GREEN AUDIT REPORT

FY 2025-2026

DARRANG COLLEGE

Tezpur, Sonitpur, Assam - 784001

SUBMITTED TO

The Principal
Darrang College
Tezpur, Assam

SUBMITTED BY

TRCATS LLP
Baruah Chuburi, Mazgaon, Sonitpur, Assam - 784001

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Item	Details
Report title	Green Audit Report - Darrang College
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Prepared by	TRCATS LLP, Tezpur, Assam
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Environmental parameters	Land use, climate, water, soil, air, noise, biodiversity, waste, mobility, energy and green practices

Acknowledgement

TRCATS LLP acknowledges the support of the Principal, Darrang College, and the college administration in making campus information, environmental records and utility data available for sustainability review. The report consolidates the campus environmental profile and translates the findings into practical recommendations for resource conservation, pollution prevention, biodiversity management and continuous improvement.

For TRCATS LLP

Dr. Dipal Baruah
Director (R&D and Innovation)

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Executive Summary

This Green Audit Report reviews the environmental performance of Darrang College, Tezpur, for FY 2025-2026. It considers land use and green cover, climate context, water supply and quality management, soil fertility, noise and air conditions, biodiversity, solid waste handling, vehicular movement, energy use and institutional green practices. The focus is on practical measures that can improve environmental quality and strengthen a measurable green-campus programme.

Indicator	Campus profile
Campus land area assessed	70,518.67 m^2 (17.43 acres)
Open space and plantation	31,120.74 m^2 (44.1%)
Built-up area	20,782.53 m^2 (29.5%)
Major buildings / departments	22 major buildings / 27 academic departments
FY 2025-2026 grid electricity	134,589 kWh
FY 2025-2026 APDCL bills	₹1,612,478
Estimated grid-electricity emissions	104.8 tCO_2e (electricity only)
Environmental assets	Green cover, composting/vermicomposting, biogas systems, environmental education

Main Findings

- Approximately 44.1% of the measured campus land inventory is recorded as open space and plantation, providing an important base for biodiversity, shade, infiltration and outdoor learning.
- Groundwater is the primary water source. Existing filtration is an important safeguard for drinking-water use; raw water should not be consumed without treatment and periodic laboratory verification.
- Soils are mildly acidic (approximately pH 5.5-5.8), with moderate-to-high organic carbon, comparatively low available nitrogen and phosphorus, and moderate potassium.
- Noise levels are highest at the canteen (73 dB) and administrative block (71 dB); quieter readings include the library (41 dB) and hostels (42-43 dB). Activity management and repeat measurements are recommended.
- Spot air readings identify the canteen and administrative block as locations for closer attention to particulate matter and ventilation, particularly during high occupancy and food preparation.
- Campus biodiversity records include a diverse mix of trees, fruit plants, ornamental species, herbs, birds, insects, reptiles and other fauna. A validated species register and protection of native planting are priorities.
- Waste management has a foundation in source segregation, vermicomposting and biogas systems. A formal waste ledger, stronger segregation, authorised recycling linkages and clear responsibility are recommended.
- Energy use is an important part of the campus footprint. FY 2025-2026 grid electricity use was 134,589 kWh, with annual APDCL bills of ₹16,12,478.

Priority campus programme

Establish a Green Campus Committee and an annual action register covering water safety, soil health, four-stream waste segregation, biodiversity monitoring, noise and air rechecks, energy conservation and green mobility.

Dr. Dipal Baruah
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1. Introduction and Objectives

A green audit is a structured review of an institution's use of natural resources and its environmental performance. For a college campus, it provides a practical framework to improve the quality of the learning environment while conserving water, land, energy and biodiversity, reducing pollution and improving waste recovery.

1.1 Objectives

- Document the campus land-use pattern and extent of open space and plantation.
- Review groundwater use, drinking-water treatment and water-quality monitoring practices.
- Assess soil condition and identify sustainable landscaping and nutrient-management measures.
- Summarise available campus noise and air-quality readings and identify priority locations for follow-up monitoring.
- Document floral and faunal diversity and recommend biodiversity conservation measures.
- Review waste management, organic waste treatment, recycling, transport and energy conservation.
- Provide a phased green-campus action plan with assigned responsibilities and measurable indicators.

1.2 Green-campus principles

Principle	Application at Darrang College
Prevention first	Reduce waste and emissions at source before treatment or disposal.
Resource efficiency	Use water and electricity efficiently; track consumption and repair leaks.
Circularity	Convert suitable organic waste into compost/biogas and route dry recyclables to authorised handlers.
Nature-positive planning	Protect existing trees, increase native planting and improve soil and rainwater infiltration.
Healthy learning environment	Manage classroom noise, indoor air quality, drinking water and campus traffic.
Measurement and accountability	Maintain a yearly record of environmental indicators, actions and outcomes.

2. Scope and Methodology

2.1 Scope of assessment

Theme	Assessment elements
Land and vegetation	Land-use distribution, green cover, trees, lawns, plantation and landscape management.
Climate	Monthly temperature, relative humidity and precipitation reference profile.
Water	Groundwater supply, treatment, water-quality records, storage tanks and conservation opportunities.
Soil	pH, organic carbon, available N-P-K and landscape health.
Air and noise	Available location-level particulate matter, CO_2, HCHO and sound-level records.
Biodiversity	Plant species and fauna documented on campus.
Waste	Segregation, organic waste, composting, biogas, recyclables, e-waste and laboratory waste.
Transport	Vehicle types, peak movement periods, parking, pedestrian safety and green mobility.
Energy and climate	FY 2025-2026 electricity consumption and billed cost; associated grid-electricity emissions.
Institutional practices	Environmental awareness, curricular integration and campus sustainability activities.

2.2 Methodology

1. Review of institutional campus and environmental records, including land-use, infrastructure, waste and biodiversity information.
2. Analysis of APDCL bills covering April 2025-March 2026 for the energy and electricity-cost component.
3. Compilation of available environmental monitoring records for water, soil, noise and air quality.
4. Comparison of relevant parameters with applicable Indian standards or guidance, while recognising differences between spot measurements and regulatory sampling durations.
5. Prioritisation of actions based on environmental benefit, health and safety importance, cost, ease of implementation and monitoring feasibility.

Interpretation of monitoring results

Measurements listed in this report are environmental screening records for campus planning. Spot readings should not be interpreted as proof of annual regulatory compliance where applicable standards require specific sampling durations, laboratory methods or designated-zone classification. Repeat monitoring should follow a consistent protocol.

3. Institutional and Campus Profile

Parameter	Campus information
Institution	Darrang College
Location	Tezpur, Sonitpur district, Assam 784001
Approximate latitude	26°38'05" N to 26°38'20" N
Approximate longitude	92°47'45" E to 92°47'55" E
Campus land inventory	70,518.67 m^2
Major buildings	22
Academic departments	27
Academic disciplines	Arts 16; Science 8; Commerce 1; Environmental Science 1; Home Science 1
Facilities	Academic and administration buildings, laboratories, library, hostels, auditorium, indoor stadium, playground and planted open spaces
Primary water source	Groundwater from deep tube wells
Electricity utility	APDCL; HT IV Bulk Supply (Government Education)
Green infrastructure	Trees, lawns, plantations, vermicomposting and biogas systems

The campus includes RCC and Assam-type buildings, academic and administration zones, laboratories, a central library, boys' and girls' hostels and large shared facilities. The combination of built-up areas and substantial open space provides opportunities for improved rainwater infiltration, tree canopy protection, biodiversity trails and outdoor sustainability learning.

