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100 YEARS
1921 - 2021

Green Audit

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR

CERTIFICATE

This is to certify that the Green Audit for Harcourt Butler Technical University,Located at Nawabganj,Kanpur has been conducted in Month of July 2022 to assess the Green practices as well as execution of existing Environmental Management System implemented in the University Campus for Water Management ,Air Quality .Green Area Cover, Solid Waste Management and Knowledge of Environmental Legislation, Energy Consumption, Student Welfare Facilities Housekeeping Practices Existence of Carbon Foot Print and Green Wealth etc.

This specific Green Audit was carried out for the first time to assess the impact of major factors of Environmental practices and green initiatives inside the University' The corrective recommendations of this audit shall be helpful in much better planning for Green practices inside the University to make sustainable impact to increase the natural diversity .

Dr Ashutosh Tandon
External Lead Auditor

JES, Kanpur

GREEN AUDIT REPORT

Prepared by

JUPITER
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ACKNOWLEDGEMENT

M/s Jupiter Enviro-Safe Consultants Green Audit Team is pleased to convey thanks to the management of Harcourt Butler Technical University specially Honorable Prof. Shamsher Singh ,Vice Chancellor, HBTU, Prof. Sunil Kumar ,Prof. D. Parmar ,Prof. J.K. Dwivedi, Er. Ashutosh Kumar Singh and Staff members of HBTU, Kanpur. We appreciate the cooperation extended to our team for completion of Green audit report successfully.

We extend our note of thanks to entire community including students club, Photography club and administration of HBTU for providing us the necessary inputs and data to carry out the vital exercise of Green Audit and field survey.

For-**Jupiter Enviro-Safe Consultants**

(Dr A Tandon)

Harcourt Butler Technical University

Green Audit Team

Sr. No.	Name	Designation	Role
1.	Prof. Sunil Kumar	Chairman Central Maintenance Committee and Dean Student Welfare	Coordinator
2.	Prof. D. Parmar	HOD Department of Civil Engineering	Internal Auditor
3.	Mr J.K. Dwivedi Associate Prof.	HOD Department of Electrical Engineering	Internal Auditor
4.	Er. Ashutosh Kumar Singh	AE HBTU Central Maintenance	Internal Auditor
5.	Dr. Ashutosh Tandon	Environmental Consultant	External Auditor
6.	Mr. Dheeraj Ganesh Mishra	Environment Consultant	External Audit Team Member

CONTENTS

INTRODUCTION

Green Audit as undertaken is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of the University. It aims to analyze environmental practices within and outside of the university campus, which will have an impact on the surroundings & campus itself. Green audit is a valuable means for the University to determine how and where they are using the most energy or water or other resources; the University 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 can also be stated that this initiative if adopted may prove beneficial to the university. Thus it is imperative that for the university to 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 extremely important.

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 generated CO_2 emissions from the campus. The National Assessment and Accreditation Council (NAAC) have made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

ABOUT THE HARCOURT BUTLER TECHNOLOGICAL UNIVERSITY (HBTU), KANPUR

Since 1921 Harcourt Butler Technical University (Formerly HBTI Kanpur) has always been a paragon and a source of inspiration in the field of science and technology. It has maintained its conspicuous presence in the technical world. H.B.T.U has a history of realization, fulfilment of necessities and advancement in the field of science and technology. It is dedicated for the cause of rapid industrial development, creating a healthy environment for applied researches and above all to carve out men and women, having a truly rational and scientific demeanour. 'Attitude' is the watchword – taking care of which the personality of every Harcourtian is moulded. Its roots are as deep as its outlook. "Government Research Institute, Cawnpore" was established in 1920, which was renamed as "Government Technological Institute" in 1921. Finally in 1926 it got the name by which we know it today "Harcourt Butler Technological Institute". Now as per Act No. 11 of 2016 by the Government of Uttar Pradesh it becomes university, i.e., Harcourt Butler Technical University Kanpur.

The University is spread across two campuses, the east campus (77 acres) and the west campus (271 acres) situated about 3 km apart. HBTU, retained **M/S Jupiter Enviro-Safe Consultants,** Kanpur to conduct environmental audit for their both east & west campus.

Harcourt Butler Technical University Kanpur has been established in year 2016 by the Government of Uttar Pradesh with a view for making it a leading Residential University to become a Centre of Excellence with focus on Research and Development and Incubation in the field of Engineering, Technology, Basic & Applied Sciences,

Humanities, Social Science & Management Architecture and other professional courses. HBTU aims to promote studies, research & innovation in engineering areas of higher education, to enhance skill development through continuing education programme and knowledge and to achieve excellence in higher Technical education.

On academic front, the University is running Four Schools with thirteen Undergraduate Programmes in Chemical Engineering, Civil Engineering, Computer Science & Engineering, Electrical Engineering, Electronics Engineering, Information Technology, Leather Technology , Mechanical Engineering, Biochemical Engineering, Food Technology , Oil Technology, Paint Technology and Plastic Technology along with M.C.A, full time & part time M.Tech. Programme in various disciplines and going to start full time Ph.D. programme in number of disciplines as part of Quality Improvement Programme of MHRD and TEQUP-II. In view of the emerging need of the time, the University is planning to start number of Programmes at Undergraduate and Post Graduate level in the near future.

The University provides a congenial environment for the holistic growth and all round development of the students such that they become globally acceptable personalities with communication skills, proper attitudes, aptitudes, problem solving capabilities and to work as a team.

HBTU Kanpur (Formerly HBTI) has received aid from the World Bank(Phases TEQIP-I , TEQIP-II) for various developmental projects. This aid will be spent for:

- Development of the Infrastructure.
- New Laboratory equipment.
- Maintenance and repair of old laboratory equipment.

- Funding for research and lectures attended by faculty in foreign Universities.
- Aim towards community development and overall growth.

The faculty members have contributed large numbers of research papers in Indian as well as International journals. Besides, many R&D Schemes sponsored by D.S.T, U.G.C, I.C.A.R, D.R.D.O.,U.P.C.S.T., C.S.I.R., D.A.E., I.C.M.R.,D.O.E. and Ministry of Civil supplies have been successfully completed. All these accomplishments definitely prove it to be a fecund ground for nurturing intellects.

GENERAL INFORMATION AND FACILITIES

Staff and Students Detail

Males	330
Females	20
Total	350

STUDENTS (INCLUDING ALL COURSES)

Boys	2400
Girls 20 % of total	600

Other Welfare Facilities at HBTU Kanpur

1) ATM-02 (EC & WC)
2) Free Wi-Fi -All Around the Campus
3) E-Learning Classrooms
4) Guest House with Modern Facilities -01
5) Cafeteria-02
6) Medical Centre-01
7) Ambulance-01
8) Auditorium-02
9) Gen. X Incubation Centre-01
10) E-Library-01
11) Parking-02 (EC & WC)
12) Community Hall -01
13) Multipurpose Hall-01
14) Post Office

Student Clubs

These sub-councils and student clubs existing- at HBTU Kanpur.

1. Literary Sub-council
2. Sports Sub-council
3. Cultural Sub-council
4. Photography Club
5. Yoga Club
6. Hobby Club
7. NSS

Annual Budget of the University (Approx.)

Rs 62 Crores for year 2021-22.

OBJECTIVES OF GREEN AUDIT

In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the existing environmental problems if any. The University has been continuously striving to keep the environment healthy since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

- To document the floral and faunal diversity of the University
- To identify General Climatic conditions of Kanpur where University is situated
- To Review the ambient air condition, water consumptions of the University.
- To Review the waste disposal system
- To estimate the Energy requirements of the University.
- To identify green initiatives in practice at present.
- Recommendations for further improvements

METHODOLOGY

The purpose of the green audit of HBTU, Kanpur was to ensure that the practices followed in the university campus are as such which keep the environment healthy. The methodology undertaken includes: collection of data, physical inspection of the campus, observation and review of the documentation and data analysis.

MISSION STATEMENT OF HBTU

1. Imparting Knowledge to develop analytical ability in science and technology to serve the industry and society at large.
2. Equip and enable students with conceptual, technical and managerial skills to transform the organization and society.
3. Inculcating entrepreneurial philosophy and innovative thinking to promote research, consultancy and institutional social responsibility.
4. Serving people, society and nation with utmost professionalism, values and ethics to make development sustainable and quality of life.

LAND USE ANALYSIS DETAILS OF HBTU, KANPUR

S.No.	Location	Area	In Sq.Mtr.
1	East Campus	77 Acre	3,11,607.94 Sqm.
2	West Campus	248 Acre	10,03,620.39 Sqm.

Being a largest technical university of Kanpur, HBTU has massive huge land bank. We have verified the land uses by the method of document review, site map and physical tour throughout the campus. Following measurements were found to assess the roads, covered area, built-up area and green area of east & west campus of the university.

