time, diesel used and unit generated. However, the fact remains that to the extent possible the use of DG set should be optimum depending on the need to maintain the essential power supply. As a matter of fact,cost one unit of electricity generated by DG set is much higher in cost than the grid power. Further as Diesel is a fossil fuel and a costly one DG set has to be used to overcome emergency situation only.

- Electric Connected Load = 50 KW
- Contract Demand = 58.82 KVA

Table 10: Energy consumption of electrical equipment in college (@ 6hrs /day)

SlNo.	Equipment	Quantity	Watts/unit	Whr	kwh	Kwh(month)
1	LED Tube	20	20	2400	2.4	72
2	LED light	138	15	12420	12.42	372.6
3	LED light	180	10	10800	10.8	324
4	CFLlight	68	23	9384	9.384	281.52
5	Ceiling fan	292	65	113880	113.88	3416.4
6	Exhaust fan	20	60	7200	7.2	216
9	Exhaust fan	6	100	3600	3.6	108
10	Computer	48	35	10080	10.08	324
11	Printers	6	360	12960	12.96	388.8
12	Photostat	1	1600	9600	9.6	288
13	Inverter	3	750	13500	13.5	405
14	Incinerator	2	1500	18000	18	540
15	AC 1.5 tons	2	1500	9000	9	270
16	AC 2 tons	3	2000	36000	36	36
17	LCD projector	2	420	5040	5.04	151.2
18	Water pump	1	373	2238	2.23	66.9
19	Water pump	4	560	13440	13.44	403.2
20	Water pump	1	746	4476	4.47	134.1
21	Aqua guard	3	60	1080	1.08	32.4
22	UPS online	2	5000	60000	60	360
23	LED	7	100	4200	4.2	126
24	Halide lamp	3	400	7200	7.2	216
25	Monitor	1	630	3780	3.78	113.4

26	Stabilizer	1	5000	30000	30	900
27	Refrigerator	1	215	1290	1.29	38.7
28	UV spectro	1	750	4500	4.5	135
29	Hot air oven	2	1750	21000	21	630
30	Incubator	2	1500	18000	18	540
31	Water bath	2	200	2400	2.4	72
32	Laminar air	1	1000	6000	6	180
34	Heater	1	800	4800	4.8	144
35	Shaker	2	1500	9000	9	270
36	UV Cabinet	1	300	1800	1.8	54
37	speaker	5	25	750	0.75	22.5
38	**Total power**					**11448.12Kwh**

Table 11 : ENERGY CONSUMPTION DATA OF CHILAPATHAR COLLEGE FOR 2020-21

Connected Load- 50kw: Contract Demand- 58.82 KVA						63KVA DTR
Sl no	**Months**	**Billed kwh**	**Max. Demand**	**Total Bill**	**Bill for Max. Demand**	**% of total bill**
1	**2**	**3**	**3**	**4**	**5**	**6**
1	April,2020	442.16	3.9	33447.00	10474.39	31.32
2	May,2020	951.7	4.2	18710.00	10823.67	57.85
3	June,2020	724.9	3	16780.00	10474.52	62.42
4	July,2020	623.5	3	16177.00	10823.67	66.91
5	August,2020	652	7.8	16396.00	10823.67	66.01
6	Sept,2020	782.3	16.5	17036.00	10823.67	63.53
7	Oct,2020	965.1	16.5	18813.00	10823.67	57.53
8	November,2020	856.5	11.7	17609.00	10474.52	59.48
9	December,2020	1388.83	4.8	22083.00	10823.67	49.01
10	January,2021	917.73	3.9	18447.00	10823.67	58.67
11	February,2021	972.79	4.5	12814.00	9776.22	76.29
12	March,2021	1370.48	7.5	21471.29	10587.6	49.31
13	**Year 2020-21**	**10647.99**		**229783.29**	**127552.94**	55.51

As declared by University of Dibrugarh, there were only 180 working days in the year 2020-21. As major portion of the session was affected by pandemic, the average power consumption per person per year was at 7.36 kwh per year.

Overall energy Consumption per year/person= 10648/1445=7.36 kwh per year.

However, on the basis of the recommendation of the energy auditor, the college has fulfilled the following measures-

- Contract demand has been reduced from 58.82 KVA to 30KVA.
- 3 (three) numbers of halide lamp having 400 watts have been replaced with LED bulb having 50 watts each.
- 68 nos. of CFL bulbs having 23 watts has been replaced by LED bulbs having 9 watts each.
- A total number of 41 (16 AMPS) and 10 (6 AMPS) plugs which were not in used have been removed.
- Further, 5 (five) LED solar street light having 30W each (Li-on Battery with dusk to dawn sensor and 6m pole) have been installed within the college campus.