4. Land Use and Green Cover

4.1 Land-use distribution

The campus land-use inventory totals 70,518.67 m^2 (approximately 17.43 acres). Open space and plantation account for 44.1% of the total, while built-up areas account for 29.5%.

Land-use category	Area (m^2)	Share (%)	Environmental role
Built-up area	20,782.53	29.47	Roofed footprint and hard infrastructure
Playground	18,162.42	25.76	Recreation, sports and open activity
Open space and plantation	31,120.74	44.13	Shade, biodiversity, carbon storage and infiltration
Hollows / trenches	452.98	0.64	Local drainage / low-lying land; manage to prevent stagnation

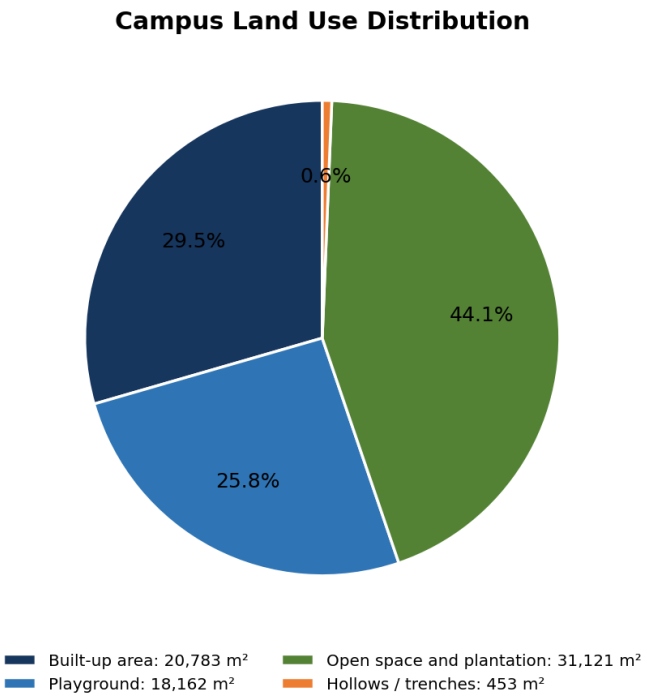


Figure 1. Land-use distribution derived from the campus area inventory.

4.2 Green-cover management

- Protect established shade trees and avoid unnecessary removal during building maintenance.
- Prioritise locally adapted native species in new plantation and replacement planting.
- Use mulch and compost around trees to conserve soil moisture and limit erosion.
- Maintain a geotagged tree and shrub register with species, location, approximate girth, health and maintenance date.
- Keep drainage channels and hollows free of litter and ensure they retain or convey stormwater safely.
- Use permeable paving where feasible and avoid unnecessary hard surfacing in open campus areas.

4.3 Green infrastructure opportunities

Opportunity	Suggested design / management action	Monitoring indicator
Native shade corridors	Plant mixed native species along suitable walkways and parking edges.	Trees planted and survival rate after 12 months.
Pollinator garden	Create a small garden with flowering native shrubs and seasonal plants.	Plant species count; pollinator observations.
Medicinal plant corner	Label local medicinal plants for teaching and conservation.	Species maintained and student use.
Rainwater infiltration	Use vegetated swales / soak pits where soil and drainage assessment permit.	Number of functional structures; observed ponding.
Tree health	Annual arboricultural inspection, pruning and safety checks.	Tree register updated annually.

5. Weather and Climate Context

Tezpur experiences a humid subtropical climate with a pronounced monsoon period. Climate variation influences plantation management, indoor ventilation, stormwater handling, water demand and the seasonal use of campus buildings. The table below is a monthly reference profile for environmental planning; it should be interpreted as climate context rather than as a year-specific weather station record for FY 2025-2026.

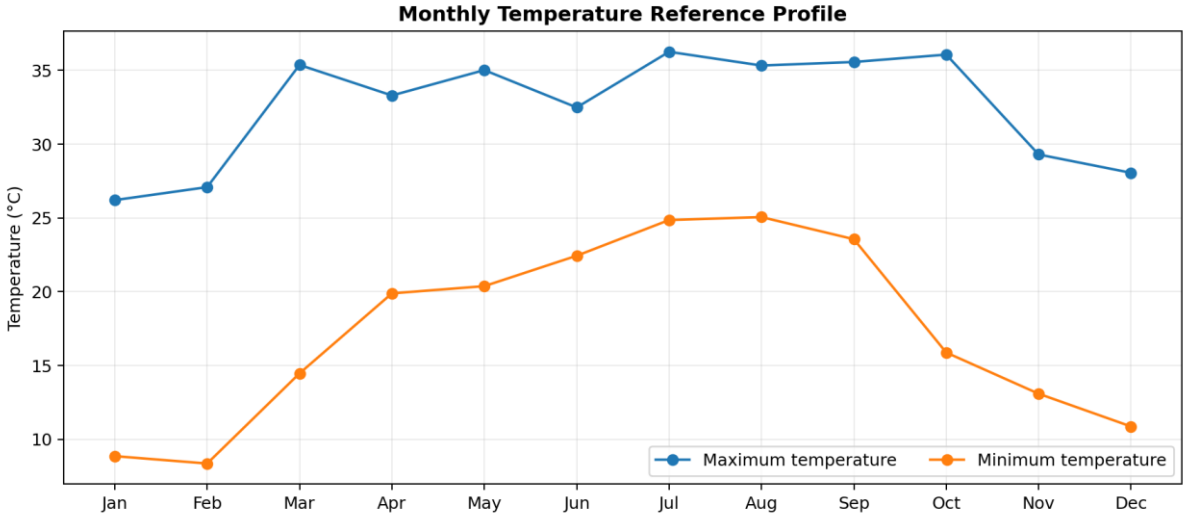


Figure 2. Monthly maximum and minimum temperature reference values.