Area break-up details

Sr.No.	Name of the Building	Area in Sq.Mtrs	Location
1.	Main Building	9048.40	East campus
2.	Computer Science and engineering	992.81	East Campus
3.	Mechanical Engineering	1422.60	East Campus
4.	Electrical and Electronics Engineering	1260.00	East Campus
5.	Civil Engineering	1594.65	East Campus
6.	Leather Technology	714.56	East Campus
7.	Work shop	6026.00	East Campus
8.	Library	2072.00	East Campus
9.	Drawing Hall	524.00	East campus
10	New Class Rooms in civil Engineering Department	250.00	East Campus
11.	New Environmental Engineering lab	120.00	East campus

12.	Incubation Lab Centre	412.74	East Campus
13	Chemical Engineering New Building	1507.00	East Campus
14.	Electronics Engineering New Building	2320.00	East Campus
15.	Gen X innovation Incubation and Entrepreneurship Cell	635.00	East Campus
16.	Extension of EE and Concrete labs	135.00	East campus
17	Administrative Office	1705.60	East Campus Main building
18	Class Rooms Total no. 63	5703.00	All Around East Campus
19.	Auditorium Old	825.00	East Campus
20.	Bank and Dispensary	420.00	East Campus
21.	Cafeteria Old	277.00	East Campus
22.	Cafeteria New	252.00	East Campus
23.	Guest House	1018.74	East Campus
24	Security Building	80.00	East Campus
25	Post Office	10.00	East Campus
26.	ATM	6.00	East Campus
27	Parking Old	5000.00	East Campus
28	Parking New	5000.00	East Campus
29	Community Center	150.00	West Campus
30	Indoor Court	200.00	East & West Campus
31	New Gymnasium	320.34	West Campus
32.	New Auditorium	595.00	West Campus
33	Multipurpose Hall	2321.25	West Campus

34.	Alaknanda Hostel	1275.00	East Campus
35.	Mandakini Hostel	980.00	East Campus
36.	Gangotri Hostel	920.00	East Campus
37.	Bhagirithi Hostel	1275.00	East Campus
38.	Kaveri Hostel	2000.00	East Campus
39.	Saraswati Hostel	1474.00	East Campus
40	Ramanujam Lake View Hostel	2627.00	East Campus
41	Sridharacharya Hostel	1352.93	East Campus
42	Abdul kalam Hostel	6250.00	West Campus
43.	Visvesaraya Hostel	5116.00	West Campus
44.	Raman Hostel	3602.00	West Campus
45.	Vishwakarma Hostel	2489.00	West Campus
46.	Ambedkar Hostel	3454.26	West Campus
47	Aryabhatt Hostel	3454.26	West Campus
48.	Vivekanand Hostel	2014.00	West Campus
49.	Residence Buildings (Type-I,Type-II,Type-III,Type IV	4005.00 Total -73.00 Residences	East Campus
50.	Residence Buildings Type-I, Type II, Type III, Type IV Type V VC Residence	18514.00 Total-230.00 Residences	West Campus
51.	Roads 7km x3.75 mtr.Width	26250.00	East and West Campus

Total Built-up Area and Roads (East & West Campus)

S.no	Category	Area (in sq metre)	Location
1	Academic Buildings	29902.45	East Campus
2	Admin Buildings	2384.00	East Campus
3	Class Rooms	5703.00	East Campus
4	Residence	4005.00	East Campus
5	Residence	18514.00	West Campus
6	General Amenities	16577.38	East and West Campus
7	Boys Hostel	26380.00	West Campus
8	Boys/Girls Hostel	11854.00	East Campus
9	Roads (7KmLength;3.75 width)	26250.00	East and West Campus

Total Covered Area & Area of the roads = 141569.83 sqm

Total available open area for green belt development = Total Area of the Campus (E+W) – Total Covered Area & area of the roads (1315228.33 – 141569.83 sq.m)
= 1173658.5 sqm

The area reserved for green belt = 8,76,818 sqm
Above figures reveal that more than 2/3rd of the total land area is reserved for green belt. The university authorities are continuously incrementing their green cover in phases.

GEOGRAPHICAL LOCATION

HBTU, Kanpur is situated at the mid of the city near Nawabganj, Kanpur. The main heritage sites and tourist places near HBTU are Jageshwar Temple, C.S.A University, River Ganga, Kanpur Zoo(Allen Forest) etc. The co-ordinates of East Campus and West Campus are as following

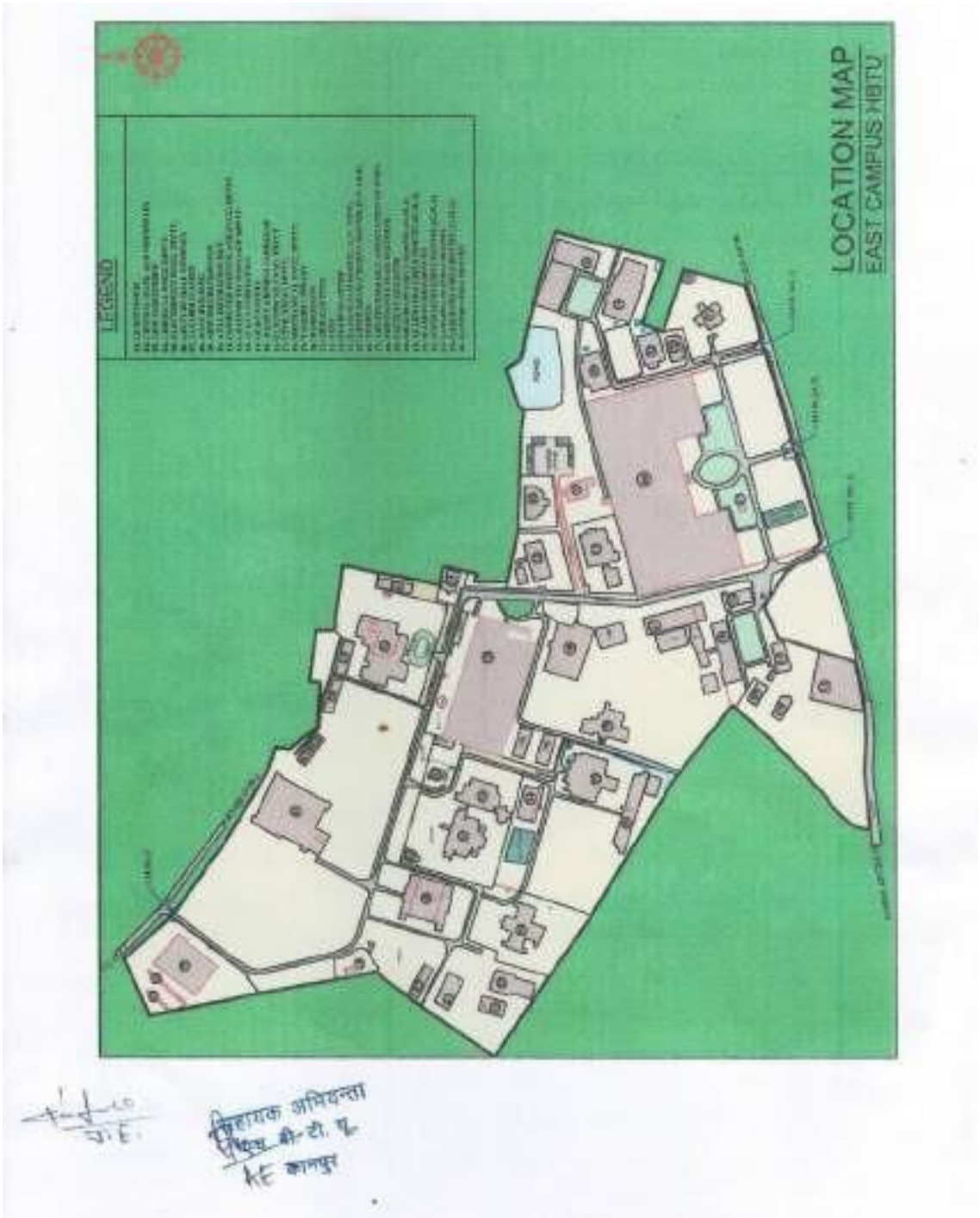
East Campus Co-Ordinates:
Latitude 26.49.35°N

Longitude 80.30.74°E

West Campus Co-ordinates:
Latitude 26.49.50°N

Longitude 80.30.52°E

SITE MAP OF CAMPUS



Location map of East Campus

Location map of West Campus

FLORA & FAUNA DIVERSITY IN HBTU

HBTU is within the geo-position between East Campus: Latitude-26.4935°N and Longitude- **80.30.74°E and West Campus : Latitude-26.4950°N and Longitude-80.30.52°E** in Kanpur, Uttar Pradesh, India. It encompasses an area of about 325 Acres. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the authority and have become an integral part of the University. The trees of the University have increased the quality of life, not only the University fraternity but also the people around of the University in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favourite of birds and many insects. Leaf –covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colors. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees give them a monumental life quality. They also remind the glorious history of our University for lush greenery in particular. The existing & presently planted saplings give an emotional connection and sometime become personally attached to the ones during their course of growth. A thick belt of large shady trees in the periphery of the University have found to reduce noise level and cut down dust and aerosols. Thus, the University has been playing a

significant role in maintaining the environment in its surrounding areas.

DEVELOPMENT OF GREEN BELT

The HBTU authorities have always stressed the need of appropriate green belt area within & outside the university boundary. Thus the university has covered the maximum available area for development of green belt. To further increase the green-belt area the scheme is proposed as follows:

As per the movement of the prevailing wind direction at the plant site on yearly average basis, it can be said that the wind can rotate through all the angles and the specific direction movement cannot be considered.

Thus considering the scattered nature of fugitive emissions sources it is proposed to carry out extensive tree plantation along the roads, fuel stockpile and all other areas wherever feasible. In areas where it is not feasible to plant tall trees, shrubs and bushes are to be planted.

The guidelines for development of G.B. around and inside the unit are described in subsequent paragraphs.

GENERAL GUIDE LINES :

Trees growing upto 10 mtr. or more in height should be planted around the installation.