Observations:

i) There is minimum or practically negligible use of lights during day time as the building structure has possibility of daylight usage

ii) The lighting arrangements are well balanced with arrangements to switch ON and OFF

iii) The policy of college is switch off the lights and other electrical equipment when they are not in use.

iv) Cleanliness is well maintained. In- house light f i t tings are c leaned time to time.

v) Lights are negligibly operated during day time. The lights are operated manually. There is no any sensor based lighting system

vi) The college is utilising natural lighting as first preference

vii) Computers, printers, photocopiers and other equipment are switched off at the end of the day.

viii) All the electrical equipments are well operated. The overall electrification system is regularly monitored by a duly qualified electrician. Energy audit of the college has already done by BEE Certified Energy Auditor and submitted its report on 21st February, 2022.

ix) Regarding the use of renewable energy college has already installed solar light and planned to install more solar panels which will caters the lighting on roads and open fields.

x) College Management is evaluating the feasibility of introduction of the solar PV generation.

xi) No grid electricity is purchased from any third party

Solar street light near science faculty room

Solar street light near the drinking water tank

6.0 Transportation

The college has total students enrolled almost 1400 and employees almost 50. The students staying in the hostel walk to college. Remaining students commute to college with the use of public transport or bicycle. Personal commuting is not encouraged by college and hence there is not parking lot for the students inside college premise. Faculty members and other office staffs also preferably used public transport and some of them used their personal two wheeler or four wheeler.

Average Quantity of mode of transportation		
Two Wheelers	Four Wheelers	Bicycles
23	40	74

On 11th January 2022, a mass pollution test was conducted in presence of DTO officials of Dhemaji district in the Silapathar College campus. All the vehicles (two & four wheeler) used by employees and students gone through tests. An awareness talk was also delivered by the DTO officials addressing teachers and students to highlight the hazardous effects of carbon emission as well importance of road safety.

38 vehicles were tested to evaluate their pollution status. 23 out of 38 were four wheeler and 15 were two wheeler

PUC tests were carried out in numerous vehicles to check their pollution status. Emission rates were calculated for different vehicles in idling state and high idling state. Those values then compared with the standard emission value according to the date of manufacture. Emission of Carbon Monoxide (CO), Hydrocarbon (HC), RPM (Respirable Particulate Matter), Lambda etc parameters were taken into consideration for the pollution test.

Table 13.3: Analysis PUC tests conducted on College campus:

SlNo	PUCC No.	Vehicle Number	Status	Date	Time	CO (Idling Emission)	HC (Idling Emission)	CO(High Idling Emission)	RPM	Lambda
1	AS0220002000 1320	AS07E9374	PASS	11/01 /2022	11:00:57 AM	00	00	00	00	00
2	AS0220002000 1322	AS22D9036	PASS	11/01 /2022	11:12:11 AM	00	00	00	00	00
3	AS0220001000 6032	AS22E0232	PASS	11/01 /2022	11:24:45 AM	0.11	15.0	00	00	00
4	AS0220001000 6039	AS01EP088 6	PASS	11/01 /2022	11:46:09 AM	0.11	15.0	0.11	2470	0.99
5	AS0220001000 6035	AS22AB81 84	PASS	11/01 /2022	11:35:46	0.14	15.0	0.11	2480	0.99
6	AS0220001000 6059	AS22D3759	PASS	11/01 /2022	13:39:09 PM	0.08	15.0	00	00	00
7	AS0220001000 6038	AS01BM48 55	PASS	11/01 /2022	11:43:26 AM	0.13	15.0	00	00	00