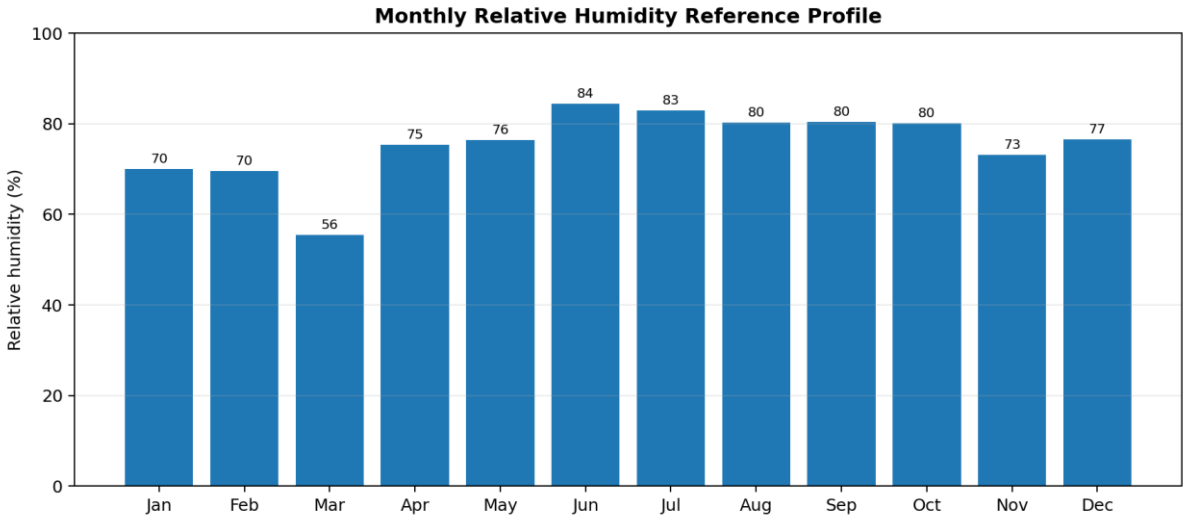


Figure 3. Monthly relative-humidity reference values.

Month	Maximum temp. (°C)	Minimum temp. (°C)	Relative humidity (%)	Precipitation reference (mm/day)
Jan	26.21	8.86	70.06	0.63
Feb	27.09	8.36	69.50	2.13
Mar	35.37	14.47	55.50	1.78
Apr	33.30	19.89	75.31	8.43
May	35.02	20.38	76.44	10.50
Jun	32.49	22.44	84.38	17.09
Jul	36.26	24.86	83.00	5.67
Aug	35.33	25.06	80.31	2.97
Sep	35.57	23.56	80.38	2.96
Oct	36.07	15.88	80.12	5.24
Nov	29.30	13.09	73.12	0.00
Dec	28.06	10.87	76.56	0.08

5.1 Climate-sensitive actions

- Inspect roof drainage and stormwater pathways before and during the monsoon.
- Use native, rain-resilient plant species and provide temporary protection to young plants during heavy rain.
- Improve natural ventilation while controlling noise and rain ingress.
- Use rainwater harvesting and infiltration measures to reduce runoff and pressure on groundwater.
- Record any local flooding, waterlogging, heat-stress or tree-fall incidents in an annual campus environment log.

6. Water Resources and Water Quality

6.1 Supply and uses

Groundwater extracted through deep tube wells is the principal water source for the campus. Water is used for drinking, food preparation, sanitation, laboratory activities, cleaning and landscape maintenance. Available campus records identify central supply and academic-block and hostel distribution, including raw and filtered water points.

6.2 Water quality review

Parameter / control point	Available finding	Required management response
Raw groundwater	Not suitable for direct drinking without appropriate treatment.	Keep raw-water points identified; prevent use for drinking.
Filtered drinking water	Available test records indicate the filtered supply is suitable for drinking/domestic use when filtration is operating correctly.	Test at least twice a year and after any source or treatment change.
pH	Reported in the acceptable drinking-water range in available laboratory interpretation.	Include pH in routine laboratory panel.
Turbidity	Reported within acceptable limits in the available interpretation.	Monitor after heavy rainfall and tank cleaning.
TDS / hardness	Reported within permissible or acceptable ranges in available interpretation.	Review trends and clean treatment equipment as scheduled.
Iron / fluoride	Reported within permissible ranges in available interpretation.	Retain laboratory certificates and confirm with periodic testing.
Storage tanks	Storage tank hygiene is essential to protect water after treatment.	Clean and disinfect tanks on a documented schedule; record dates.

6.3 Water conservation actions

- Maintain a water-point register covering source, pump, storage tanks, filters and distribution points.
- Keep raw-water and drinking-water networks clearly labelled and protected against cross-connection.
- Undertake laboratory testing at least twice each year using a recognised laboratory and retain full reports.
- Clean storage tanks on a scheduled basis and inspect them after major storms or repair work.
- Repair leaks quickly and install water-efficient taps, dual-flush systems and trigger-controlled fixtures where practical.
- Use treated greywater or harvested rainwater for gardening only after a fit-for-purpose safety assessment.
- Introduce water meters at main supply and, where feasible, at hostels and major buildings.
- Assess rooftop rainwater harvesting with first-flush, filtration, safe storage and overflow management.

6.4 Water performance indicators

Indicator	Recommended frequency	Record / target
Groundwater abstraction / pump runtime	Monthly	Metered volume or pump hours by source.
Drinking-water quality	At least twice per year	Full laboratory report; retain sampling date and point.
Storage tank cleaning	Quarterly or as required	Cleaning log and responsible person.
Leakage and fixture checks	Monthly	Defects reported and days to repair.
Rainwater harvesting performance	Before and after monsoon	Functional status, overflow / first-flush inspection.
Water-use awareness	Each semester	Notices, activities and participation record.

7. Soil Quality and Landscape Management

Soil condition affects plant growth, biodiversity, water infiltration and the stability of landscaped areas. Soil samples in the campus environmental records were analysed through NERIWALM, Tezpur, with attention to pH, organic carbon and available macronutrients.

Soil indicator	Campus finding	Interpretation / response
Soil pH	Approximately 5.5-5.8	Mildly acidic, a common condition in the region; select species suited to local soil.
Organic carbon	Moderate to high	Supports structure and moisture retention; maintain organic inputs.
Available nitrogen (N)	Relatively low	Use mature compost and targeted nutrient management; avoid indiscriminate fertiliser application.
Available phosphorus (P)	Relatively low	Confirm through periodic soil testing before applying amendments.
Available potassium (K)	Moderate	Maintain balanced nutrient inputs and leaf-litter recycling.
Soil monitoring plan	No consolidated annual record specified	Adopt a fixed sampling grid and retain laboratory reports by date and location.

7.1 Soil-health measures

- Expand vermicomposting and apply mature compost at rates appropriate to plant needs.
- Use locally suitable biofertilisers where recommended by an agronomist or horticulture specialist.
- Avoid burning leaf litter; compost leaves and use mulch where disease or pest conditions allow.
- Prevent soil compaction around tree root zones and reduce unnecessary vehicle movement on planted areas.
- Use erosion control on slopes and exposed soil before monsoon rainfall.
- Repeat soil testing at consistent locations every 1-2 years to track pH, organic carbon and available N-P-K.

8. Noise Environment

Noise affects concentration, communication, classroom comfort and residential well-being. The campus readings show a clear contrast between high-activity locations and quiet study/residential spaces. The records below list the number of measurement points and average sound level for each location.