- Planting of trees should be undertaken in appropriate encircling rows around the installation in alternating rows to prevent horizontal pollution dispersion.
- Trees should be planted along the roadsides, to arrest the dust, auto-exhaust and noise pollution in such a way that there is no sight to the installation when viewed from a point outside foliage perimeter.
- Since tree trunks are normally devoid of foliage (upto 2 mtrs.), it would be appropriate to have shrubs in front of such trees to give coverage to this portion.

- Fast growing trees with thick perennial foliage should be grown, as it will take years for trees to grow to their full height.

The suitable plant species for development of green belt are enumerated as shown in the table.

Plant Species Identified for Green Belt Development

S.No.	Plant Species	Vernacular Name
1.	Alibizzia lebbek	Kalsiris
2.	Terminalia arjuna	Arjun
3.	Cassia Fistual	amaltas
4.	Polyalthia longifolia	Asoka
5.	Embelica officianalis	Amala
6.	Bauhinia variegata	Kachnar
7.	Mitragyna parviflora	Kadamb
8.	Pongamia pinnata	Kranj
9.	Cassia siamea	Kasod
10.	Dalbergia sissoo	Sheesham
11.	Delonix regia	Gulmohar
12.	Ficus glomerata	Gular
13.	Acacia nilotica	Keekar
14.	Cacia catechu	Khair
15.	Acacia arabica	Babul

16.	Syzygium cumini	Jamun
17.	Mimusops elangi	Maulsiri
18.	Madhuca indica	Mahua
19.	Ficus bengalensis	Bargad
20.	Ficus religeosa	Peepal
21.	Azadirachta indica	Neem
22.	Casurina equisitifolia	Jhau
SHRUB		
23.	Nerium odourum	Kaner
24.	Parkinsonia aculeate	Vilayati Jhau
25.	Hibiscus rosasinesis	Gudhal
26.	Dracaena	
27.	Callistemon Ianceolatus	Bottle brush
28.	Salvadora oleoids	Peelu
29.	Zizyphus mauritiana	Ber
30.	Lantana camara	Kuri
31.	prosopisjuliflora	Vilayati babul

The plant-to-plant and row-to-row spacing on each greenbelt strip is 5 mtr. Depending upon the width of the greenbelt, the number of plant rows in each green belt varies from 4 to 17.

On roadsides 3 or 2 rows of plants on either side, the tree positions in the first row on either side will be in a staggering fashion with respect to those in the first row. In case of tree positions on the greenbelt strips also, tree positions in each row will be in a staggering fashion with respect to those on either side rows.

Table: Flora & Fauna Study in Buffer Zone:

Plant species	Abundance	Average	Minimum
	Buffer Zone	Buffer Zone	Buffer Zone
Azadirachta indica (Neem)	√		
Ficus benghalensis(Bargad)		√	
Neolamarckia cadamba (Kadam)	√		
Calotropis procera (Mudar)	√		
Delonix regia (Gulmohar)		√	
Eucalyptus	√		
Saraca asoca (Ashoka)			√
Psidium guajara (Amrud)			√
Carica papaya (Papaya)			√
Musa acuminata (Banana)			√
Madhuca longifolia (Mahua)			√
Chitwan		√	
Bambusa Sp.		√	
Zizyphus Sp.		√	
Acacia nilotica	√		
Ficus religiosa (Peepal)		√	
Prosopis juliflora (Vilayati Babool)	√		
Acacia arabica (Babool)			√
Melia azaderach (Bakain)			√
Aegle marmelos (Bel)			√
Cassia fistula (Amaltas)			√
Tamarindus indica (Imli)			√
Dalbergia sissoo (Shisham)		√	
Hephophragma adanophyllum (Kath		√	

Sagaun)			
Terminalia arjuna (Arjun)		√	
Feronia limonia (Kaith)			√
Syzygium cuminii (Jamun)		√	
Tectona grandis (Sagaun)			√

Fauna species found in the buffer zone

Sr. No.	Common Name	Scientific Name	Schedule list as per Wildlife Protection Act
1	Toad	*Bufo sp*	
2	Frog	*Rana tigrina*	
3	Indian garden lizards	*Calotes versicolor*	
4	House lizards	*Hemidactylus sp.*	
5	Cobra	*Naja naja*	Schedule II
6.	Viper	*Vipera sp*	
7	Indian palm squirrel	*Fumambulus pennanti*	
8	Cat	*Felis sp.*	
9	Dog	*Canis lupus familiaris*	
10	Cow	*Bos sp.*	
11	Buffalo	*Bubalus bubalis*	
12	Horse	*Eqqus sp.*	
13	Newala	*Herpestes sp.*	
14	Rat	*Rattus rattus*	
15	Monkey	Rhesus macaque	
16	Crow	*Corves splendens*	
17	Sparrow	*Passer domesticus*	
18	Parrot	*Psittacula krameri*	

19	Peafowl	*Pavo cristatus*	Schedule I
20	Pigeon	*Columba livia*	
21	Bulbul	*Pycnonotus sp.*	
22	Maina	*Acridotheres tristis*	
23	Koel	*Eudynamys scolopacea*	
24	Pond Heron	*Ardeola grayii*	
25	Crimson breasted Wood pecker	*Dendrocopus cathpharius*	
26	Kite	*Milvus sp*	
27	Shikara	*Accipitor badius*	
28	Common quail	*Coturnix sp*	
29	Dove	*Streptopelio sp*	
30	Owl	*Bubo bubo*	
31	Butterflies	*Rhopalocera sp*	
32	Wasps	*Vespa orientalis*	
33	Dragonfly	*Agrian sp*	
34	Honey Bee	*Apis indica*	
35	House fly	*Musca domestica*	
36	Cockroach	*Periplanata sp.*	
37	Beetles	*Lasioderma sp.*	
38	Spider	*Pachlomerus sp.*	
39	Grasshopper	*Schistocera sp.*	

AIR & NOISE QUALITY OF HBTU

The AAQ & Noise quality as monitored at the university campus was found within the prescribed norms. The universities are further taking initiatives to further improve the environmental quality & thus the human health. The university has also planned to further increase its green-cover as a measure to enhance the ambient air quality & moreover to give an aesthetic look to the university campus.

The results of Ambient Air Quality (AAQ) as monitored at east & west campus is annexed.

The air quality data reveals that the AAQ at HBTU is well below the stipulated norms. The attribution for the same can be given to the existing lush green area & moreover significant traffic restriction practices which as such a integral part of the university.

WATER MANAGEMENT

At HBTU, Kanpur, a field survey was conducted by the audit team to find natural water bodies as well as fresh water consumption intake & its usage for varied purposes. The same are detailed as under:

Natural Water Bodies

1) Natural pond: In east campus, there is a natural pond near leather technology building which is currently under renovation by Nagar Nigam Authority to improve its aesthetic look.

2) Open wells: At HBTU, Kanpur, there are four Nos. of open wells out of which 2 Nos. of wells are situated at East Campus and 2 Nos. of wells are situated at West Campus. Presently the wells are not in use & are used as rain water harvesting system

3) Natural Low lying areas: There are several low lying areas at west campus where rainfall runoff is accumulated and is used for irrigation as well as natural course of percolation for rain water harvesting.

4) Water Intake: For domestic and other uses approx 695 KL water is extracted through bore wells and collected in 3 numbers of overhead tanks of 300 KL capacity each. Out of these 3 tanks, one is situated at East Campus and 2 numbers of tanks are situated at West campus. The water is abstracted through 3 Nos. of pumps of 25HP capacity each, one nos of pump is kept as standby for emergency needs. The total consumption of water for domestic and other uses is around 695KL for both the campus on full capacity utilization. The collected water is consumed by population of around 7000 people of whole campus through distribution lines.

Details of Overhead Tanks

S.No	Name of the tank	Capacity	Location
1	OHT-01	300 KL	East Campus
2	OHT-02	300KL	West Campus
3	OHT-03	300KL	West Campus

Out of above 03 OHT`s tanks one nos. is kept for emergency requirements.