8	AS0220001000 6030	AS22D8507	PASS	11/01 /2022	11:16:26 AM	0.11	15.0	00	00	00
9	AS0220001000 6063	AS06AA57 25	PASS	11/01 /2022	13:49:37 PM	0.11	15.00	0.12	2470	0.99
10	AS0220001000 6060	AS06Z3001	PASS	11/01 /2022	13:42:03 PM	0.11	15.0	0.11	2490	0.99
11	AS0220001000 6034	AS22G1957	PASS	11/01 /2022	11:33:08 AM	0.1	15.0	0.1	2470	0.99
12	AS0220001006 045	AS22B5697	PASS	11/01 /2022	12:06:50 PM	0.07	15.0	00	00	00
13	AS0220001000 6037	AS06P0072	PASS	11/01 /2022	11:41:56	0.12	15.0	00	00	00
14	AS0220001000 6042	AS22B2681	PASS	11/01 /2022	11:57:05 AM	0.07	15.0	00	00	00
15	AS0220001000 6043	AS06AD92 17	PASS	11/01 /2022	12:00:09 PM	0.08	15.0	0.08	2400	1.0
16	AS0220001000 6041	AS22G0588	PASS	11/01 /2022	11:54:45	0.05	15.0	0.07	2360	1.0
17	AS0220001000 6047	AS22G2451	PASS	11/01 /2022	12:13:00	0.12	15.0	0.11	2470	0.99
18	AS0220001000 6036	AS22E1206	PASS	11/01 /2022	11:37:27 AM	0.11	15.0	00	00	00
19	AS0220001000 6052	AS01AY08 97	PASS	11/01 /2022	12:33:41 PM	0.11	15.0	0.11	2480 .0	0.99
20	AS0220001000 6044	AS22G7695	PASS	11/01 /2022	12:01:55	0.07	15.0	0.05	2380 .0	1.0
21	AS0220001000 6033	AS06AB20 73	PASS	11/01 /2022	11:31;14 AM	0.11	15.0	0.14	2490 .0	0.99
22	AS0060001001 4929	AS01AZ01 70	PASS	11/01 /2022	11:42:36 A	0.11	15.0	00	00	00
23	AS0220002000 1321	AS06AE33 15	PASS	11/01 /2022	11:08:13 AM	00	00	00	00	00
24	AS0220001000 6064	AS22B2776	PASS	11/01 /2022	13:52:43 PM	0.06	15.00	00	00	00
25	AS0220001000 6056	AS22A4369	PASS	11/01 /2022	13:34:10 PM	0.07	15.00	00	00	00
26	AS0220001000 6061	AS22G4178	PASS	11/01 /2022	13:44:12 PM	0.1	15.0	0.11	2470 .0	0.99
27	AS0220001000 6062	AS06AB25 96	PASS	11/01 /2022	13:46:33 PM	0.12	15.0	0.12	2490 .0	0.99
28	AS0220001000 6049	AS22D3977	PASS	11/01 /2022	12:21:17 PM	0.06	15.0	00	00	00
29	AS0220001000 6051	AS22E5456	PASS	11/01 /2021	12:27:08 PM	0.06	15.00	00	00	00
30	AS0220001000 6039	ASO1EP08 86	PASS	11/01 /2022	11:46:09 AM	0.11	15.0	0.11	2470 .0	0.99
31	AS0220001000 6056	AS22A4369	PASS	11/01 /2022	13:34:10 PM	0.07	15.00	00	00	00
32	AS0220001000 6062	AS06AB25 96	PASS	11/01 /2022	13:46:33 PM	0.12	15.0	0.12	2490 .0	0.99
33	AS0220001000 6061	AS22G4178	PASS	11/01 /2022	13:44:12 PM	0.1	15.0	0.11	2470 .0	0.99
34	AS0220001000 6058	AS22F5993	PASS	11/01 /2022	13:37:39 PM	00	00	00	00	00
35	AS0220001000 6053	AS06X9145	PASS	11/01 /2022	13:27:09 PM	0.07	15.0	00	00	00
36	AS0220001000 6046	AS11Q5277	PASS	11/01 /2022	12:10:15 PM	0.11	15.0	12.0	2480 .0	0.99

7.0 Carbon Footprint

Anthropogenic greenhouse gas (GHG) emissions are the major reason for global climate change, an urgent problem that various countries and international organizations are trying to solve. The atmospheric carbon dioxide (CO2) concentration has increased from 279 to 397 ppm since 1800, primarily due to fossil fuel combustion.

Carbon footprint is historically defined as *the total set of greenhouse gas emissions caused by an individual, event, organization or product, expressed as* ***carbon dioxide equivalent.***

The present form of carbon footprint may be viewed as a hybrid, deriving its name from "ecological footprint", and conceptually being a global warming potential indicator. Carbon footprint, being a quantitative expression of GHG emissions from an activity helps in emission management and evaluation of mitigation measures

7.1 Carbon Footprint of the college

Sl. No.	Particulars	Consumption	Tons of CO_2 emission
1	Annual Electricity Consumption in kWh	10647	8.83701
2	Annual LPG Consumption in Kg	298	0.9238
3	Annual Diesel Consumption in Ltr	480	1.563
4	Annual Petrol Consumption in Ltr	1994.3	5.3447
5	Annual Firewood Consumption	000	000
6	Food Waste in Kg per year	2880	1.8144
7	Paper Waste in Kg per year	840	0.4704
8	Plastic Waste in Kg per year	360	0.1224
9	Total Carbon Footprint in tonne per year	-	19.07571

7.2 Carbon footprint due to Transport System

Emission of CO_2 through transport system – both public and private – is very high in India as India is credited with the third rank in carbon emission in this regard. It is estimated that in India, 9% of the total carbon is emitted by the transport system.

In Silapathar College during survey it was observed that on an average, there are 40 number of four wheelers are used by faculty while 23 number of two wheelers are used by students and staff. It is appropriate to calculate the petrol consumption separately for four wheelers and two wheelers.

The fuel consumption by vehicles is determined by the type of vehicle, year of manufacturing, maintenance status, traffic system of the particular area, etc. High-end and medium-range bikes consume different quantities of petrol.

Conversion table to calculate carbon emission by vehicles per litre is very complicated in view of the local variables to be taken for calculation. Instead, a simple but universally accepted calculation calendar for various types of fuels and their CO_2 conversion rate was adopted.