Location	No. of measurement points	Average noise (dB)	Management priority
New Academic Building	15	56	Moderate
Administrative Block	10	71	High
Main Building	8	55	Moderate
Sanskrit Block	5	58	Moderate
Zoology Block	3	57	Moderate
Chemistry Block	3	54	Routine
Heritage Block	4	55	Moderate
Auditorium	4	52	Routine
Indoor Stadium	4	51	Routine
Boys Common Room	3	47	Routine
Union Office	4	51	Routine
AASU Office	5	49	Routine
Boys Hostel	3	42	Routine
Girls Hostel	4	43	Routine
Canteen	4	73	High
Library	3	41	Routine

Location	No. of measurement points	Average noise (dB)	Management priority
NEC Building	3	47	Routine
Academic Block	14	48	Routine
Old Alumni Building	3	48	Routine
Old Warden House	2	57	Moderate

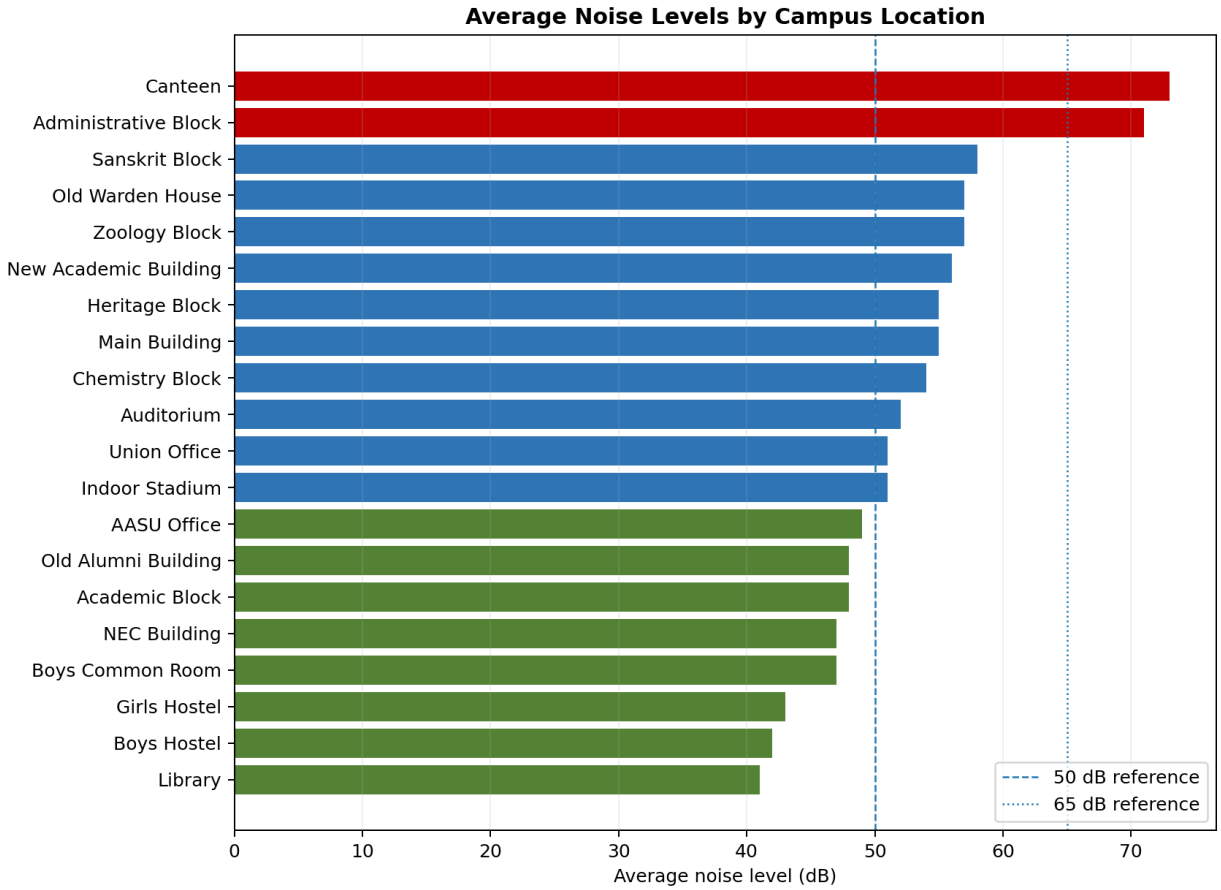


Figure 4. Average noise levels recorded across campus locations.

8.1 Main observations

- The canteen (73 dB) and administrative block (71 dB) are the principal noise-control hotspots in the available location readings.
- Several academic buildings have average values in the mid-50 dB range; quiet teaching spaces should receive priority during lecture hours.
- The library (41 dB) and hostels (42-43 dB) show relatively quiet conditions in the available measurements.
- Peak traffic, crowding, canteen activity and events are likely to be important contributors; monitoring should include busy and quiet periods.

8.2 Standards interpretation

Assam Pollution Control Board lists ambient noise limits of 75/70 dB(A) for industrial, 65/55 for commercial, 55/45 for residential and 50/40 for silence zones (day/night). The applicable comparison depends on the notified zone, time of measurement and the approved measurement protocol. Campus measurements are screening observations; repeat monitoring should log time, duration, meter calibration, weather and occupancy. A designated silence-zone requirement should be confirmed with the competent authority.

8.3 Noise mitigation

- Schedule loud maintenance, deliveries and event sound checks outside lecture periods where possible.
- Set and enforce practical sound limits for public-address systems and events.
- Improve parking discipline and restrict unnecessary vehicle movement near teaching blocks.
- Use soft landscape buffers and maintain tree belts where they do not create security or visibility issues.

- Consider acoustic panels, door seals, curtains or ceiling treatment in persistently noisy classrooms after a building-specific assessment.
- Repeat Leq measurements at the canteen, administration, library, hostels and representative classrooms, including lecture hours.

9. Air Quality and Ventilation

Campus air quality is influenced by road traffic, dust resuspension, cooking activity, indoor occupancy, cleaning products and ventilation. Available spot readings are summarised below. They are useful for identifying locations requiring better housekeeping or ventilation, but they are not a substitute for prescribed ambient air-quality monitoring over specified sampling periods.

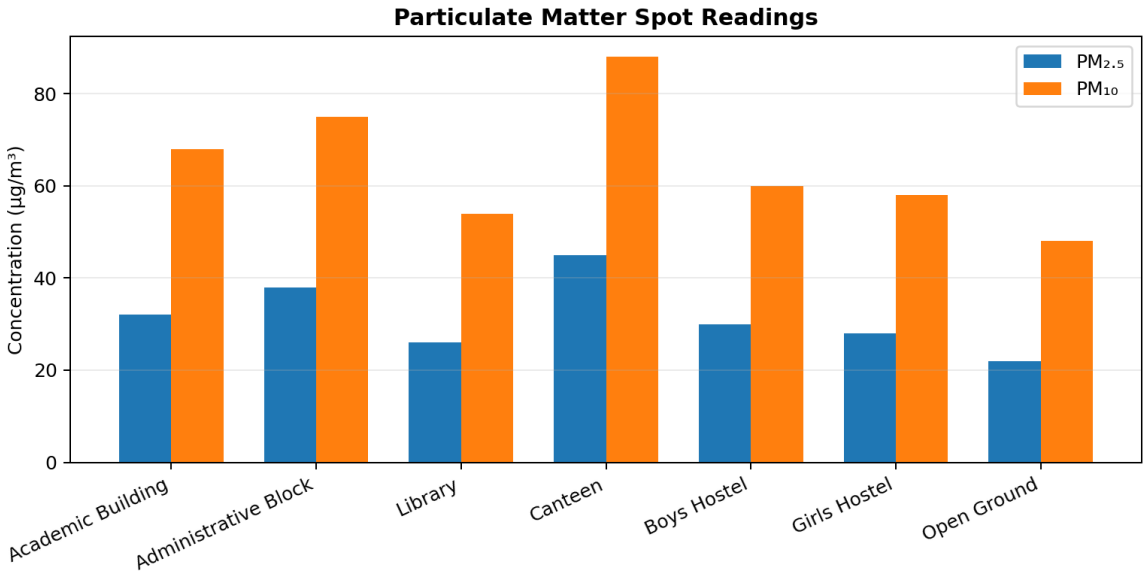


Figure 5. Particulate matter spot readings at selected campus locations.