The total population of the HBTU Campus is as under

Details of water requirement and waste water generation

S. No.	Purpose	Consumption rate (Ltr./D)	Usage persons/D	Total requirement (KL/D)	Waste water (Generation @ 80% D)
1	Institutional East Campus	35	3000 (Students & 350 staff)	117.25	93.8
2	Hostel East campus (8 Nos.)	125	1034	129.25	103.4

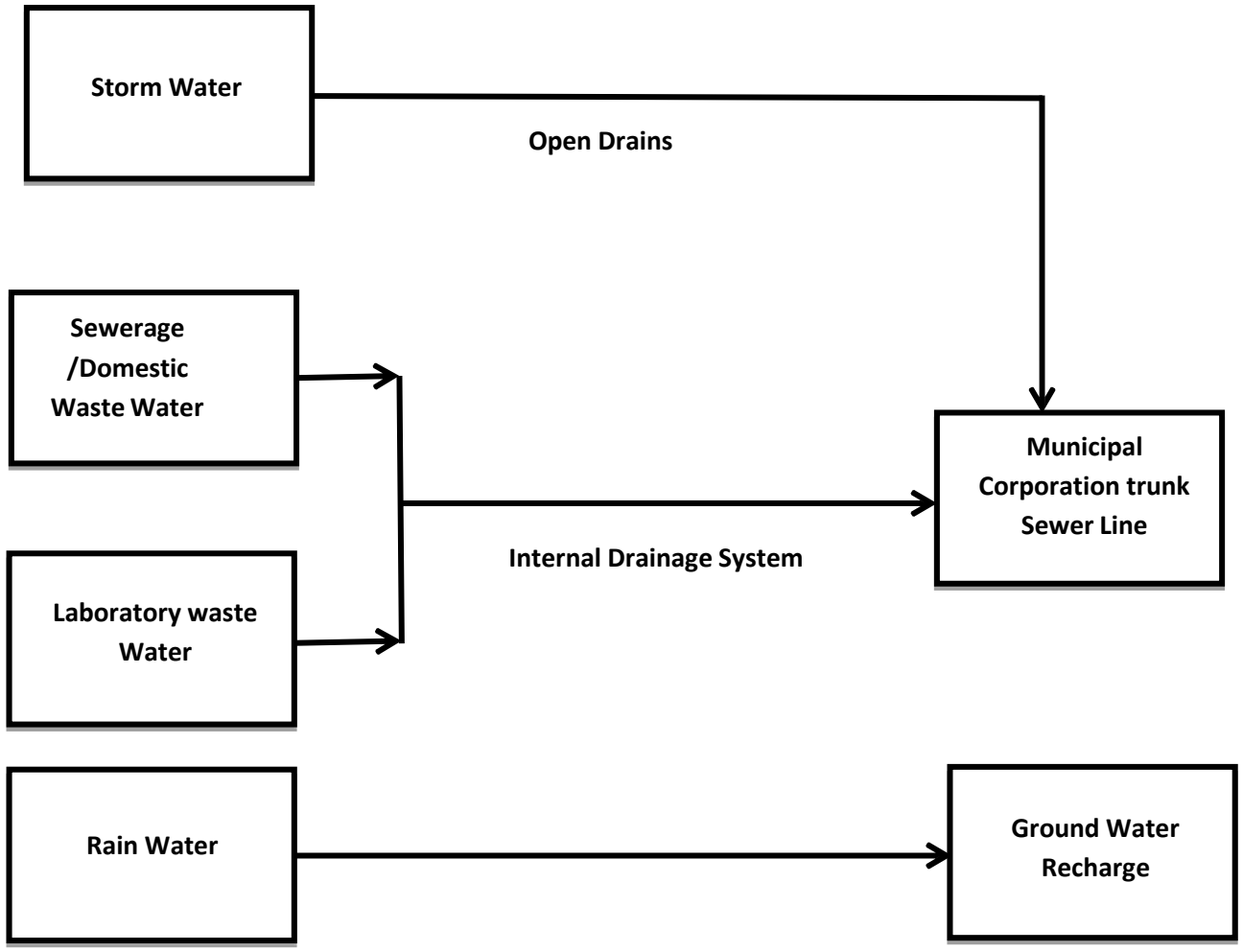
3	Hostel West campus (7Nos.)	125	1232	154	123.2
4	Residential Staff flats (East campus)	150	365	54.75	43.8
5	Residential Staff flats (East campus)	150	1150	172.5	138
6	Labs & R & D activities	50	100	5	4
7	Green-Belt development	Say 50 KL/D	-	50	Totally consumed
8	Canteens	20	600	12	9.6
9	Security guards	35	12	0.42	0.33
	Total		**7843**	**695.17 Say 695**	**516.13 Say 516**

The exact water accounting and balancing shall be done after installation of electro-magnetic flow-meter at raw water intake point. However, on reviewing the Environmental Management system & meetings with the concerned it was revealed that the same will be implemented in a short span of time to quantify the uses and disposal from various streams for wise usage of the natural resource water.

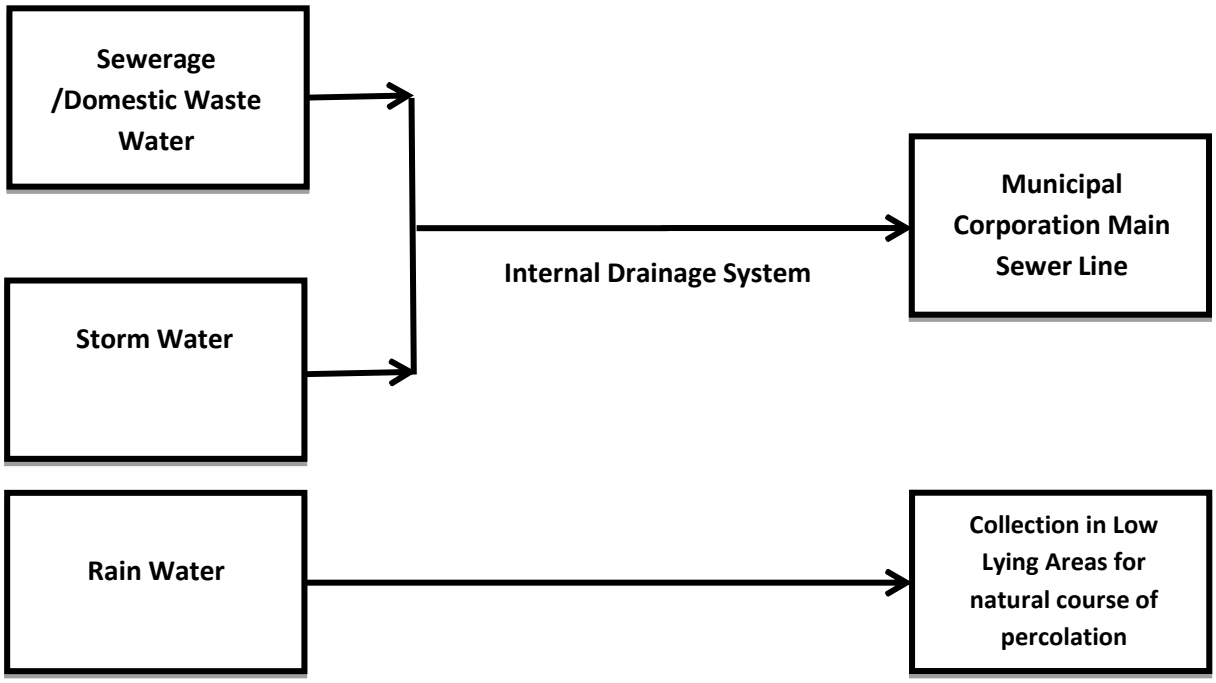
Waste water Disposal System

Domestic waste water and sewerage from east campus and west campus is finally discharged through internal drainage system which is ultimately discharged in municipal trunk sewer line. The water drainage flow chart is depicted as below :

East Campus



West Campus


Sewerage /Domestic Waste Water
Storm Water
Rain Water
Internal Drainage System
Municipal Corporation Main Sewer Line
Collection in Low Lying Areas for natural course of percolation

RAW WATER CHARACTERISTICS (WEST CAMPUS)

S.No.	Parameter	Unit	Result	Specification/Limit (As per IS:10500:2012)	
				Desirable	Permissible
1	Color	Hazen	<5.0	5.0	15
2	pH	-	7.21	6.5-8.5	No Relaxation
3	Turbidity	NTU	<1	1.0	5.0
4	TDS	Mg/lt	246	500	2000
5	Chloride	Mg/lt	38.42	250	1000
6	Fluoride	Mg/lt	0.26	1.0	1.5
7	Total Alkalinity	Mg/lt	128	200	600
8	Total Hardness	Mg/lt	168	200	600
9	Sulphate	Mg/lt	26.34	200	400
10	Iron	Mg/lt	<0.05	0.3	No Relaxation
11	Arsenic	Mg/lt	<0.01	0.01	0.05

SOLID WASTE MANAGEMENT

During site visit and interviews with officials of HBTU, we have tried to identify types of solid waste generated from different departments and activities. The solid waste generated at HBTU is tabulated here under with approximate quantities and their disposal methods. It was observed that biodegradable solid waste from kitchens, solid waste from maintenance and construction activities, lab waste, e-waste, battery waste are the main categories of solid waste generated at HBTU.

SOLID WASTE

S.No	Type of waste	Source of generation	Quantity per year (approx.)	Disposal method
1	Kitchen Waste	Canteen/Mess/ Residences	Not measured	Animal Feed
2.	Cartons	All Around	100 Kg	Scrap Vendors
3	Paper Waste	Residence /Offices	2000 Kg	Scrap Vendors
4.	Garden Waste	Gardens	1200 Kg	For manure
5.	Broken Glass Wares	Laboratories	250 Kg	Scrap Vendors
6.	House Hold Waste	From Residences/Hostels	1286 Kg/D	Dump yard
7.	Scrap Equipment	Departments	300 Kg	Scrap Vendors

HAZARDOUS WASTE/MEDICAL WASTE

S.No	Type of waste	Source of generation	Quantity per year (approx.)	Disposal method
1	E-Waste	All Around	Stored	Scrap Vendors
2	Batteries/ Electrical	All Around	Stored	Scrap Vendors
3	Plastic Bags/ Packing	All Around	100 Kg	Scrap Vendors
4	Mask/Tablet Strips	Medical Centre/ all Around	20 Kg	Dustbins
5	Sanitary Used Napkins	Girls Hostels/ Residences	50 Kg	Dustbins
6	Lube Oil / Filters	Generator Sets	50 Ltr	Scrap Vendors

Apart from Commercial valued solid waste which is disposed through scrap policy of the university, all domestic other solid waste is collected from different generation sources by housekeeping staff in manual rickshaw trolleys, handcarts and dumped into nearby municipal demarked dumping yards as designated by Nagar Nigam authority for final disposal.