Emissions of CO_2 by transport system at Silapathar College

It is estimated that the average mileage covered by each vehicle is about	3 km.
The total mileage covered by the 23 number of two wheelers per year	(23 × 3 × 200) = 13800 km
The average mileage covered by four wheelers is also the same	3 km per day
The total mileage covered by 41 four wheelers per year	(40 × 3 × 200) = 24000 km
The total mileage covered by two and four wheelers per year	(138000+ 24000) = 37,800km
The standard fuel consumption for two wheelers is taken	35 km / 1L of Fuel
The standard fuel consumption for Four wheelers is taken	15 km / 1L of Fuel
The total quantity of petrol consumed by 23 number Two Wheelers	(13800 /35) = 394.3 L
The total quantity of fuel consumed by 40 number four wheelers per year	(24000/15) = 1600 L
The total fuel consumption per year (Two+ Four) Wheelers	(394.3+ 1600) = 1994.3 L
Combustion of 1 litre of diesel/petrol leads to the emission of CO_2	2.68 kg
The total quantity of CO_2 emitted by 1994.3 litres of fuel per year	(1994.3 × 2.68) = 5344.7 kg

7.3 Emission Factor

1	Item	Factor
2	Electricity	0.00083 tonne/kWh
3	LPG	0.0031 tonne/Kg
4	Diesel	0.0032 tonne/Ltr
5	Petrol	0.0029 tonne/Ltr
6	Food Waste	0.00063 tonne/Kg
7	Papar Waste	0.00056 tonne/Kg
8	Plastic Waste	0.00034 tonne/Kg

7.4 Flora and Carbon Footprint Reduction

7.4.1 Carbon Absorption Capacity of Flora at Silapathar College

The carbon footprint calculation is based on the following standard accepted assumptions

- Carbon absorption capacity of one full grown tree = 6.8 kg CO_2
- Carbon absorption capacity of one semi grown tree = 3.4 kg CO_2
- Carbon absorption capacity of one Shrubby vegetation = 0.2 kg CO_2

Total CO_2 absorption Capacity of Flora

Type of Tree	Total No. of Tree	Amount of CO_2 absorption/ tree (kg)	Total CO_2 absorption (kg)
Full Grown	560	6.8	560x 6.8 = 3808
Semi Grown	39	3.4	39x3.4 = 132.6
Shrubby Vegetation	48	0.2	48x0.2 = 9.6
		Total amount of carbon absorption by Flora	**3950.2**

7.4.2Oxygen Emission Capacity of Flora at Silapathar College

The carbon footprint calculation is based on the following standard accepted assumptions

- Oxygen Emission capacity of one full grown tree = 117.6 kg O_2
- Oxygen Emission capacity of one semi grown tree = 58.8 kg O_2
- Oxygen Emission Capacity of 400 number of Shrubby vegetation = 550 kg O_2

Type of Tree	Total No. of Tree	Amount of CO_2 absorption/ tree (kg)	Total CO_2 absorption (kg)
Full Grown	560	117.6	560x117.6 = 65,856
Semi Grown	39	58.8	39x58.8 = 2,293.2
Shrubby Vegetation	0.12 (48/400=0.12)	550	0.12 x 550 = 66
Total amount of Oxygen Emission by Flora			**68,215.2**

7.5 Summary of Carbon Footprint Reduction at Silapathar College

Carbon Absorption Capacity of Flora : **3,950.2** kg

Oxygen Emission Capacity of Flora : **68,215.2** kg

The total quantity of CO_2 emitted by vehicles : **5344.7** kg

7.6 Summary of Carbon Footprint per person at Silapathar College

Total Carbon Footprint in Tonnes : 19.07571

Total Carbon Footprint in kg : 19075.71

Total Average number of persons in the College : 1454

Carbon emission per person in kg : 19075.71/1454= 13.12

Carbon emission per person in kg : 13.12 kg

8.0. Organizational effort

S/N	Items	Responses
Organizational effort		
1	Is the college having campus green team?	Yes. Copy Attached
2	Have you established an environmental mission/vision for your campus	Yes. College has established Environment and Climate Cell to make the students and teachers aware about the environmental issues and challenges. The college has organized several programmes addressing environmental awareness among students and community as well (e.g. World Wetland Day, 2nd February; World Environment Day,
3	College initiates any tree plantation programme	Yes. Any programme organized by NSS within and outside the college campus particularly on College Foundation Day (15th August), World Environment Day (5th June), National Science Day (28th February),Azadi ka Amrit Mahotsav etc.
4	How may numbers of existing tree, shrubs and herbs species	Tree- 599, Shrubs- 48, Herbs- 256
5	How may numbers of existing full grown tree, semi grown trees	Full Grown -560 Semi Grown – 39
6	Is there any lawn in the college campus? If yes what is area	Yes, College encompasses aprox. 32646.94 sq. mts. lawn area.
7	Is the college encouraging sustainable behaviour via: Education campaigns? Such as Posters, placards, Messages, incentives? Contests? awards?	Yes, College organized various programme encouraging sustainable behaviour such as World Environment day (5th June), World Wetlands day (2nd February), National Science day (28th February), International Yoga Day (21st June), World AIDS Day(1st December), No Tobacoo Day (31st May), Ekta Divas(31st October) ; Wildlife Conservation Day (4th December); World Soil Day (5th December) and many more.