Location	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	CO_2 (ppm)	HCHO (mg/m³)	Priority / note
Academic Building	32	68	620	0.018	Routine monitoring
Administrative Block	38	75	710	0.022	Review ventilation and activity
Library	26	54	580	0.015	Routine monitoring
Canteen	45	88	820	0.028	Review ventilation and activity
Boys Hostel	30	60	650	0.020	Routine monitoring
Girls Hostel	28	58	630	0.019	Routine monitoring
Open Ground	22	48	520	0.012	Routine monitoring

9.1 Interpretation

- The canteen has the highest spot readings among the listed locations for $PM_{2.5}$ (45 µg/m³), PM_{10} (88 µg/m³), CO_2 (820 ppm) and HCHO (0.028 mg/m³); review cooking exhaust, cleaning practices and ventilation.
- The administrative block records 38 µg/m³ $PM_{2.5}$, 75 µg/m³ PM_{10} and 710 ppm CO_2, making ventilation and dust control appropriate priorities.
- The open ground and library show lower particulate readings in the available samples.
- CO_2 is a useful indicator of ventilation adequacy in occupied spaces but is not, by itself, a complete measure of indoor air quality.
- Regulatory comparison for $PM_{2.5}$ and PM_{10} requires method-consistent ambient measurements and applicable averaging periods; one-time readings should not be described as annual compliance results.

9.2 Improvement measures

- Maintain effective kitchen exhaust and clean filters; keep cooking smoke away from occupied indoor areas.

- Adopt dust-suppression housekeeping for dry paths and high-traffic entry areas; avoid dry sweeping during occupied periods.
- Ventilate classrooms, offices and common rooms adequately, especially at peak occupancy.
- Use low-emission cleaning products and store chemicals in labelled, ventilated areas.
- Maintain vegetation along suitable road edges and dusty open areas without blocking drainage or security sightlines.
- Repeat air-quality monitoring with a documented instrument, calibration check, location, duration and occupancy/weather notes.

10. Floral Diversity

The campus floral inventory contains shade trees, timber species, fruit-bearing trees, ornamental plants, herbs and aquatic or wet-area plants. This diversity supports shade, carbon storage, soil protection, pollinators, birds and campus aesthetics. The table below consolidates species recorded in the campus inventory; local and scientific names should be periodically checked by a botanist or relevant department.

No.	Common name	Local name	Scientific name	Family
1	Blue rat's tail / Indian snakeweed	Indian Snakeweed	Stachytarpheta cayennensis	Verbenaceae
2	Flannel weed	Bor Sonborial	Solanum mauritianum	Solanaceae
3	Lantana	Gui phul	Lantana camara	Verbenaceae
4	Jamaican cherry	Hagrani cherry	Muntingia calabura	Muntingiaceae
5	Water lily	Bhet phul	Nymphaea spp.	Nymphaeaceae
6	Ivy gourd	Kunduli	Coccinia grandis	Cucurbitaceae
7	Indian prickly ash	Tez-mui	Zanthoxylum myriacanthum	Rutaceae
8	Brazilian spinach	Matikaduri	Alternanthera sessilis	Amaranthaceae
9	Pickerel weed	Bhat meteka	Pontederia plantaginea	Pontederiaceae
10	Indian jujube	Bogori	Ziziphus mauritiana	Rhamnaceae
11	Indian olive	Jolphai	Elaeocarpus floribundus	Elaeocarpaceae
12	Litchi	Lichu gosh	Litchi chinensis	Sapindaceae
13	Jackfruit	Kothal	Artocarpus heterophyllus	Moraceae
14	Neem	Moha neem	Azadirachta indica	Meliaceae
15	Indian timber bamboo	Bah	Bambusa tulda	Poaceae
16	Kanchan	Boga kanchan	Bauhinia racemosa	Fabaceae
17	Areca nut / betel nut	Tamul	Areca catechu	Arecaceae
18	Coconut palm	Naricol	Cocos nucifera	Arecaceae
19	Black plum / jamun	Kolajamu	Syzygium cumini	Myrtaceae
20	Pride of India	Ajar	Lagerstroemia speciosa	Lythraceae
21	Mango	Aam gosh	Mangifera indica	Anacardiaceae
22	Nahor	Nahor	Mesua ferrea	Calophyllaceae
23	Bakul	Bokul	Mimusops elengi	Sapotaceae
24	Mast tree / false ashoka	Debdaru	Monoon longifolium	Annonaceae
25	Guava	Madhuri aam	Psidium guajava	Myrtaceae
26	Curry leaf	Norosingho	Murraya koenigii	Rutaceae
27	Amlokhi / Indian gooseberry	Amlokhi	Phyllanthus emblica	Phyllanthaceae
28	Gomari	Gomari	Gmelina arborea	Lamiaceae
29	Lemon	Gol nemoo	Citrus aurantiifolia	Rutaceae
30	Champak	Titachopa	Magnolia champaca	Magnoliaceae
31	Teak	Segun	Tectona grandis	Lamiaceae
32	Sal	Sal	Shorea robusta	Dipterocarpaceae
33	Indian rosewood	Sishu	Dalbergia sissoo	Fabaceae
34	Golden shower	Xunaru	Cassia fistula	Fabaceae
35	Umbrella sedge	Nagarmotha	Cyperus scariosus	Cyperaceae
36	Arjun tree	Arjun gosh	Terminalia arjuna	Combretaceae

No.	Common name	Local name	Scientific name	Family
37	Agarwood	Agaru / sashi	Aquilaria malaccensis	Thymelaeaceae
38	Wood apple	Bel	Aegle marmelos	Rutaceae
39	Peepal	Aahat	Ficus religiosa	Moraceae
40	Bonsum	Bonsum	Phoebe goalparensis	Lauraceae
41	Elephant apple	Ou-tenga	Dillenia indica	Dilleniaceae
42	Baheda	Bhumura	Terminalia bellirica	Combretaceae
43	Flame of the forest	Polash	Butea monosperma	Fabaceae
44	Assam rubber tree	Robor gos	Ficus elastica	Moraceae
45	Star gooseberry	Pura amlakhi	Phyllanthus acidus	Phyllanthaceae
46	Cinnamon	Dalseni	Cinnamomum verum	Lauraceae
47	Indian bay leaf	Tejpat	Cinnamomum tamala	Lauraceae
48	Sandalwood	Boga chandan	Santalum album	Santalaceae
49	Star fruit	Kordoi	Averrhoa carambola	Oxalidaceae
50	Burmese grape	Leteku	Baccaurea ramiflora	Phyllanthaceae
51	Parijat	Parijat	Nyctanthes arbor-tristis	Oleaceae
52	Henna	Jetuka	Lawsonia inermis	Lythraceae
53	Pomegranate	Dalim	Punica granatum	Lythraceae
54	Ashoka	Ashok	Saraca asoca	Fabaceae
55	Bougainvillea	Bougainvillea	Bougainvillea spectabilis	Nyctaginaceae
56	Rangoon creeper	Malati	Combretum indicum	Combretaceae
57	Billygoat weed	Gendali-bon	Ageratum conyzoides	Asteraceae