ENERGY MANAGEMENT

The current power supply system was reviewed, energy bills for one year of UPSEB and generator backup system to meet out the energy requirements of university the details are as under:

1) UPSEB – Sub Station – 33/11 KVA – East Campus

2) Generators – 15 KVA & 75 KVA Capacity each – East Campus
250 KVA & 10 KVA Capacity each – West Campus

Total Running Hours of Generators during Power Break and shut downs

East Campus = 15-20 Hours per month

West Campus = 30 -40 Hours

Acoustic enclosure in one Genset of 250 KVA only

3) Transformers – 889 KVA & 630 KVA(05)–Total 6 Numbers–East Campus
630 KVA (05) – West Campus

Total Energy Consumption of HBTU East and West Campus Based on Review of Bills of last One Year 2021-2022

East Campus

Total units Consumed in 12 Months (2021-2022)= 12,75,979 (Units)

Average Units Consumption Per Month = 1,06,331 (Units)

Amount Incurred Per Year = Rs. 1,60,85,252/-

Average Amount Per Month = Rs. 13,40,437/-

West Campus

Total units Consumed in 12 Months (2021-2022) = 3,72,905 (Units)

Average Units Required Per Month = 31,075 (Units)
Amount Incurred Per Year = Rs. 5780250
Average of Amount Per Month = Rs. 4,81,687

Total Units Consumed in Last 12 Months as per 2021-2022 for East and West Campus =1648884 (Units) Per Year

Amount Paid for Energy Requirements in 2021-2022 is around
= Rs. 2,18,65,502/- (East and West Campus)

The Figures Above are Showing That Around 3.5% of the Total annual Budget is spent for University Energy Needs. The collected data reveals that university is totally dependent on UPSEB supply and generator backup for energy needs.

'

Solar Energy uses – Negligible

FUEL CONSUMPTION/CARBON FOOTPRINT POSSIBILITIES AT HBTU CAMPUS

1. Diesel in Generators 700 Ltr. Per Month
2. Av. Petrol consumption in Official Vehicles = 489 Ltr. Per Month
3. Av. Diesel consumption in Official Vehicles = 264 Ltr. Per Month
4. LPG in Mess and Canteen =30 commercial cylinders of 19 Kg per month
5. LPG uses by Resident population in staff flats =Approx.303 Domestic cylinders of 14 Kg. per month
6. Visitors Vehicles 100 per Day x1 Ltr. = 100 Ltr/Day .
7. Staff Cars 100x1Ltr=100 Ltr Per Day
8. Staff Bikes =250 x0.5 Ltr Per day =125 Ltr Per Day
9. Material Movement Vehicles 5 per day x1 Ltr =5 Ltr.Per Day
10. Students Bikes 350 per Day = 350x0.5 Ltr Per Day =175 Ltr Per Day
11. Students Cars x 30x1Litre Per Day = 30 Ltr Per Day

Above Data is based on to and fro Distances covered by vehicles of around 14 Km. Per Day from university east campus to west campus. This makes the possibility of Carbon Foot Print at different Locations. A detailed study of Carbon foot print is necessary to explore the reality.

GREEN AND ENVIRONMENTAL PRACTICES AT HBTU

1. Green Campus

During our field survey and document verification it was found that entire green area is covered by nos. of tree species, plants, flower plants, vegetables plants, pot plants and hedges road side plantation including the deciduous forests. The university is practicing massive plantation work on regular intervals. The team of outsourced gardeners are taking care and maintaining the green belt of the university. Around 60 lakhs per annum is being spent on house-keeping and maintenance of gardens which approximately 1% of the total annual budget of the university.

2. Environmental Awareness

The audit team investigated the HBTU staff/students to check the environmental awareness level for further improvement. It was found that level of consciousness regarding environmental issues was satisfactory. There is an environmental management plan which was documented in 2019 and is in practice at present. To implement guidelines of environmental legislation in the university campus. University is having its own environmental laboratory for testing of various environmental parameters. The university is in stage of preparing an official environmental policy to be implemented in near future for the strict compliance of environmental regulations.

3. Waste Management

Waste water management

The observation made therein reveals that there are some shortcomings regarding waste water management for which the University management has planned to rectify in near future by the way of installing a Sewage Treatment Plant (STP).

Rain water harvesting

During interviews of maintenance department officials we were informed about practice of ground water recharging through rain water harvesting systems installed in different blocks of university. Some new buildings are under construction and in every new block provision of rain water harvesting is planned. Here under is a list of places, where rain water harvesting system have already been implemented and are working successfully. The rain water harvesting system were installed during from the year 2020-2022

1. Mechanical Engineering Building.
2. Lecture Theatres
3. New Auditorium
4. Electronics Engineering Building
5. Chemical Engineering Building
6. Kavery Girls Hostel
7. Saraswati Girls Hostel
8. Some other new blocks.

Existing ponds and low line areas for conservation of rain water

There are some low lying areas situated at the west campus and 4 nos. of abandoned wells are presently used for conservation of rain water. There is also a natural pond located in east campus which is under renovation for beautification by Nagar Nigam authority.

Air Quality

University is committed to maintain good emission inside both of the campuses and in this regard the green belt and regular plantation are main area of concern. The plantation of new saplings at different open areas of the university is a regular feature.

Solid Waste Management

Review of documents and physical observations reveals that commercial valued solid waste (scrap) is disposed to registered vendors through tendering process of universities scrap policy. Other solid wastages including some quantity of hazardous and other waste shall be disposed as per the regulatory guideline. Currently domestic solid waste including paper, cottons, kitchen waste and garden waste is disposed by traditional manual methods. The waste is collected by housekeeping staff in rickshaw trolley and handcarts and dumped into waste collection yards as identified by municipal authorities. In some areas waste is also segregated, the university has installed waste segregation dustbins all around the academic building and offices. So that wet and dry waste can be segregated and collected separately for its ultimate disposal. In proposed environmental policy of the university some initiative for much better solid waste management are under process.

The university has planned and initiated for installation of a bio-composting plant at west campus for which the space and shade shall be provided by the university and all operational part will be taken care by Nagar Nigam Authority. An agreement regarding this initiative is under process.

4. Energy Management

We have found that at present university is totally dependent on State Power Supply Corporation and generator backup to fulfill the energy needs during power failure. There are some areas of concern where university is taking initiatives to plan utilization of renewable energy sources to reduce heavy expenditure of energy.

5. Carbon Foot Print

The uses of fossil fuels for cooking and vehicles always make the possibility of CO_2 emissions. The massive use of air conditioners is an area of concern for energy conservation and moreover reduces the possibilities of green emissions as well as the carbon foot print reduction.

6. House Keeping

Satisfactory level of housekeeping and cleanliness is found in offices, laboratories, hostels, roads, residential area, canteen and hostel mess. The regular maintenance of drainage system, cleaning of water collection tank, corridors, drinking water, coolers is practiced for maintaining cleanliness and hygienic condition all around university campus.

7. Paper Free Governance And E-Learning Facilities

University is practicing paper free governance in offices, in inter departmental communications and the whole campus is provided with free wifi facilities to motivate students and staffs for paper free communication. Where modern e-learning facilities are available in classrooms, lecture theatres, auditorium, library to impact for minimum uses of paper inside the university. In this regard no. of official circulars is being disseminated among student and other staff.

8. Other Facilities

The university has provided ATM facility, postal facility, Modern cafeteria, medical facility, sports facility, auditorium for cultural programs, ambulance etc. for students and staff.

9. Awareness About Safety Features

University has installed appropriate nos. of fire extinguisher of all types at prominent locations to meet out any eventuality. There is an EMP plan where some imitative have been taken for laboratory safety.

10. Pest Control

There is a schedule for regular pest control in identified areas. At least twice a year pest control is done by local parties through tendering process.

11. Infectious Disease Awareness

We have found that various awareness slogans & posters are displayed at prominent locations of the university campus along with notice boards inside the university. A COVID-19 Help Desk is existing in main building reception area. Students are also counseled about health issues regularly through various awareness programs.

RECOMMENDATIONS

1. The university should formulate its own environmental policy.
2. The university may establish a purchase policy for environmental friendly material.
3. The University may conduct more seminar and ground discussions on environmental awareness.
4. The students/staff can be permitted to solve local environmental issues.
5. Renovation of cooking system in the canteen/hostel mess to save gas for reduction for use of fossils fuels.
6. The slogans, posters, banners may be displayed all over the campus for further improvement in green practices.
7. All trees in the campus should be named and quantified.
8. The university can also frame internal eco-friendly green committee or club for making campus green.
9. Encouraging students not just through words, but also through action for making the campus green.
10. Conducting inter-university and internal competitions among departments for making students more interested for green practices.
11. University may establish a system of car pooling among the staff to reduce the no. of four wheelers coming to the university.
12. Discourage the students using two wheelers for irrelevant use within the campus.
13. The carbon generation awareness programs on carbon emission due to vehicles, hostel mess & canteen facilities should be propagated at individual as well as social level. This practice will help to further improve the air and noise pollution in the campus.
14. The university may enhance the budget for plantation and maintenance of green belt.