8	Is the college staff modelling sustainable behaviour for students, peers, and community?	Yes, College follow sustainable behaviour in the following forms- (i). Instead of using plastic materials plant based product (dishes made from *Dhokua*, coffee cup etc) are preferred in any kind of meeting, gathering or functions. (ii). In the laboratory, appropriate measures have been taken to use minimum hazardous chemicals as per the protocols provided . (iii). "Road Safety Week", No Vehicle day", "No Helmet No Entry" "Bicycle day" have been observed.
9	Is the college having solar, wind, or other forms of renewable energy?	Yes, College has five LED solar street lights, having 30W each (Li-on Battery with dusk to dawn sensor and 6 m pole) installed within the college campus, but no other form of renewable energy.
10	What are the good practices pertaining to Transport?	(i.)Road Safety week has been observed in order to make awareness among students. (ii)Traffic symbols have been displayed within the college campus for awareness among students. (iii).Entry is strictly prohibited within the college campus without halmet and seat belt and speed limit is 20km within the college campus. (iv)Once in a month, every employee and students of the college prohibits the use of vehicles within the college campus. And encourage the use of public transport and bicycle.
11	What is the average number of vehicle movements in terms of two & Four wheelers	Two Wheelers : 23 - 30 Four Wheelers : 35 – 40
12	Has the college calculated its carbon footprint	Yes, College has taken several initiatives to reduce total carbon footprint amount within the college campus.

13	Has the college adopted any specific measures to reduce pollution	(i)Encourage the students, office staff and teachers for the use of public transport and bicycle. (ii)There is a system of best practice of reducing **carbon footprint** within the college campus. In this regard, every employee and students of the college have given consent **not to bring any vehicle once in every month.** (iii)Five LED solar street light having 30W (Li-on Battery with dusk to dawn sensor and 6m pole) have been installed within the college campus. (iv)Use of any kind of plastic is strictly prohibited in the campus as the campus is declared as "Plastic free zone". (v)Pollution via smoking is eliminated by announcing the campus as "Tobacoo Free Zone." (vi)Previously used flex is subjected to be reused. (vii)Maintenance and repairing of furniture are done regularly to avoid waste. (viii)To motivate students, social service competitions (NSS) are being held on special occasion such as college week, environment day, Science day, Azadi ka Amrit Mahotsav etc., where they are awarded for their active participation. (ix)The dry solid wastes after collection from different bins are dumped temporarily in a large bin constructed near the backside of canteen. From there, these are picked up by municipal vehicles timely as per MoU signed between the college and municipality.

Bamboo Dustbin

Bamboo Dustbin

Solar Panel

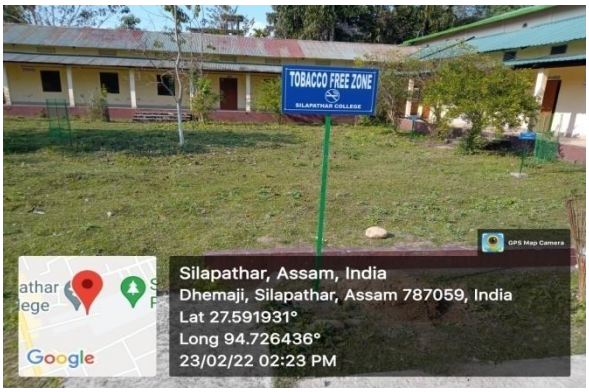
Use of Biodegradable material in college functions

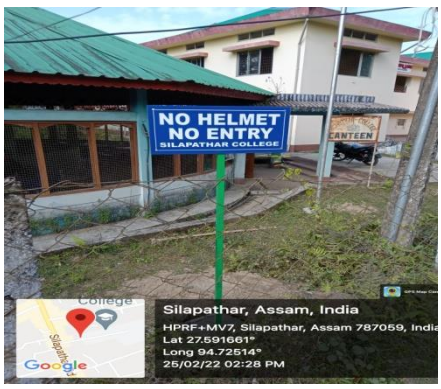
Laboratory Waste Management

Few Photographs of waste management at Silapathar College

Orchid Plantation

Few Photographs of various plantation at Silapathar College





Few Photographs of various awareness campaign at Silapathar College

9.0 Recommendations

Water Management

(i) Considering contamination of water with coliform bacteria, water purification treatment facilities may be installed within the campus in order to ensure safe drinking water.

(ii) Drinking water quality should monitor on periodical basis.