10.1 Floral diversity management

- Prioritise native and locally adapted species for additional plantation.
- Maintain a tree census with coordinates, common/scientific name, canopy estimate, health condition and year planted.
- Protect mature trees and avoid soil filling, concrete paving or trenching within root zones.
- Control invasive weeds such as Lantana where they are spreading, using environmentally appropriate methods.
- Create labelled learning trails for trees, medicinal plants, pollinator plants and wetland-associated species.
- Record survival rates for each planting campaign and replace failed saplings in the next suitable season.

11. Faunal Diversity

Recorded campus fauna include birds, butterflies and other insects, soil invertebrates, reptiles and mammals. Green spaces, trees and wet areas provide habitat and feeding resources. Species identification should be verified before making conservation, wildlife-handling or habitat-modification decisions.

No.	Common name	Scientific group / recorded identification	Ecological role / note
1	Earthworm	Lumbricus terrestris	Soil ecosystem engineer
2	Egret	Ardea alba	Wetland / open-ground bird
3	Parakeet	Psittacidae spp.	Fruit and seed consumer
4	Common mime butterfly	Papilio clytia	Pollinator-associated insect
5	Common mormon butterfly	Papilio polytes	Pollinator-associated insect
6	Copperhead trinket snake	Coelognathus radiatus	Reptile
7	Little cormorant	Microcarbo niger	Waterbird
8	Crow	Corvus splendens	Scavenger / omnivore
9	Common myna	Acridotheres tristis	Insectivore / omnivore
10	Owl	Athene spp.	Nocturnal bird
11	House sparrow	Passer domesticus	Urban-associated bird

No.	Common name	Scientific group / recorded identification	Ecological role / note
12	Bulbul	Pycnonotidae spp.	Fruit / insect consumer
13	Pond heron	Ardeola grayii	Wetland-associated bird
14	Pigeon	Columba livia	Urban-associated bird
15	House gecko	Hemidactylus / Gekko spp.	Insectivorous reptile
16	Macaque / monkey	Macaca spp.	Mammal; species
17	Cicada	Cicadidae spp.	Sap-feeding insect
18	Tiger-moth caterpillar	Arctiinae spp.	Larval insect
19	Red cotton stainer	Dysdercus cingulatus	Plant-associated insect
20	Ground beetle	Chlaenius spp.	Predatory beetle
21	Centipede	Scolopendra spp.	Predatory invertebrate
22	Blister beetle	Meloidae spp.	Plant-associated beetle

11.1 Biodiversity safeguards

- Retain mature trees and nesting/roosting habitat where safe and compatible with campus operations.
- Avoid pesticide use in pollinator gardens and apply integrated pest management.
- Do not feed or handle wild animals; establish a safe reporting procedure for wildlife encounters.
- Reduce unnecessary night lighting near vegetated patches and use shielded fixtures where practical.
- Conduct seasonal bird, butterfly and tree observations with student volunteers and maintain dated records.
- Seek expert identification where species status or conservation significance is uncertain.

12. Waste Management and Circular Resource Use

12.1 Waste streams and current practices

The main campus waste streams include food and garden waste, paper and cardboard, plastic and packaging, glass and metal, sanitary waste, obsolete electrical/electronic equipment and small quantities of laboratory-related waste. Waste quantities are expected to vary with student occupancy, semester activity, hostel operations and campus events.

Waste stream	Existing practice / key risk	Recommended management
Wet / biodegradable waste	Bins are used; organic waste is partly treated through composting/vermicomposting and biogas systems.	Segregate wet waste at source; weigh daily/weekly; keep contaminants out of compost and digester feed.
Dry recyclable waste	Paper, cardboard, plastic, metal and packaging can be mixed with residual waste.	Provide dry-waste storage; use authorised recyclers; maintain receipts and weight records.
Sanitary waste	Requires separate hygienic handling.	Segregate in closed/labelled bins and hand over through the authorised collection route.
Special-care waste	Batteries, CFLs/tubes, chemicals, broken thermometers and certain contaminated items require special handling.	Use labelled, secure storage and authorised channels; do not mix with wet/dry streams.
E-waste	Generated from computers, peripherals, cables and laboratory equipment; ad hoc storage creates risk.	Maintain asset/e-waste register and hand over only to registered authorised recyclers/refurbishers.
Laboratory waste	Chemical residues, broken glassware and biological materials require segregation by hazard.	Follow department-specific SOPs; label containers and ensure authorised treatment/disposal.
Garden waste	Leaves and pruning residues can be composted; burning should be avoided.	Use composting/mulching and log quantities diverted from disposal.

12.2 Organic waste systems

Vermicomposting and campus biogas systems provide a foundation for circular resource management. To improve performance, the college should record feedstock quantity and type, operating status, compost output, digestate handling and end use. Organic waste should not be introduced into a digester unless it is compatible with the unit design and operating plan.

System	Operating controls	Suggested record
Vermicomposting	Suitable moisture/shade; no plastics or chemical contamination; protect from flooding.	Feedstock kg/week; compost output; rejects; maintenance.

System	Operating controls	Suggested record
Biogas	Feedstock screening; avoid grit and plastics; maintain gas lines, valves, water traps and safety controls.	Feedstock kg/day; operating days; gas use; downtime; digestate use.
Dry recyclables	Keep clean and dry; avoid mixing with wet waste.	Material type, weight, collector and receipt.
Special-care waste	Label, segregate and store securely.	Type, approximate quantity, date, handover documentation.

12.3 Compliance and institutional arrangements

For forward planning, the Solid Waste Management Rules, 2026 were notified by MoEFCC and came into effect on 1 April 2026. They establish four-stream segregation at source: wet, dry, sanitary and special-care waste, with defined stakeholder responsibilities and reporting. Although this audit covers FY 2025-2026, campus operating procedures should be aligned to the rules applicable from 1 April 2026.

- Place a clearly illustrated four-stream segregation point at major buildings, hostels, the canteen and event venues.
- Nominate a Waste Management Coordinator and retain handover receipts from authorised collectors.
- Conduct a periodic waste characterisation exercise and record wet, recyclable, sanitary and residual quantities.
- Provide clear instructions on laboratory waste, e-waste, batteries and tube lights; prohibit mixing with municipal waste.
- Use compost and digestate in landscaping only after confirming maturity, handling safety and fit-for-purpose quality.
- Report waste performance to the Green Campus Committee every semester.