15. Display boards for all plants identified can be installed.
16. Lab waste water quantity should be treated prior discharge in municipal drainage system.
17. A plan may be formulated for chemical consumption and its purchase.
18. The university may take initiative for sewage treatment plant facility for primary treatment of wastewater.
19. Composting of generated bio degradable waste from hostel mess & canteens should be practiced for organic manure generation & thereby reduction in procured chemical based manure.
20. The university may declare the whole campus plastic and tobacco free.
21. The university may revise its current environmental management plan for better waste segregation and adequate disposal of hazardous, e-waste with authorized vendors.
22. The university should immediately plan for use of renewable energy sources and replacement of power equipment of heavy loads with power saving equipments.
23. Department wise electrical load consumption is to be done for wise usage of procured electric power.
24. Awareness for energy and water conservation among students and staff should be taken on priority.
25. Awareness among students and staff about green environment shall be done use tools like display boards/camps.
26. The university to further increase their green cover may adopt the prevailing “Miyawaki Technique” of plantation.

MAIN BUILDINGS

	
Main Gate	Main Building
	
Corridor	Mechanical Engg. Dept.

	
Auditorium	Auditorium
	
Medical Centre	ATM
	
Library	Cafeteria

	
Class Room	Class Room

	
Guest House	Community Hall

Gen-X Incubation Centre

HOSTELS

GREEN AREAS AND LAWNS






SPORTS FACILITIES

PLANTATION DRIVE PHOTOGRAPHS

GREEN PRACTICES

100 Year Celebration

CLEAN ROADS

AWARENESS SLOGANS & COVID HELP DESK

WASTE COLLECTION DUSTBINS

ANNEXURE: TEST REPORTS

ENVIRO-TECH SERVICES

An Analytical Laboratory

(A GOVERNMENT APPROVED LAB)

(An ISO 9001:2015, 14001:2015 and 45001-2018 Certified Company)

Plot No. 1/32, South Side G.T. Road Industrial Area, Ghaziabad (U.P.) - 201001

email : etslab2012@gmail.com | Website : www.etslab.in | Ph.: 9911516076, 9811736063

ETS-LAB

ISO 9001/14001/45001

TEST REPORT

TEST REPORT NO.: ETS/1235/07/2022 URLNO.TC8771220000001235F DATE OF REPORT: 25.07.2022

WATER SAMPLE ANALYSIS REPORT

Name And Address of Customer : M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002

TC-8771

Date of Sample Received : 20.07.2022
Analysis Start Date : 21.07.2022
Analysis End Date : 25.07.2022
Sample ID No : 1235
Sampling Done By : ETS STAFF
Sampling Description : GROUND WATER
Sampling Location : BOREWELL WATER-I (EAST CAMPUS)
Sampling Method : IS 3025 (Part-1)
Sample Quantity : 2.0+0.5 Ltr
Packing Condition : SEALED
Packed In : P.V.C. AND GLASS BOTTLE

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500: 2012)		Test Method
				Desirable	Permissible	
PHYSICAL & CHEMICAL PARAMETERS;						
1	Colour	Hazen	<5.0	5	15	APHA 2120-B
2	Odour	...	Agreeable	Agreeable	Agreeable	APHA 2150-B
3	Taste	...	Agreeable	Agreeable	Agreeable	APHA 2160-C
4	Turbidity	NTU	<1	1	5	APHA 2130-B
5	pH	...	7.84	6.5 - 8.5	No Relaxation	APHA 4500-H+
6	Total Dissolved Solids,(TDS)	mg/L	272.0	500	2000	APHA 2540-C
7	Total Alkalinity,($CaCO3$)	mg/L	143.0	200	600	APHA 2320-B
8	Total Hardness,($CaCO_3$)	mg/L	187.0	200	600	APHA 2340-C
9	Calcium,(Ca)	mg/L	38.0	75	200	APHA 3500:(Ca)-B
10	Magnesium,(Mg)	mg/L	22.4	30	100	APHA 3500:(Mg)-B
11	Chloride,(Cl)	mg/L	44.30	250	1000	APHA 4500:(Cl-)-B
12	Sulphate,(SO_4)	mg/L	28.40	200	400	APHA 4500:(SO_4)-E
13	Nitrate,(NO_3)	mg/L	8.50	45	No Relaxation	APHA 4500:(NO_3-)-B
14	Fluoride,(F)	mg/L	0.18	1	1.5	APHA 4500:(F-)-D
15	Anionic Detergent,(MBAS)	mg/L	<1.0	0.2	1	APHA 5540-C
16	Mineral Oil	mg/L	<1.0	1.0	No Relaxation	IS 3025 (Part-39)
17	Free Chlorine (Residual)	mg/L	<0.1	0.2	1	APHA 4500:(Cl)-B

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services

Pushkar Mittal
AUTHORIZED SIGNATORY
Lab In-charge

Format No ETS/LAB/TR-09, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

Note:-

1. Test reports without ETS LAB HOLOGRAM are not issued by our laboratory.
2. This test report shall not be used in any advertising media or as evidence in the court of Law without prior written permission of the laboratory.
3. The sample shall be destroyed after 15 days & Biological / Perishable sample shall be destroyed immediately after issue of test report.
4. The results indicated only refer to the tested samples and listed applicable parameters.
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TEST REPORT

TEST REPORT NO.: ETS/1235/07/2022 URLNO.TC877122000001235F DATE OF REPORT: 25.07.2022

WATER SAMPLE ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500: 2012)		Test Method
				Desirable	Permissible	
HEAVY METALS;-						
18	Arsenic,(As)	mg/L	<0.01	0.01	No Relaxation	APHA 3120B
19	Lead,(Pb)	mg/L	<0.01	0.01	No Relaxation	APHA-3120B
20	Zinc as Zn	mg/L	0.12	5.0	15	APHA-3120B
21	Boron,(B)	mg/L	0.18	0.5	2.4	APHA 4500:(B)
22	Mercury,(Hg)	ug/L	<0.1	0.001	No Relaxation	US EPA Method 200.7 1994
23	Cadmium,(Cd)	mg/L	<0.01	0.003	No Relaxation	APHA 3120B
24	Copper,(Cu)	mg/L	<0.01	0.05	1.5	APHA 3120B
25	Iron,(Fe)	mg/L	<0.05	1.0	No Relaxation	APHA-3120B
26	Manganese,(Mn)	mg/L	<0.01	0.1	0.3	APHA-3120B
27	Phenolic Compound,(C_6H_5OH)	mg/L	<0.01	0.001	0.002	APHA 5530-C

CHECKED BY
SHRADDHA GUPTA

For Enviro Tech Services
Pushkar Mittal
AUTHORIZED SIGNATORY
Lab In Charge

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ISO 9001/14001/45001

TEST REPORT

TEST REPORT NO. : ETS/1235/07/2022 DATE OF REPORT: 25.07.2022

WATER SAMPLE ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500: 2012)	Test Method
MICROBIOLOGICAL PARAMETER;					
28	Escherichia coli	MPN/100mL	Absent	Shall Not Be Detectable	IS1622;2019
29	Total Coliform	MPN/100mL	Absent	Shall Not Be Detectable	IS1622;2019

End of the report

CHECKED BY IQBAL

For Enviro-Tech Services

Pushkar Mittal

Lab In-charge

AUTHORIZED SIGNATORY

Formal No ETS/LAB/TR-09, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

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TEST REPORT

TEST REPORT NO.: ETS/1236/07/2022 URLNO.TC877122000001236F DATE OF REPORT: 25.07.2022

WATER SAMPLE ANALYSIS REPORT

Name And Address of Customer : M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002

TC-8771

Date of Sample Received	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Sample ID No	:	1236
Sampling Done By	:	ETS STAFF
Sampling Description	:	GROUND WATER
Sampling Location	:	BOREWELL WATER-II (WEST CAMPUS)
Sampling Method	:	IS 3025 (Part-1)
Sample Quantity	:	2.0+0.5 Ltr
Packing Condition	:	SEALED
Packed In	:	P.V.C. AND GLASS BOTTLE

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500: 2012)		Test Method
				Desirable	Permissible	
PHYSICAL & CHEMICAL PARAMETERS;						
1	Colour	Hazen	<5.0	5	15	APHA 2120-B
2	Odour	...	Agreeable	Agreeable	Agreeable	APHA 2150-B
3	Taste	...	Agreeable	Agreeable	Agreeable	APHA 2160-C
4	Turbidity	NTU	<1	1	5	APHA 2130-B
5	pH	...	7.21	6.5 - 8.5	No Relaxation	APHA 4500-H+
6	Total Dissolved Solids,(TDS)	mg/L	246.0	500	2000	APHA 2540-C
7	Total Alkalinity,($CaCO3$)	mg/L	128.0	200	600	APHA 2320-B
8	Total Hardness,($CaCO_3$)	mg/L	168.0	200	600	APHA 2340-C
9	Calcium,(Ca)	mg/L	30.6	75	200	APHA 3500:(Ca)-B
10	Magnesium,(Mg)	mg/L	22.2	30	100	APHA 3500:(Mg)-B
11	Chloride,(Cl)	mg/L	38.42	250	1000	APHA 4500:(Cl^-)-B
12	Sulphate,(SO_4)	mg/L	26.34	200	400	APHA 4500:(SO_4)-E
13	Nitrate,(NO_3)	mg/L	7.62	45	No Relaxation	APHA 4500:(NO_3^-)-B
14	Fluoride,(F)	mg/L	0.26	1	1.5	APHA 4500:(F^-)-D
15	Anionic Detergent,(MBAS)	mg/L	<1.0	0.2	1	APHA 5540-C
16	Mineral Oil	mg/L	<1.0	1.0	No Relaxation	IS 3025 (Part-39)
17	Free Chlorine (Residual)	mg/L	<0.1	0.2	1	APHA 4500:(Cl)-B