Energy Management

- Although few public lights within the campus has been run with solar panels but more solar panels may be installed within the campus.
- Energy auditing should be done with the help of Energy Management Centre (EMC) periodically

Waste Management

- Seperate toilet for girl's and boy's should be established in newly constructed science building

Green Management

- The Campus should develop a garden in front of each buildings.
- Green habitat concept should be adopted for all the building construction activities of the college in future, which may help a long way in reducing energy usage, increasing aesthetic appeal of the buildings and class rooms, besides reducing carbon foot print.
- Air quality, Drinking water quality should monitor annually.

Fire & Safety Management

- More Fire safety instruments should be installed in all the buildings

Transportation Management

- Vehicle pooling should be promoted both among students and faculty and use of bicycles should be promoted as a policy of college.

****

OFFICE OF THE PRINCIPAL
SILAPATHAR COLLEGE
PO: SILAPATHAR – 787059, DIST: DHEMAJI (ASSAM)
Website: www.silapatharcollege.edu.in
Email: silapatharcollege@gmail.com
NAAC Accredited with CGPA of 2.62 on 15/11/2015 as 'B' Grade
Phone & Fax: (03753) 246777, Mobile(s): (+91) 9435534268, 8472861787

GREEN CAMPUS COMMITTEE

Dr. L. N. Pegu
Principal
Chairman, Green Campus Committee

Dr. Upen Deka
Assistant Professor, Department of Botany
Convener, Green Campus Committee

Members

1.	Dr. Upasana Borthakur,	Assistant Professor, Department of Chemistry
2.	Dr. Merina Narah,	Assistant Professor, Department of Zoology
3.	Dr. Abdul Mutalib,	Assistant Professor, Department of Sociology
4.	Dr. Junali Chetia,	Assistant Professor, Department of Botany
5.	Mr. Kalyan Malakar	Assistant Professor, Department of Physics

25/01/22

(Dr. L.N. Pegu)
Principal
Silapathar College, Silapathar

Principal
Silapathar College
Silapathar

Assam Power Distribution Company Limited

NAME OF ELECTRICAL SUB-DIVISION / IRCA : IRCALAKHIMPUR
CIN: U40109AS2003SGC007242
GSTIN: 18AABCL1354J1ZJ
ELECTRICITY BILL

Website: www.apdcl.org

Centralized Customer Care Number: 1912

Consumer Name: THE PRINCIPAL
Address: ,CHILAPATHAR COLLEGE,NORTH LAKHIMPUR

Contact Number : 9707830368
Email : chilapathercollege@gmail.com
Tariff Category: HT IV BULK SUPPLY (OTHERS)
Supply Voltage Level: HT

Consumer Number: 230000000408
Old Consumer Number: 63000001430
DTR Number: M154H01P
Pole Number :000
Connected Load in KW: 50.0
Contracted Demand in KVA: 58.82
Load Security:68300.00
Meter Number: ASA84131

Bill Amount: 13526.0
Due Date: 24-Jan-2022
Bill Number:900004781
Bill Period: 01-Dec-2021 To 31-Dec-2021
Bill Date : 08-Jan-2022
Number of Days: 31
Meter Status: RUNNING
Billing Status: NORMAL

230000000408

Meter Reading Details

Reading Type	Meter Number	MF	Previous Reading in KWh	Previous Export in KWh	Current Reading in KWh	Current Export in KWh	Difference Reading in KWh	Difference Export in KWh
KWH(Normal)	ASA84131	30.0	3407.900	0.000	3436.500	0.000	28.600	0.000

Units Consumed	PF Penalty/Rebate	LT Metering Penalty	DTR Penalty	HT Rebate	Voltage Rebate	Voltage Penalty	Billable Units in KWh
Normal | 858.000	-8.840	25.740	0.000	0.00	0.00	0.00	874.900

Recorded Demand (in KVA)	0.13	Maximum Demand (in KVA)	3.9	Billing Demand (in KVA)	58.82	Average Power Factor	87.2
Power on Hours	744.0			Availability Percentage			

Billing Details

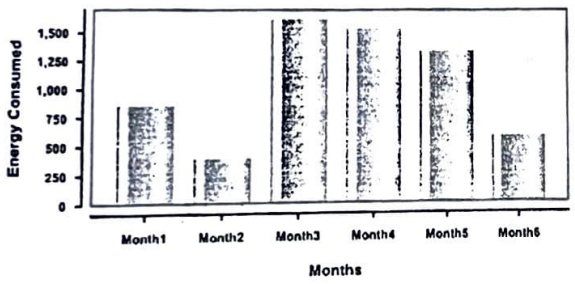
Current Demand	Outstanding Amount	Adjustment Amount	Solar Rebate	Net Bill Amount
Rs. 17979.100	Rs. 0.000	Rs. 4453.160	0.000	**Rs. 13526.0**

LS Interest of Rs. 4453.16 and Load Security Rs. 0.0 has been adjusted for FY 2020-2021.