13. Vehicular Movement and Green Mobility

Vehicular movement is associated with students, faculty, staff, visitors, public transport and service deliveries. Movement is concentrated around campus entry, administrative areas and parking during morning arrival and afternoon dispersal. Two-wheelers form a major share of personal vehicles. Poorly organised parking and vehicles entering core academic zones can increase local congestion, dust and noise.

13.1 Recommended mobility measures

- Mark and enforce designated parking; keep accessible routes, pedestrian paths, hydrants and emergency access clear.
- Designate low-vehicle or vehicle-free core academic areas during teaching hours where feasible.
- Provide safe walking routes, cycle parking and shaded pedestrian links.
- Encourage carpooling, public transport and cycling through student and staff awareness.
- Schedule deliveries and maintenance vehicles outside class-change peaks.
- Assess electric two-wheeler/car charging only after electrical load, safety, parking and fire-protection requirements are reviewed.
- Conduct short traffic counts at entry/exit points at the same time windows each semester to evaluate trends.

Indicator	Baseline approach	Recommended target / practice
Peak-hour traffic	Count entries in 15-minute intervals during morning and afternoon peaks.	Establish a semester baseline and repeat consistently.
Parking compliance	Monthly walk-through with photographs.	All designated parking bays marked and maintained.
Pedestrian safety	Inspect crossing points, paths and vehicle conflict locations.	Close high-risk defects promptly.
Clean mobility	Record bicycle racks, carpool participation and public-transport information.	Increase participation annually.
Vehicle emissions / idling	Observe idling at gates and loading areas.	Introduce no-idling guidance and signage.

14. Energy and Carbon Footprint

Electricity consumption is an important component of the campus environmental footprint. The 12 APDCL bills for FY 2025-2026 record 134,589 kWh of grid electricity and total bills of ₹1,612,478. This corresponds to an effective billed cost of ₹11.98 per consumed kWh, including energy charges, demand/fixed charges, duty and other bill components.

Indicator	FY 2025-2026 value
APDCL consumer number	099000001429
Tariff category	HT IV Bulk Supply (Government Education)

Indicator	FY 2025-2026 value
Connected load	210 kW
Contract demand	247.06 kVA
Annual grid electricity consumption	134,589 kWh
Annual APDCL bill amount	₹1,612,478
Average monthly electricity use	11,216 kWh
Effective cost per consumed unit	₹11.98/kWh
Grid-emission factor used	0.779 kg CO_2/kWh (CEA FY 2025-2026 weighted-average reference)
Estimated Scope 2 emissions	104.8 tCO_2
Other emission sources excluded	Diesel generators, refrigerants, commuting, waste and embodied emissions

14.1 Energy conservation opportunities

- Prioritise sub-metering of academic blocks, laboratories, hostels, library and water pumps.
- Review power factor monthly; investigate lower PF months and maintain capacitor compensation after suitable power-quality assessment.
- Replace conventional fans in phases with high-efficiency BLDC fans after confirming quantities and operating hours.
- Use daylight and switching zones in classrooms; install occupancy sensors in toilets, corridors, stores and intermittently used spaces.
- Maintain air conditioners and pumps, control operating hours and prevent avoidable operation.
- Assess rooftop solar PV based on roof condition, shading, daytime load matching, tariff and technical interconnection requirements.
- Publish a monthly energy dashboard alongside water and waste indicators.

15. Existing Green Practices

15.1 Environmental awareness and academic integration

The college's campus sustainability activities include environmental awareness and commemorative-day observances, plantation-related activities, student engagement around sustainable development, and integration of Environmental Science into the student learning experience. Such activities can be strengthened by linking each campaign to a measurable outcome, such as waste collected and diverted, sapling survival, water saved or biodiversity records completed.

15.2 Resource recovery and campus stewardship

- LED lighting adoption and energy conservation awareness.
- Vermicomposting of suitable organic material for use in campus planting.
- Biogas systems as a demonstration of organic waste-to-energy.
- Tree cover, open green spaces and opportunities for student biodiversity documentation.
- Environmental education and participation in awareness events such as World Environment Day and World Water Day.

15.3 Institutional improvement opportunity

A Green Campus Committee should coordinate activities across the estate office, departments, hostels, canteen, student groups and administration. A single annual register can record the owner, budget, baseline, target, evidence and status of each action. This approach helps translate one-off events into sustained campus performance improvement.

16. Recommendations and Action Plan

Time frame	Action	Lead unit	Performance evidence
0-3 months	Constitute Green Campus Committee; nominate owners for water, waste, biodiversity, energy and mobility.	Principal / administration	Committee order, meeting minutes and annual action plan.
0-3 months	Implement four-stream waste segregation points and colour/signage system.	Estate office / hostels / canteen	Bin map, inspection checklist and waste collection records.
0-3 months	Start monthly water leak and tank-cleaning log.	Estate office	Water-point register; maintenance log.

Time frame	Action	Lead unit	Performance evidence
0-6 months	Conduct drinking-water testing at source, raw supply and filtered points.	Administration / approved laboratory	Full test reports, corrective action and retest.
0-6 months	Repeat noise and indoor air screening at canteen, administrative block, library and classrooms.	Green Campus Committee / competent agency	Monitoring sheets with duration, instrument and timing.
0-6 months	Prepare tree inventory and validate priority plant / fauna identifications.	Botany / Zoology / Environment Science departments	Geotagged register and biodiversity records.
0-6 months	Begin waste weighing and track compost/biogas input and output.	Estate office / canteen / departments	Monthly waste ledger and diversion indicators.
0-12 months	Repeat soil testing at fixed locations and initiate nutrient management.	Horticulture / relevant department	Lab reports and soil improvement log.
0-12 months	Improve walking routes, parking markings and no-idling practice.	Administration / security	Traffic inspection and compliance record.
0-12 months	Install priority energy sub-meters and start monthly energy dashboard.	Estate office / electrical team	Sub-meter reports and trend dashboard.
6-18 months	Prepare rooftop solar feasibility assessment.	Management / technical consultant	Design, load matching, capex/O&M and payback analysis.
Annual	Conduct the green audit review and publish an action-completion summary.	Green Campus Committee	Annual report and year-on-year KPI comparison.

16.1 Priority matrix

Priority	Action package	Reason
High	Drinking-water safety and tank hygiene; four-stream waste segregation; canteen noise / air review.	Public health, pollution prevention and operational control.
High	Tree protection, fire/chemical/waste safety and authorised waste handover.	Avoid irreversible ecological damage and unsafe disposal.
Medium	Soil improvement, compost/biogas logs, water metering and maintenance.	Resource efficiency and better operational evidence.
Medium	Parking discipline, low-vehicle academic zones and classroom acoustic improvements.	Learning environment and local pollution reduction.
Strategic	Rooftop solar, rainwater harvesting expansion and biodiversity interpretation trail.	Long-term climate resilience and environmental education.