For Enviro-Tech Services

CHECKED BY
SHRADDHA GUPTA

AUTHORIZED SIGNATORY

Pushkar Mittal
Lab In-charge

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TEST REPORT

TEST REPORT NO.: ETS/1236/07/2022 URLNO.TC877122000001236F DATE OF REPORT: 26.07.2022

WATER SAMPLE ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500: 2012)		Test Method
				Desirable	Permissible	
HEAVY METALS;-						
18	Arsenic,(As)	mg/L	<0.01	0.01	No Relaxation	APHA 3120B
19	Lead,(Pb)	mg/L	<0.01	0.01	No Relaxation	APHA-3120B
20	Zinc as Zn	mg/L	0.17	5.0	15	APHA-3120B
21	Boron,(B)	mg/L	0.23	0.5	2.4	APHA 4500:(B)
22	Mercury,(Hg)	ug/L	<0.1	0.001	No Relaxation	US EPA Method 200.7 1994
23	Cadmium,(Cd)	mg/L	<0.01	0.003	No Relaxation	APHA 3120B
24	Copper,(Cu)	mg/L	<0.01	0.05	1.5	APHA 3120B
25	Iron,(Fe)	mg/L	<0.05	1.0	No Relaxation	APHA-3120B
26	Manganese,(Mn)	mg/L	<0.01	0.1	0.3	APHA-3120B
27	Phenolic Compound,(C_6H_5OH)	mg/L	<0.01	0.001	0.002	APHA 5530-C

CHECKED BY
SHRADDHA GUPTA

For Enviro Tech Services

Mittal
Lab In-charge

AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-09, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

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ETS-LAB

ENVIRO-TECH SERVICES

An Analytical Laboratory

(A GOVERNMENT APPROVED LAB)

(An ISO 9001:2015, 14001:2015 and 45001-2018 Certified Company)

ISO 9001/14001/45001

Plot No. 1/32, South Side G.T. Road Industrial Area, Ghaziabad (U.P.) - 201001

email : etslab2012@gmail.com | Website : www.etslab.in | Ph.: 9911516076, 9811736063

TEST REPORT

TEST REPORT NO.: ETS/1236/07/2022 DATE OF REPORT: 25.07.2022

WATER SAMPLE ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per IS:10500: 2012)	Test Method
MICROBIOLOGICAL PARAMETER;					
28	Escherichia coli	MPN/100mL	Absent	Shall Not Be Detectable	IS1622:2019
29	Total Coliform	MPN/100mL	Absent	Shall Not Be Detectable	IS1622:2019

End of the report

CHECKED BY IQBAL

For Enviro-Tech Services

Prashar Mittal
Lab In-charge

AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-09, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

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TEST REPORT

TEST REPORT NO.: ETS/1227/07/2022 URLNO.TC877122000001227F DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

Name And Address of Customer	:	M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002
Date of Monitoring	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Duration Of Monitoring	:	20.07.2022 To 21.07.2022
Time Of Monitoring	:	09.30 AM To 08.35 AM (CO&O_3 for 1.0 Hrs.)
Sample ID No	:	1227
Sampling Done By	:	ETS STAFF
Sampling Location	:	NEAR MAIN GATE (EAST CAMPUS)
Sampling Method	:	ETS/STP/AIR-01
Sampling Machine Placed At Height	:	1.5 METER FROM GROUND LEVEL
Weather Condition	:	CLEAR **Ambient Temperature:** 34.0 ^{u}C
Wind Direction	:	E To W
Equipment Used	:	Respirable Dust Sampler (PM_{10}) + Fine Particulate Sampler ($PM_{2.5}$)

TC-8771

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
1	Particulate Matters,(PM_{10})	$\mu g/m^3$	90.50	For 24 Hrs.=100	IS 5182 (Part-23)
2	Particulate Matters,($PM_{2.5}$)	$\mu g/m^3$	48.10	For 24 Hrs.=60	IS 5182 (Part-24)
3	Sulphur Dioxide, (SO_2)	$\mu g/m^3$	12.65	For 24 Hrs.=80	IS: 5182 (Part-2)
4	Nitrogen Dioxide,(NO_2)	$\mu g/m^3$	25.20	For 24 Hrs.=80	IS: 5182 (Part-6)

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services
Poshker Mittal
Lab In-charge
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1227/07/2022 DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
5	Carbon Monoxide,(CO)	mg/m^3	0.75	For 8 Hrs.=2 / For 1 Hrs.=4	IS 5182 : Part 10

*****End of Test Report*****

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services

Lab In-charge
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1228/07/2022 URLNO.TC877122000001228F DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

TC-8771

Name And Address of Customer : M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002

Date of Monitoring : 20.07.2022

Analysis Start Date : 21.07.2022

Analysis End Date : 25.07.2022

Duration Of Monitoring : 20.07.2022 To 21.07.2022

Time Of Monitoring : 09.25 AM To 08.30 AM ($CO\&O_3$ for 1.0 Hrs.)

Sample ID No : 1228

Sampling Done By : ETS STAFF

Sampling Location : NEAR AUDITORIUM (EAST CAMPUS)

Sampling Method : ETS/STP/AIR-01

Sampling Machine Placed At Height : 1.5 METER FROM GROUND LEVEL

Weather Condition : CLEAR **Ambient Temperature:** 34.0 °C

Wind Direction : E To W

Equipment Used : Respirable Dust Sampler (PM_{10}) + Fine Particulate Sampler ($PM_{2.5}$)

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
1	Particulate Matters,(PM_{10})	$\mu g/m^3$	55.10	For 24 Hrs.=100	IS 5182 (Part-23)
2	Particulate Matters,($PM_{2.5}$)	$\mu g/m^3$	28.90	For 24 Hrs.=60	IS 5182 (Part-24)
3	Sulphur Dioxide, (SO_2)	$\mu g/m^3$	8.80	For 24 Hrs.=80	IS: 5182 (Part-2)
4	Nitrogen Dioxide,(NO_2)	$\mu g/m^3$	20.50	For 24 Hrs.=80	IS: 5182 (Part-6)

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SHRADDHA GUPTA

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TEST REPORT

TEST REPORT NO.: ETS/1228/07/2022 DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
5	Carbon Monoxide,(CO)	mg/m^3	0.60	For 8 Hrs.=2 / For 1 Hrs.=4	IS 5182 : Part 10

*****End of Test Report*****

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services
Lab Incharge
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1229/07/2022 URLNO.TC877122000001229F DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

TC-877 1

Name And Address of Customer	:	M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002
Date of Monitoring	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Duration Of Monitoring	:	20.07.2022 To 21.07.2022
Time Of Monitoring	:	09.00 AM To 08.05 AM ($CO\&O_3$ for 1.0 Hrs.)
Sample ID No	:	1229
Sampling Done By	:	ETS STAFF
Sampling Location	:	NEAR LAKE VIEW HOSTEL (EAST CAMPUS)
Sampling Method	:	ETS/STP/AIR-01
Sampling Machine Placed At Height	:	1.5 METER FROM GROUND LEVEL
Weather Condition	:	CLEAR **Ambient Temperature:** 34.0 ^{0}C
Wind Direction	:	E To W
Equipment Used	:	Respirable Dust Sampler (PM_{10}) + Fine Particulate Sampler ($PM_{2.5}$)

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
1	Particulate Matters,(PM_{10})	$\mu g/m^3$	59.80	For 24 Hrs.=100	IS 5182 (Part-23)
2	Particulate Matters,($PM_{2.5}$)	$\mu g/m^3$	27.20	For 24 Hrs.=60	IS 5182 (Part-24)
3	Sulphur Dioxide, (SO_2)	$\mu g/m^3$	9.50	For 24 Hrs.=80	IS: 5182 (Part-2)
4	Nitrogen Dioxide,(NO_2)	$\mu g/m^3$	21.80	For 24 Hrs.=80	IS: 5182 (Part-6)

For Enviro-Tech Services

CHECKED BY
SHRADDHA GUPTA

Pushkal Mittal
Lab In-charge
AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-01, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

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TEST REPORT

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AMBIENT AIR MONITORING AND ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
5	Carbon Monoxide,(CO)	mg/m^3	0.32	For 8 Hrs.=2 / For 1 Hrs.=4	IS 5182 : Part 10

*****End of Test Report*****

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services

Prashkar Mittal
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1230/07/2022 URLNO.TC877122000001230F DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

TC-8771

Name And Address of Customer	:	M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002
Date of Monitoring	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Duration Of Monitoring	:	20.07.2022 To 21.07.2022
Time Of Monitoring	:	09.30 AM To 08.35 AM (CO&O_3 for 1.0 Hrs.)
Sample ID No	:	1230
Sampling Done By	:	ETS STAFF
Sampling Location	:	NEAR MAIN GATE (WEST CAMPUS)
Sampling Method	:	ETS/STP/AIR-01
Sampling Machine Placed At Height	:	1.5 METER FROM GROUND LEVEL
Weather Condition	:	CLEAR **Ambient Temperature:** 34.0 ^{0}C
Wind Direction	:	E To W
Equipment Used	:	Respirable Dust Sampler (PM_{10}) + Fine Particulate Sampler ($PM_{2.5}$)