In Words: Rupees Thirteen Thousands Five Hundred Twenty Six Only

PLEASE PAY YOUR BILL ON TIME AND HELP US TO SERVE YOU BETTER

Energy Consumption (Last Month's Bill)



Charges Breakup

Details	Units	Rate	Amount
Energy Charge(Normal)	874.900	7.200	6299.280
Total Energy Charge			6299.280
Energy Charge Re-Estimated			0.000
Rooftop Solar Adjustment			0.000
Demand/Fixed Charge (KVA)	58.82	180.000	10823.670
Electricity Duty			856.15
Govt. Subsidy		0.00	0.00
Overdrawal Penalty			0.00
Meter Rent		0.00	0.000
Charges for dishonoured cheque			0.000
Arrear Principal			0.000
Arrear Surcharge			0.000
Current Surcharge			0.00
Adjustment Amount			4453.16
Rebate if paid before due date			**0.00**
Payable amount before due date			**13526.00**
Payable amount after due date			**13526.00**

Checked by E&OE:

Prepared by: 40008081

Signature with seal

25/01/22
Principal
Silapathar College
Silapathar

Integral Certification (P) Ltd.

Certificate OF REGISTRATION

This is to Certify that the Management System of

ENVIRO TESTING SERVICES

BIJAY NAGAR, NOONMATI, GUWAHATI - 781020, ASSAM, INDIA

has been found to conform to the Environmental Management System standard:

ISO 14001:2015

This certificate is valid for the following scope of operations:

ENVIRONMENTAL ASSESSMENT, MANAGEMENT, GREEN AUDIT AND ENVIRONMENTAL AUDIT

Certificate No.: IN19503B

Date of initial registration	*Date of this Certificate*	*Surv. audit on or before/ Certificate expiry*	*Recertification Due*
08 February 2023	*08 February 2023*	*07 February 2024*	*07 February 2026*

This Certificate remains valid subject to satisfactory surveillance audits.

Accreditation

EGAC Accredited EMS Certification CAB # 011201

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Director

ICL/FM-001/REV06

For verification and updated information concerning the present certificate visit to www.iclcert.com

Integral Certification (P) Ltd.
301, U-60 (3rd Floor), Shakar Pur, Laxmi Nagar, Delhi-110092
E-mail: info@iclcert.com Website : www.iclcert.com
Contact No. : +91-9319332223

Integral Certification (P) Ltd.

Certificate OF REGISTRATION

This is to Certify that the Management System of

ENVIRO TESTING SERVICES

BIJAY NAGAR, NOONMATI, GUWAHATI - 781020,
ASSAM, INDIA

has been found to conform to the Quality Management System standard:

ISO 9001:2015

This certificate is valid for the following scope of operations:

ENVIRONMENTAL ASSESSMENT, MANAGEMENT AND MONITORING FOR SOIL, WATER, AIR, FLORA AND FAUNA.

Certificate No.: IN18831A

Date of initial registration	*Date of this Certificate*	*Surv. audit on or before/ Certificate expiry*	*Recertification Due*
24 August 2022	*24 August 2022*	*23 August 2023*	*23 August 2025*

Accreditation

This Certificate remains valid subject to satisfactory surveillance audits.

EGAC Accredited QMS Certification CAB # 112001

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Director

ICL/FM-001/REV06

For verification and updated information concerning the present certificate visit to www.iclcert.com

This certificate is property of Integral Certification (P) Ltd. and shall be returned immediately when demanded.

Integral Certification (P) Ltd.
301, U-60 (3rd Floor), Shakar Pur, Laxmi Nagar, Delhi-110092
E-mail: info@iclcert.com Website : www.iclcert.com
Contact No. : +91-9319332223

Pollution Control Board, Assam

(Department of Environment & Forests : : Government of Assam)

অসম প্রদূষণ নিয়ন্ত্রণ পৰিষদ

(অসম চৰকাৰৰ বন আৰু পৰিবেশ বিভাগ)

No WB/GUW/T-2445/13-14/198 1949

Dated Guwahati the 19th Feb 2022

OFFICE ORDER

In exercise of the powers conferred under section 17(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 17(2) of the Air (Prevention & Control of Pollution) Act, 1981, the Pollution Control Board, Assam is pleased to renew the recognition of the Laboratory for One (1) year subject to the outcome of Hon'ble Guwahati High Court Order WP(C)/8468/2018 to **M/s. Enviro Testing Services, Bijoy Nagar ,House No.35. Noonmati, Guwahati-22, Kamrup (M),Assam** awarded vide Pollution Control Board, Assam order No. WB/GUW/T-2445/13-14/197 dtd 19.02.2022. This Renewal of recognition is awarded subject to the following terms & conditions for the purpose of analyzing certain parameters discharged from the industries or any other institutions.