17. Environmental Monitoring Framework

Parameter	Indicator	Frequency	Responsibility / record
Land and green cover	Area by category; tree count; sapling survival.	Annual / each planting cycle	Estate office and Botany; land-use map and tree register.
Water	Source volume / pump hours; quality test; tank cleaning.	Monthly; quality twice yearly	Estate office; meter and lab reports.
Soil	pH, organic carbon, available N-P-K.	Every 1-2 years	Horticulture / relevant department; lab report.
Noise	Leq at fixed points and times.	Annually and after major changes	Green Campus Committee; calibrated meter logs.
Air / ventilation	PM2.5, PM10, CO_2, indoor ventilation notes.	Annually / high-risk locations more often	Competent monitoring agency; method and duration log.
Biodiversity	Floral/faunal species observations.	At least twice yearly	Botany / Zoology / student volunteers.
Waste	Wet, dry, sanitary, special-care, recyclable and residual quantities.	Monthly	Waste Coordinator; weights and handover receipts.
Energy / carbon	kWh, cost, PF, DG fuel, solar generation and CO_2 estimate.	Monthly / annual carbon update	Accounts / electrical team; bills and fuel ledger.
Mobility	Entry counts, parking compliance and safety issues.	Each semester	Security / estate office.

Parameter	Indicator	Frequency	Responsibility / record
Awareness	Activities, participation, waste/plantation outcomes.	Each semester	NSS / departments / Green Campus Committee.

17.1 Annual performance dashboard

Key performance indicator	Baseline / starting point	Annual reporting approach
Open space and plantation	31,120.74 m^2; 44.13% of listed area	Recheck only when campus land use changes.
Drinking water safety	Filtered supply supported by available laboratory interpretation	Report tests, corrective actions and retests.
Waste segregation	Basic segregation and organic treatment practices in place	Report coverage of four streams, quantities and authorised handovers.
Composting / biogas	Systems present in campus records	Record throughput, operating days and end use.
Noise hotspots	Canteen 73 dB; administrative block 71 dB in available observations	Repeat with matched timing and method; track reductions.
Grid electricity	134,589 kWh; ₹16,12,478 in FY 2025-2026	Report kWh, billed cost, PF and current emission factor.
Floral and faunal records	Multi-species campus inventory available	Validate taxonomy and update species and habitat records.
Environmental education	Environmental Science and awareness activities	Report participation and measurable outcomes.

18. Conclusion

Darrang College has a significant environmental asset in its open space and plantation area, alongside active academic and student-learning opportunities in environmental science. The campus also has foundations for circular resource use through vermicomposting and biogas systems. The next step is to embed these assets in a structured environmental management system that uses clear responsibilities, documented records and repeatable measurements.

Priority improvements include secure drinking-water management, soil-health monitoring, noise and air-quality follow-up at active locations, validated biodiversity records, improved waste segregation and authorised recycling, reduced vehicle conflict in academic spaces, and measurable energy conservation. Implementing these measures through a Green Campus Committee and annual dashboard will strengthen environmental performance and create a practical living laboratory for sustainability education.

Recommended institutional decision

Approve a Green Campus Committee and a 12-month implementation plan, with quarterly progress reviews and a documented annual environmental dashboard.

Appendix A. Environmental Data Tables

A.1 Land-use calculation

Category	Area (m^2)	Share (%)
Built-up area	20,782.53	29.47
Playground	18,162.42	25.76
Open space and plantation	31,120.74	44.13
Hollows / trenches	452.98	0.64
Total	70,518.67	100.00

A.2 Noise and air observations

Noise location	Average dB
New Academic Building	56
Administrative Block	71
Main Building	55
Sanskrit Block	58
Zoology Block	57
Chemistry Block	54
Heritage Block	55
Auditorium	52
Indoor Stadium	51
Boys Common Room	47
Union Office	51
AASU Office	49
Boys Hostel	42
Girls Hostel	43
Canteen	73
Library	41
NEC Building	47
Academic Block	48
Old Alumni Building	48
Old Warden House	57

Air location	$PM_{2·5}$	PM_{10}	CO_2	HCHO
Academic Building	32	68	620	0.018
Administrative Block	38	75	710	0.022
Library	26	54	580	0.015
Canteen	45	88	820	0.028
Boys Hostel	30	60	650	0.020
Girls Hostel	28	58	630	0.019
Open Ground	22	48	520	0.012

A.3 FY 2025-2026 electricity record

Month	Units consumed (kWh)	Bill amount (₹)	Average PF (%)
April 2025	10,929	133,337	93.5
May 2025	12,969	148,955	95.8
June 2025	15,099	165,626	96.5
July 2025	6,774	97,329	86.8
August 2025	18,069	190,381	97.4
September 2025	16,839	180,290	96.9
October 2025	13,794	157,093	94.9
November 2025	10,902	131,193	93.8
December 2025	7,968	107,494	88.8
January 2026	5,364	88,782	82.0
February 2026	7,266	98,987	90.0
March 2026	8,616	113,011	91.2
Total / mean	134,589	1,612,478	92.3

Appendix B. References and Calculation Notes

1. Assam Power Distribution Company Limited (APDCL), monthly electricity bills for consumer number 099000001429, April 2025-March 2026.
2. Campus land-use, biodiversity, water, soil, air, noise, waste-management and institutional environmental records available for Darrang College.
3. Central Electricity Authority, CDM-CO_2 Baseline Database, Version 22.0 (FY 2025-2026 grid-emission-factor reference). https://cea.nic.in/cdm-co2-baseline-database/?lang=en
4. India grid emission factor reference, FY 2025-2026 weighted average 0.779 tCO_2/MWh, updated 18 October 2026. https://zerocarbon.org.in/india-grid-emission-factor
5. Bureau of Indian Standards, IS 10500:2012 Drinking Water - Specification, reviewed in 2023 with amendments. https://standards.bis.gov.in/website/standard-details
6. Pollution Control Board, Assam, Ambient Air Quality Standards in Respect to Noise. https://pcb.assam.gov.in/information-services/ambient-air-quality-standards-in-respect-to-noise
7. Central Pollution Control Board, National Ambient Air Quality Standards (NAAQS) and air-quality guidance. https://cpcb.nic.in/air-quality-standard/
8. Ministry of Environment, Forest and Climate Change, Solid Waste Management Rules, 2026 (effective from 1 April 2026). https://moef.gov.in/rules-regulations-3
9. NASA POWER Data Access Viewer, climate data source for monthly reference values. https://power.larc.nasa.gov/data-access-viewer/

B.1 Calculation notes and interpretation

Land-use total = 70,518.67 m^2. Open space and plantation share = 44.13%. Built-up share = 29.47%. FY 2025-2026 effective electricity cost = ₹1,612,478 / 134,589 kWh = ₹11.98/kWh. Grid-electricity emissions = 134,589 kWh × 0.779 kg CO_2/kWh = 104.8 tCO_2. The grid-emissions figure is a location-based Scope 2 estimate for purchased electricity and does not include diesel generation, commuting, waste, refrigerants or embodied emissions.

Environmental spot measurements should be interpreted within their sampling method, instrument and time conditions. Water and soil test certificates, instrument calibration details and annual monitoring records should be retained by the College to support future year-on-year comparisons.