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
1	Particulate Matters,(PM_{10})	$\mu g/m^3$	68.20	For 24 Hrs.=100	IS 5182 (Part-23)
2	Particulate Matters,($PM_{2.5}$)	$\mu g/m^3$	30.90	For 24 Hrs.=60	IS 5182 (Part-24)
3	Sulphur Dioxide, (SO_2)	$\mu g/m^3$	8.95	For 24 Hrs.=80	IS: 5182 (Part-2)
4	Nitrogen Dioxide,(NO_2)	$\mu g/m^3$	19.20	For 24 Hrs.=80	IS: 5182 (Part-6)

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services
Rishkar Mittal
Lab In-charge
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1230/07/2022 DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
5	Carbon Monoxide,(CO)	mg/m^3	0.28	For 8 Hrs.=2 / For 1 Hrs.=4	IS 5182 : Part 10

*****End of Test Report*****

CHECKED BY
SHRADDHA GUPTA

AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1231/07/2022 URLNO.TC877122000001231F DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

TC-8771

Name And Address of Customer	:	M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002
Date of Monitoring	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Duration Of Monitoring	:	20.07.2022 To 21.07.2022
Time Of Monitoring	:	09.15 AM To 08.15 AM (CO&O_3 for 1.0 Hrs.)
Sample ID No	:	1231
Sampling Done By	:	ETS STAFF
Sampling Location	:	NEAR HOSTEL AREA (WEST CAMPUS)
Sampling Method	:	ETS/STP/AIR-01
Sampling Machine Placed At Height	:	1.5 METER FROM GROUND LEVEL
Weather Condition	:	CLEAR **Ambient Temperature:** 34.0 ^{0}C
Wind Direction	:	E To W
Equipment Used	:	Respirable Dust Sampler (PM_{10}) + Fine Particulate Sampler ($PM_{2.5}$)

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
1	Particulate Matters,(PM_{10})	$\mu g/m^3$	53.40	For 24 Hrs.=100	IS 5182 (Part-23)
2	Particulate Matters,($PM_{2.5}$)	$\mu g/m^3$	25.70	For 24 Hrs.=60	IS 5182 (Part-24)
3	Sulphur Dioxide, (SO_2)	$\mu g/m^3$	8.10	For 24 Hrs.=80	IS: 5182 (Part-2)
4	Nitrogen Dioxide,(NO_2)	$\mu g/m^3$	18.50	For 24 Hrs.=80	IS: 5182 (Part-6)

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services

Pushkar Mittal
Lab In-charge
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1231/07/2022 DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
5	Carbon Monoxide,(CO)	mg/m^3	0.35	For 8 Hrs.=2 / For 1 Hrs.=4	IS 5182 : Part 10

*****End of Test Report*****

CHECKED BY
SHRADDHA GUPTA

For Enviro Tech Services
Lab In-charge
AUTHORIZED SIGNATORY

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TEST REPORT

TEST REPORT NO.: ETS/1232/07/2022 URLNO.TC877122000001232F DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

TC-8771

Name And Address of Customer	:	M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002
Date of Monitoring	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Duration Of Monitoring	:	20.07.2022 To 21.07.2022
Time Of Monitoring	:	09.30 AM To 08.40 AM (CO&O_3 for 1.0 Hrs.)
Sample ID No	:	1232
Sampling Done By	:	ETS STAFF
Sampling Location	:	NEAR STAFF QUARTER (WEST CAMPUS)
Sampling Method	:	ETS/STP/AIR-01
Sampling Machine Placed At Height	:	1.5 METER FROM GROUND LEVEL
Weather Condition	:	CLEAR **Ambient Temperature:** 34.0 ^{0}C
Wind Direction	:	E To W
Equipment Used	:	Respirable Dust Sampler (PM_{10}) + Fine Particulate Sampler ($PM_{2.5}$)

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
1	Particulate Matters,(PM_{10})	$\mu g/m^3$	59.50	For 24 Hrs.=100	IS 5182 (Part-23)
2	Particulate Matters,($PM_{2.5}$)	$\mu g/m^3$	29.30	For 24 Hrs.=60	IS 5182 (Part-24)
3	Sulphur Dioxide, (SO_2)	$\mu g/m^3$	9.20	For 24 Hrs.=80	IS: 5182 (Part-2)
4	Nitrogen Dioxide,(NO_2)	$\mu g/m^3$	20.10	For 24 Hrs.=80	IS: 5182 (Part-6)

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services

Pradeep Mittal
Lab In-charge
AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-01, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

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ISO 9001/14001/45001

Plot No. 1/32, South Side G.T. Road Industrial Area, Ghaziabad (U.P.) - 201001

email : etslab2012@gmail.com | Website : www.etslab.in | Ph.: 9911516076, 9811736063

TEST REPORT

TEST REPORT NO.: ETS/1232/07/2022 DATE OF REPORT: 25.07.2022

AMBIENT AIR MONITORING AND ANALYSIS REPORT

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per CPCB)	Test Method
5	Carbon Monoxide,(CO)	mg/m^3	0.30	For 8 Hrs.=2 / For 1 Hrs.=4	IS 5182 : Part 10

*****End of Test Report*****

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services
Lab In-charge
AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-01, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

ENVIRO-TECH SERVICES

An Analytical Laboratory

(A GOVERNMENT APPROVED LAB)

(An ISO 9001:2015, 14001:2015 and 45001-2018 Certified Company)

Plot No. 1/32, South Side G.T. Road Industrial Area, Ghaziabad (U.P.) - 201001

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ETS-LAB

ISO 9001/14001/45001

TEST REPORT

TEST REPORT NO.: ETS/1233/07/2022 URLNO.TC877122000001233F DATE OF REPORT: 25.07.2022

WASTE WATER SAMPLE ANALYSIS REPORT

Name And Address of Customer : M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002

TC-8771

Date of Sampling	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Sample ID No	:	1233
Sampling Done By	:	ETS STAFF
Sampling Description	:	WASTE WATER
Sampling Location	:	FINAL OUTLET DRAIN FOR EAST CAMPUS
Sampling Method	:	ETS/STP/WATER-02
Sample Quantity	:	2.0 Ltr.
Packing Condition	:	SEALED
Packed In	:	P.V.C. CANE

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per G.S.R 422(E)	Test Method
1	pH	...	7.60	5.5 - 9.0	APHA 4500-H+
2	Total Suspended Solids,(TSS)	mg/L	47.0	100.0	APHA 2540-D
3	Total Dissolved Solids as TDS	mg/L	1015	-	APHA 2540-C
4	Oil & Grease, (O & G)	mg/L	4.6	10.0	APHA 5520-D
5	Biological Oxygen Demand (BOD_{3d} 27°C)	mg/L	20.5	30.0	IS: 3025 (Part-44)
6	Chemical Oxygen Demand,(COD)	mg/L	110.0	250.0	APHA 5220-B

END OF THE REPORT

CHECKED BY
SHRADDHA GUPTA

ENVIRO-TECH SERVICE ETS-LAB

For Enviro-Tech Services

Pushkar Mittal

AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-10, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

Note:-

1. Test reports without ETS LAB HOLOGRAM are not issued by our laboratory.
2. This test report shall not be used in any advertising media or as evidence in the court of Law without prior written permission of the laboratory.
3. The sample shall be destroyed after 15 days & Biological / Perishable sample shall be destroyed immediately after issue of test report.
4. The results indicated only refer to the tested samples and listed applicable parameters.
5. No complaint will be entertained if received after 7 days of issue of test report.
6. Our liability is limited to invoice value only.

ENVIRO-TECH SERVICES

An Analytical Laboratory

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ETS-LAB

ISO 9001/14001/45001

TEST REPORT NO.: ETS/1234/07/2022 URLNO.TC877122000001234F DATE OF REPORT: 25.07.2022

WASTE WATER SAMPLE ANALYSIS REPORT

Name And Address of Customer : M/s, HARCOURT BUTLER TECHNICAL UNIVERSITY (HBTU) NAWABGANJ, DISTT. - KANPUR (U.P.)-208002

TC-8771

Date of Sampling	:	20.07.2022
Analysis Start Date	:	21.07.2022
Analysis End Date	:	25.07.2022
Sample ID No	:	1234
Sampling Done By	:	ETS STAFF
Sampling Description	:	WASTE WATER
Sampling Location	:	FINAL OUTLET DRAIN FOR WEST CAMPUS
Sampling Method	:	ETS/STP/WATER-02
Sample Quantity	:	2.0 Ltr.
Packing Condition	:	SEALED
Packed In	:	P.V.C. CANE

S. No.	Test Parameter	Unit	Result	Specification/Limit (As per G.S.R 422(E)	Test Method
1	pH	...	7.80	5.5 - 9.0	APHA 4500-H+
2	Total Suspended Solids,(TSS)	mg/L	59.0	100.0	APHA 2540-D
3	Total Dissolved Solids as TDS	mg/L	1120.0	-	APHA 2540-C
4	Oil & Grease, (O & G)	mg/L	6.8	10.0	APHA 5520-D
5	Biological Oxygen Demand (BOD_{3d} 27°C)	mg/L	29.4	30.0	IS: 3025 (Part-44)
6	Chemical Oxygen Demand,(COD)	mg/L	167.0	250.0	APHA 5220-B

END OF THE REPORT

CHECKED BY
SHRADDHA GUPTA

For Enviro-Tech Services

Pankaj Mittal

AUTHORIZED SIGNATORY

Format No ETS/LAB/TR-10, Issue No. 05, Date 01.04.2019, Amd. No. 04 Date 01.04.2019

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