Terms & Conditions:

1 The recognition may be revoked or withdrawn subject to the violation of the following conditions -

i The laboratory shall carry out analysis only for the parameters authorized by the Board as mentioned in the certificate of approval.

ii The laboratory shall carry out analysis of samples as per IS, APHA code of Federal Regulation and should specify the method in the analysis report.

iii The laboratory will keep a proper record of receipt of samples, the reading of each and every parameter analyzed and calculation of results of all parameters on permanent register and will subject to inspect by the Board.

iv The samples collected should be analyzed within seven (7) days from the date of collection and copy of the same along with the brief inspection report to be sent to Pollution Control Board, Assam.

v The accredited laboratory will collect samples as required by the process, which will be divided in two parts. One part will be analyzed, while the other part will be preserved for thirty days. For air samples, the used thimbles and filter papers will be preserved for six(6) months so that the Board can check randomly and verify the credibility.

vi The Board officials may visit laboratory for checking preserved samples at random.

vii The Laboratory must submit information on whether ETPs/APCDs installed by the respective unit was running or not along with test report. At the time of collection samples by the Laboratory, all the processes of the unit should invariably be running. The analysis report should generally reflect site conditions and capacity at which the industry was running at the time of sampling.

viii Records pertaining to inventory of the chemicals/ reagents shall be kept properly on a permanent register and will be subject to inspection by the Board.

ix Laboratory will submit details of staff involved in sampling and testing and the person coming for collection of sample should have authority letter of Laboratory.

x Any change in address, staff or other additions/ alterations in the facilities of the laboratory should immediately be reported to this office within fifteen (15) days.

Contd....p/2

Certificate

This is to Certify that

ENVIRO TESTING SERVICES

Bijay Nagar, Noonmati, Guwahati - 781020,
Assam, India

has been found in Compliance with requirements of
Occupational Health and Safety Management Systems

ISO 45001:2018

for the following scope:

Environment Work Deals With Testing of Soil,
Water and Air.

Certificate No.	:	OHSMS/025225/1221
Original Certificate Date	:	08-December-2021
Issue Date	:	08-December-2021
Expiry Date	:	07-December-2024

To check this certificate status visit:
"http://uasl.uk.com/certifiedorganization.html"

Authorised Signature

Quality Control Certification

UK Office: 1929, Chynoweth House,
Trevissome Park, Truro-TR48UN, Cornwall, UK

India Office: 2nd Floor, Aman Market,
Narela Mandi, Delhi - 110 040, India

"Quality Control Certification (QCC)" accredited by "UASL, England, UK". This certificate remains the property of "QCC" to whom it must be returned on request.

GOVERNMENT OF ASSAM

OFFICE OF THE GENERAL MANAGER

DISTRICT INDUSTRIES & COMMERCE CENTRE : KAMRUP

CERTIFICATE OF ISSUANCE (EM Part 2)

No: DICC/KAMRUP/EM(PT-2)/02756/2017 DICC, Kamrup, 19-07-2017

ENVIRO TESTING SERVICES has field Memorandum for a Services Enterprise at Bijoy Nagar, H.No-35 Noonmati,Guwahati,Dist-Kamrup for the item/items indicated below and the activities has commenced from 15/12/2001 as stated in Form and allocated Entrepreneurs Memorandum No as below :

Date of Issue :	19-07-2017
Nature of Activity :	Services
Category of Enterprise :	Small
Entrepreneurs Memorandum No :	18062202756

Details of item/items manufactured/service provided:

Sl no.	Items of manufacture/type of service to be rendered	Capacity in case of manufacture
1	Technical Testing and Analysis	00 Nos.
2		
3		
4		
5		
6		

List of Plant & Machinery Enclosed in a Separate Sheet

Note: The issue of this acknowledgement does not bestow any legal right.The entrepreneur is required to seek requisite clearance/licence/permit required under statutory obligation stipulated under the laws of Central/State Government/UT administrations/Court orders.

General Manager
District Industries & Commerce Centre
Kamrup (M), Guwahati - 21

Date :19-07-2017
Place :Guwahati

NB:

1. In any case of any change in the information,at any point of time,please inform the details within three months to District Industries Centre.(Schedule-I, point-5)
2. In case of changed in investment in Plant & Machinery or in equipment, the enterprise who have already filed Enterpreneur's Memorandum should inform the District Industries & Commerce Centre of the same in writing three months of the change in investment(Schedule-II, point-10)
3. Acknowledgement of Part-II,enable the unit to apply for various incentive under State/Central Government

Additional Information as on date of issuance of the acknowledgement of Part-II of EM :-

1 Investment in equipments (In Rupees) 9101700.00
2 Employment (Management 1,Supervisory 1,Workers 3) Nos.
3 Proprietor/Partner/Director/Contact Person Satyanath Goswami, Priyambada Goswami, Gaurima Goswami
Goswami
Priyambada Goswami
Gaurima Goswami

Pranab Talukdar
Kamrup (Metro)
Regd. No-KAM-05
Exp. Dt-16/01/22
NOTARY GOVT. OF ASSAM

Attested
(Pranab Talukdar)
NOTARY
Kamrup (Metro), Guwahati

27 JUL 2017

Enviro-Testing-Services
Guwahati, Assam